AFSUMB 2021

The 14th Congress of the Asian Federation of Societies for Ultrasound in Medicine and Biology (AFSUMB 2021) in conjunction with the 21st Annual Meeting of Chinese Society of Ultrasound in Medicine (CSUM 2021)

第十四届亚洲超声医学与生物学联合会大会
暨中华医学会第二十一次全国超声医学学术会议

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论文汇编
Abstract Collection

2021年9月16-19日
Sept.16 - 19. 2021
珠海国际会展中心
Zhuhai International Conference and Exhibition Center

Hosted by / 主办单位:
Chinese Medical Association (CMA) 中华医学会
Chinese Society of Ultrasound in Medicine (CSUM) 中华医学会超声医学分会

Co-hosted by / 联合主办单位:
Asian Federation of Societies for Ultrasound in Medicine and Biology (AFSUMB)
亚洲超声医学与生物学联合会

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Assessment of hepatic steatosis in metabolic dysfunction-associated fatty liver disease by using attenuation imaging

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Aims To explore the diagnostic performances of ultrasound attenuation imaging (ATI) in grading the degree of hepatic steatosis in metabolic dysfunction-associated fatty liver disease (MAFLD).
Methods A total of 212 patients were enrolled into the study and underwent gray-scale ultrasound liver examination and ATI examination using Aplio i900, Canon Medical Systems with a 1~8MHz convex probe at the same time. Fatty liver was divided into normal liver, mild fatty liver, moderate fatty liver and severe fatty liver according to gray-scale ultrasonography; During ATI examination, the maximum section of S5/S6 segment of the right lobe of liver was selected and the probe was placed between the 6~8 intercostal window of the right liver lobe with the transducer perpendicular to the skin. While got the standard grayscale image, told the patient to hold their breath for 1~3s in a calm breathing state and actived the ATI-mode. In the ATI display mode, the B-mode image was shown on the left side and the ATI-mode image was shown on the right side. The ROI measurement should avoid the orange area at the top of the sampling range and select the uniform blue area in the middle and lower part of the sampling range. The excellent measurement value of $R^2 > 0.90$ was selected for 10 times and the average value was taken. The ATI values between different degrees of hepatic steatosis were analyzed and the diagnostic performance of ATI were evaluated. Relationship between ATI and clinical characteristics were assessed by Pearson¢s correlation analysis.
Results The ATI values for normal liver, mild, moderate and severe fatty liver was 0.56±0.05dB/cm/MHz, 0.68±0.09 dB/cm/MHz, 0.82±0.09dB/cm/MHz, 0.94±0.09dB /cm/MHz, respectively. There were significant differences in ATI values between different hepatic steatosis divisions. There was significant correlation between ATI value and the degree of hepatic steatosis, moderate correlation between ATI value and BMI(body mass index), weak correlation between ATI value and HDL-C(high density lipoprotein cholesterol), no correlation between ATI value and age, TC(total cholesterol), TG(triglyceride), LDL-C(low density lipoprotein cholesterol). The area under the receiver operating characteristics curve(AUC) of ATI for mild fatty liver and above、moderate fatty liver and above、severe fatty liver and above were 0.957, 0.918, 0.877; the sensitivity is 84.5%, 89.9%, 78.0%, the specificity is 100%, 76.2%, 71.7%, and the cut-off values are 0.695dB/cm/MHz, 0.745dB/cm/MHz, 0.875 dB/cm/MHz, respectively.
Conclusion ATI is a reliable and convenient method for quantitative investigating the degree of hepatic steatosis in MAFLD, it can be used for clinical screening of fatty liver and monitoring changes in the course of disease.

The methodology of attenuation imaging in liver examination

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Objective To evaluate the methodology of attenuation imaging (ATI) in liver examination.
Methods 200 subjects were included and underwent the conventional ultrasound examination and ATI examination(group A and group B had fifty healthy subjects and fifty fatty liver

subjects)using Aplio i900, Canon Medical Systems with a 1~8MHz convex probe at the same time, group A were performed by Senior physicians who have more than five years of experience in abdominal US imaging, group B were performed by Senior and junior physicians(who have less than three years of experience in abdominal US imaging), respectively. The left and right lobes of liver were measured for 10 times in group A, calculated the average values of 2~9 times and 10 times and the success rates of measuring position, the number of measurements, the inter- and intra-observer consistency were analyzed.

Results The success rates of the left and right lobes of liver in healthy subjects were 64%(32/50)、100%(50/50), respectively, ICC of the intra-observer reproducibility in the right lobe of liver was 0.948; the success rates of the left and right lobes of liver in fatty liver subjects were 80%(40/50)、100%(50/50), respectively, ICC of the intra-observer reproducibility in the right lobe of liver was 0.996.there was no statistically significant difference between healthy and fatty liver subjects of the success of the left lobe of liver. 0.763~0.990 for 2~9 repetitions of the right lobe of liver for healthy subjects, the ICC of 5 repeated measurements was 0.904(＞0.900), there was no statistically significant difference compared with 10 repeated measurements(t=0.751, P=0.456), the ICC of 7 repeated measurements was 0.957(＞0.950), there was no statistically significant difference compared with 10 repeated measurements(*t* = -1.647, *P*= 0.106). 0.975~0.999 for 2~9 repetitions of the right lobe of liver for fatty liver subjects, the ICC of 2 repeated measurements was 0.975(＞0.950), there was no statistically significant difference compared with 10 repeated measurements(t=0.655, P=0.515), the ICC of 5 repeated measurements was 0.994(＞0.990), there was no statistically significant difference compared with 10 repeated measurements(*t*=0.796, *P*=0.430). In group B, there was no significant difference between Senior and junior physicians for healthy and fatty liver subjects (*t*=0.546，*P*=0.588;*t*=0.031，*P*=0.975).

Conclusions The best measuring position is the right lobe of liver. For the detection of ATI in patients with fatty liver, 2 times should be the minimum number of measurements and 5 times should be the optimal number of measurements, for the detection of ATI in healthy subjects, 5 times should be the minimum number of measurements and 7 times should be the optimal number of measurements. ATI technology has good repeatability within observes and is suitable for clinical promotion.

Contrast-enhanced US with sonazoid for the diagnosis of focal liver lesions ： a multicentre prospective study

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Objective To fit a model by sonazoid contrast-enhanced ultrasound (CEUS) combined with conventional ultrasound and explore the value of the model in the diagnosis of benign and malignant Focal liver lesions with different parenchyma.

Methods In this prospective study conducted from August 2020 to February 2021, a total of 103 hepatic nodules were screened. 72 cases were randomly selected as the test set and 31 cases as the validation set. The variables, including echo, capsule, portal phase enhancement intensity, washout time, washout degree, late phase enhancement intensity and postvasular phase enhancement intensity were assessed. Univariate and multivariate analyses were performed to investigate the association between ultrasound features and malignancy Multivariate logistic regression analysis was performed to determine independent risk factors.

Results Of the 103 hepatic nodules, 34 were benign,69 were malignant. The test set sensitivity, specificity, and accuracy were 97.1% ,82.4%, 92.2%, respectively. The validation set sensitivity, specificity, and accuracy were 90.9% ,55.5%, 80.6%, respectively. The CT/MRI sensitivity, specificity, and accuracy were 91.8% ,80%, 90.2%, respectively.

Conclusions The logistic regression model involving CEUS and conventional US was found to be effective in the diagnosis of with hepatic nodules.

Ultrasound guided percutaneous microwave ablation of inoperable breast cancer with the skin and/or nipple areola complex involvement

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Purpose To analyze the feasibility and efficacy of ultrasound-guided percutaneous microwave ablation for breast cancer patients who have invaded the skin and/or nipple areola complex and who are not suitable for surgery or refuse surgery.
Materials and Methods We performed a retrospective analysis of patients who were admitted to our department from December 2017 to June 2021. These 12 breast cancer patients with skin and / or nipple areola complex involvement were inoperable or refused surgery and then were treated with ultrasound-guided percutaneous microwave ablation.
Results Twelve patients with 17 nodules invading the skin and/or nipple areola complex were biopsy proven to be malignant. Among them, 3 patients had lesions invaded the skin (4 nodules), 3 patients had lesions invaded the nipple areola complex (4 nodules), 6 patients had lesions invaded both skin and the nipple areola complex (9 nodules). The average age of the patients was 62.2±19.9 (49~86) years old. Except for a 49-year-old patient who actively refused surgery, other patients were intolerant of surgery or were not sensitive to radiotherapy and chemotherapy. The average diameter of the tumor was 4.8±2.4 (1.3~9.1) cm, the average follow-up time was 9 (2~25) months. And the complete response rate assessed by ultrasound was 100%. There were 6 patients with skin injury or nipple shedding after ablation. Except for two patients who invaded both skin and nipple areola complex with a large area were still in the healing period, whose large pieces of necrotic tissue were discharged within 2 months after operation. The remaining 4 patients healed during the follow-up. No other complications and adverse reactions were observed after operation. And for aesthetic satisfaction, 100% of the participating patients obtained good satisfaction.
Conclusion Ultrasound-guided percutaneous microwave ablation therapy is minimally invasive, safe and effective for breast cancer patients who have the skin and/or nipple areola complex involvement. It can be used as an alternative treatment for patients who cannot undergo surgical resection because of surgery intolerance or refuse surgery

Diagnosis of hepatic steatosis using an ultrasonic quantitative index based on time-frequency entropy

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Research Purpose Hepatic steatosis is the excessive accumulation of fat droplets in the hepatocyte. With the accumulation of fat droplets, the absorption, scattering and reflection of ultrasound will increase and results in attenuation. Acoustically, the different frequency components in the spectrum cause the difference of attenuation, which further induces the downshift of ultrasound center frequency. The information analysis of the overall spectrum may be more sensitive to reflecting attenuation. Therefore, this study proposed the time-frequency entropy (TFE) to analyze the degree of steatosis through the complexity of the frequency spectrum and explore the effect of the window size on the diagnosis effect.

Materials and Methods In this study, a total of 237 patients were enrolled for ultrasound examinations. For each participant, the short-time Fourier transform of each radio frequency A-line signal is used to obtain the spectrums as the function of time, and the information entropy of the spectrum at different times is calculated to obtain the TFE. The window size length for the TFE parameter is from 32 to 256 pixels. Receiver operating characteristic curve analysis is used to evaluate the performances of TFE in diagnosing the steatosis grade. The statistical significance of each scoring of data was identified by the *p*-value obtained from one-way analysis of variance.
Results For different window size from 32, 64, 128 and 256, the mean values of the TFE were 1.38 (1.29-1.45), 1.88 (1.74-1.96), 2.46 (2.31-2.56) and 3.1 (2.94-3.21), respectively. With increasing the steatosis grade from G0 to G3, the TFE value decreased, meaning that the attenuation due to hepatic steatosis reduces the complexity of the spectrum. Table 1 shows the AUROC obtained from using TFE in the assessment of fatty liver. With various lengths of window sizes, ultrasound TFE provided a good diagnostic effect at all steatosis grades, especially for severe hepatic steatosis.
Conclusions Ultrasound TFE may have great performance in the detection of hepatic steatosis. We recommend using 128 pixels as the calculation window size to make a trade-off between the calculation time and the acoustic theory.

Hepatic steatosis grading by using grad-CAM-based ultrasound weighted entropy estimation

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Purpose Hepatic steatosis is the major cause of non-alcoholic fatty liver disease. Ultrasound imaging is the first-line tool for screening hepatic steatosis. The backscattered signals received from the liver are useful clues, which can be quantified by statistical analysis for grading hepatic steatosis. Entropy is a quantitative measure of signal uncertainty and has been widely applied to ultrasound tissue characterization, and weighted entropy is the measure simultaneously considering the objective probabilities and some subjective weights which has been shown its more efficient performance in information analysis. Grad-weighted class activation mapping (Grad-CAM) in deep learning has been proposed as a visualization method to explain model through gradient-based positioning, which may provide useful information for parameter estimation. This study aims to explore how can the Grad-CAM-based weighted technique be used to improve the performance of ultrasound entropy in grading hepatic steatosis.
Materials and Methods A total of 334 subjects scheduled for liver biopsy examinations underwent ultrasound scans to acquire the image raw data for ultrasound entropy imaging. Concurrently, the image raw data were used to construct B-mode images, which were processed by using the pre-trained VGG16 neural network for training and weights extraction for weighted entropy imaging. The performances of weighted entropy imaging and standard entropy imaging in diagnosing the steatosis grade (G0: normal; G1: mild; G2: moderate; G3: severe) were evaluated by the areas under the receiver operating characteristic curve (AUROC) analysis.
Results The AUROCs for grading hepatic steatosis from mild to severe grades when using weighted entropy imaging were 0.93, 0.87, and 0.80; those when entropy imaging was used were 0.90, 0.85, and 0.81. Weighted entropy imaging improve the performance in diagnosing hepatic steatosis ≥ G0、G1. The Grad-CAM images show that how the local liver tissue characteristics affect the classification decision of the deep learning model, which may also reveal how the weighting technique affects the entropy estimation.
Conclusions Relevant information about tissue characteristics from deep learning models may be used as weights to improve standard entropy estimation in grading hepatic steatosis.

Efficacy of ultrasound attenuation imaging and fibroscan© controlled attenuation parameter in non-alcoholic fatty liver disease patients

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This study aimed to investigate the correlation of Attenuation Imaging (ATI) and Controlled Attenuation Parameter (CAP) using Magnetic Resonance Imaging Proton Density Fat Fraction (MRI-PDFF) as the reference standard in non-alcoholic fatty liver disease (NAFLD). The NAFLD patients with available ATI, CAP, and MRI-PDFF examination, excluding cirrhosis, history of significant alcohol drinking, and chronic liver condition were evaluated. There were 62 patients (31 males, 31 females) included with an average BMI of 27.4 kg/m2. The correlation coefficient (r) of ATI and MRI-PDFF was in moderate correlation ($r = 0.63 - 0.69$, $p < 0.001$). The correlation of CAP with ATI and MRI-PDFF was fair and slight correlation ($r = 0.42$, $p = 0.009$; $r = 0.07$, $p = 0.68$), respectively. ATI is a novel method to quantify the degree of fat deposition with a moderate correlation to MRI-PDFF and high interobserver reliability.

Age-and period-dependent survival benefit of microwave ablation for hepatocellular carcinoma: 12-year real-world multicentric experience

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Introduction Although being a promising technique for HCC treatment, the 10-year efficacies of MWA are unknown.
Objective To assess whether the advances of microwave ablation (MWA) for hepatocellular carcinoma (HCC) translated into a real-world survival benefit.
Methods This retrospective study included 2,354 patients with Barcelona Clinic Liver Cancer (BCLC) stage 0 to B from 5 hospitals, with at least 2 years of follow-up for all the patients. Recurrence and survival were analyzed using the Kaplan-Meier method with time-period and age stratification.
Results A total of 5,326 HCCs (mean diameter, 2.9 cm ± 1.2) underwent MWA with a median follow-up of 61.3 (ranging 0.6–169.5) months during three time-periods of 2007–2010, 2011–2014, and 2015–2018. Technical effectiveness was achieved in 5,194 (97.5%) tumors with significant improvement over time, especially for > 3.0 cm HCC ($p < 0.001$). The median intra-hepatic metastasis time was 27.6 (95% CI 25.2–28.8) months, and patients ≥ 60 years had a higher rate of metastasis than those < 60 years (HR = 1.2, $p = 0.003$). The 5- and 10-year overall survival were 63.9% and 41.1%, respectively, with an observable improvement over time. The median disease-free survival time increased from 19.4 (95% CI 16.5–22.6) months in 2007–2010 to 28.1 (95% CI 25.9–32.3) months in 2015–2018. The improved survival for early recurrent (≤ 2 years) patients was both period- and age-dependent as verified by Cox regression analyses. The major complications rate per procedure was 2.2% (88/4051).
Conclusions These real-world data show MWA provided an upward trend in survival for HCC patients with BCLC stage 0–B over a 12-year follow-up time. A clear survival benefit in early recurrent patients was also observed encouragingly , regardless of age.

Peripheral-immune based index improves the accuracy of early recurrence prediction of hcc after thermal ablation

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Background Although models combining tumor histopathological characteristics and clinical related parameters have been constructed to predict prognosis of patients who suffer from hepatocellular carcinoma(HCC), their performances to predict the recurrence among those treated with thermal ablation were largely unsatisfied. Questions remain in the prognostic value of immune features in peripheral blood mononuclear cells (PBMCs),which can reflect patients peripheral immune competence and are easily accessible in the therapeutic processes. Therefore, we aimed to construct a novel peripheral-immune index(PII), and evaluate the significance of PII as well as its supplementing value for other existing predictive markers and staging systems.
Patients and Methods This retrospective study included patients with treatment-naive HCC who received PBMCs tests before thermal ablation from September 2008 to June 2016. All tumors were within Milan Criteria, with no extra-hepatic metastasis and main vein or artery invasion.Using recurrence free survival(RFS) end-point which was defined as the time from thermal ablation to the first documented instance of disease recurrence or the last follow-up visit and death.Four inflammation-based prognostic scores, prognostic nutritional index (PNI), neutrophil to lymphocyte ratio (NLR), platelet to lymphocyte ratio (PLR), systemic immune-inflammation index (SII) as well as two widely accepted HCC staging systems Barcelona Clínic Liver Cancer (BCLC) , 8th American Joint Committee on Cancer(AJCC) were assessed for recurrence prediction by time-dependent receiver operating characteristic (t-ROC) curves. Applying the LASSO-Cox regression model to select related immune factors and constructed as the PII. Discrimination (Harrell's C-statistic), net benefit using decision curve analysis(DCA) and net reclassification index (NRI)were performed to assess the prediction ability improvement for HCC early recurrence.
Results Univariable analysis of 24 baseline factors revealed 6 factors exhibited statistically association with inferior RFS($p<0.1$). In the multivariate Cox analysis, PNI($P=0.009$), BCLC($P=0.030$), TNM($P=0.004$) were independent prognostic predictors($p<0.05$), thus combining the PNI with other two staging systems to build TNM-PNI BCLC-PNI clinical prediction models. However, whether the single index or the integrated clinical nomograms all just showed modest predictive capacities, with the highest C-index was 0.62 in TNM-PNI model.Next using the LASSO-Cox regression model, we selected eight related immune factors, including $CD3^+$, $CD3^+CD4^+$, NKT($CD3^+CD16^+/CD56^+$), $CD4^+CD45RA^+$, $CD4^+CD45RO^+$, $CD8^+CD28^+$, $CD8^+CD28^-$ and $CD8^+CD28^+/CD8^+CD28^-$ to construct the PII. Further results showed an improved C-index from 0.62 to 0.69 for RFS when PII was included in the model with TNM and PNI. Similar improvements were also found in the BCLC-PNI model:the C-index increased from 0.57 to 0.67 when the PII was added. Decision curve analyses showed that the 1-year and 2-year risk of recurrence were more accurately classified with a model that included this peripheral immune signatures. Furthermore, by using the nomogram cutoff value 115.4, patients were stratified into low-risk and high-risk groups, with 2-year recurrence rate were 30.3% and 71.4%($P=0.0001$), respectively.
Conclusion We identified and constructed a peripheral-immune related signature, this index significantly improved the predictive accuracy for RFS when added to the clinical models.Such immune-clinical models will be valuable in the post-ablation adjuvant therapy application.

Anti-tumor effect of cRGD-PEG-PLGA drug and gene loaded nanoparticles combined with UTD on breast cancer in vitro

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Objective To prepare cRGD-PEG-PLGA targeted nanoparticles coating VEGFC siRNA, DTX and PFP successfully, verify its targeting and contrast effect in vitro, and observe their anti-breast cancer effect as well as contrast ability in vitro.
Methods After the nanoparticles were successfully prepared by double emulsion method, their physical characteristics were observed by transmission electron microscope and Malvern laser particle size analyzer, and the entrapment of DTX and siRNA-FAM were detected by UV spectrophotometer and confocal laser microscope, the effect of NPs + UTD siRNA transfection in vitro was verified by the experiments of CCK8, Transwell, Tunel, and Western Blot.
Results The appearance of cRGD-PEG-PLGA@VEGFC siRNA-DTX-PFP (cPPVDP NPs) nanoparticles was a white suspension, which was uniform in size under the Transmission Electron Microscope. The size and ζ potential of the nanoparticles were 224.7±110.9 and -4.08±0.85 respectively and they were stable within seven days. the drug loading was 84.89±0.78%, the release rate was highest at 4h (81.54 %). The cytotoxicity test showed that the cPPVDP group had the greatest suppression effect on the viability of 4T1 breast cancer cells, while the Transwell group showed the least ability of invasion and metastasis. the results of the Tunel showed that the apoptosis and necrosis rate of the cPPVDP NPs + UTD group was higher than that of other groups ($p < 0.05$). Western blot showed that cPPVDP NPs + UTD group had the best effect on silencing target gene VEGFC siRNA, and the results of in vitro imaging were better after ultrasound irradiation.
Conclusion Nanoparticles combined with ultrasound-targeted microbubble destruction can effectively improve the transfection efficiency and silencing effect of siRNA on the target gene, and have a better anti-tumor therapeutic effect. Nanoparticles are an ideal nonviral vector for siRNA, the combination with UTD can improve the transfection efficiency and realize contrast-enhanced ultrasound, which is a new method of non-invasive treatment for breast cancer.

Theranostic nanomedicine carrying l-menthol and near-infrared dye ir-780 for multimodal imaging-guided photothermal therapy of cancer

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Photothermal therapy (PTT) as an emerging technique for cancer treatment has drawn great attention owing to its minimally invasive nature. However, it is difficult to achieve a complete tumor regression due to the heterogeneous heat distribution over the tumor. Application of photothermal conversion agents may enhance PTT efficiency, and a multifunctional imaging may provide guidance for the implementation of PTT. Herein, we integrated a biocompatible “tri-phase transitional” medium, L-menthol, as the inner core for enhancing US imaging sensitivity and photothermal treatment. The menthol/IR-780-encapsulated liposome was designed and stabilized using biodegradable lipid shell via a simple ethanol injection method. When exposing the menthol/IR 780@liposome (MIL) to a NIR laser, the loaded IR-780 would convert light into heat energy, induce the coagulation necrosis of tumor cells, as well as trigger the vaporization of encapsulated L-menthol. The continuously generated L-menthol bubbles could improve echogenicity and backscattering of the ultrasound, thus enhancing the contrast US imaging. It is

worth noting that the process of vaporization of L-menthol bubbles may induce a cavitation effect which in combination with PTT effect can facilitate the permeability of tumor cell membranes and consequently promote the therapeutic effect. Therefore, the MIL will enable a trimodal PA/NIRF/US imaging-guided enhanced PTT (Scheme 1). First, the PA/NIRF contrast ability was investigated in vitro and in vivo. Additionally, the effect of enhanced ultrasound imaging induced by external NIR stimulus was further demonstrated. Finally, the enhanced PTT effect of employing MIL was excellent comparing with other samples, especially with IR-780 liposome (IL). The Tumor inhibitory rate of MIL was70.8%, which was 5.5fold higher than that of IL groups. Overall, the prepared MIL holds great potential for clinical application in multimodal imaging-guided enhanced photothermal therapy.

Abnormal sylvian fissure at 20~30 weeks as an indicator of malformations of cortical development: a role for prenatal whole-genome sequencing

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Objective This study aimed to assess the correlation between abnormal SF on intrauterine neurosonography and MCD, and to explore the value of Whole-Genome Sequencing (WGS) in prenatal detection.
Methods This was a prospective study of fetuses with a sonographic diagnosis of abnormal SF between 2018 and 2020.Intrauterine and/or postnatal MRI examinations were performed to confirm the findings. Amniotic fluid/cord blood obtained by amniocentesis or tissue samples from umbilical cord after birth were collected for WGS. Pregnancy outcome and final diagnosis were recorded.
Results During the study period, 28 fetuses with abnormal SF were identified, with an average gestational age of 24·8±2·0 weeks (range 21·3-30·0 weeks). Abnormal SF presented in MCD (n=15, 53·6%), chromosomal anomalies (n=3, 10·7%) or single-gene genetic syndromes (n=3, 10·7%) with the affected fetuses showing developmental delay, hydrocephalus or leukomalacia (n=4, 14·3%), corpus callosal agenesis with large interhemispheric cysts (n=1, 3·6%), benign subarachnoid space enlargement with arachnoid cysts (n=1, 3·6%), and multiple malformations (n=1, 3·6%). All cases were categorized into six types depending on SF morphology in the axial plane: no plateau-like or a small insula, no SF, irregular corrugated SF, frontal operculum dysplasia, and open operculum. A related pathogenic genetic variant was detected in 57·1% (16/28) and de novo SNVs accounted for 78·6% (11/14).
Conclusions Familiarity with the abnormal ultrasonographic appearances of fetal SF is crucially involved in early detection of MCD and chromosomal anomalies/syndromes. Abnormal SF may indicate a subsequent poor neurodevelopmental prognosis, and single test strategy such as WGS is suggested.

Comparison of imaging modalities for ovarian neoplasms and their imaging features – a retrospective analysis

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Aims and Objectives To compare the ultrasound and MR imaging in characterization of ovarian masses as benign and malignant and to assess the statistical significance of individual imaging features of ovarian mass lesions.
Materials and Methods A retrospective study on 85 patients with histopathologically evaluated ovarian lesions, using USG and MRI was conducted in M.G.M. Medical college, Indore.
Results and Discussion Most common age group with ovarian neoplasms was 48-57 years with abdominal pain and distension as most common presenting symptoms. The sensitivity and specificity of B-mode ultrasound in correct identification of nature of ovarian lesions were 81.82% and 84.62% respectively. Addition of color doppler decreased the sensitivity (75.76%) and improved the specificity (94.23%). MRI had comparable sensitivity (81.82%) and higher specificity (96.15%) without diffusion weighted imaging. DW-MRI was found to be the most accurate modality with 93.94% sensitivity and 98.08% specificity. The most significant morphological feature that pointed towards the malignant nature of the ovarian lesion was papillary projections [OR=55.58], followed by mixed nature of the lesion [OR=42.93] and thick septations [OR=32.67]. In picking up of morphological features, MRI slightly outsmarted USG in detection of thick septations, lymphadenopathy and peritoneal deposits. For the rest, both showed almost equal efficacy.
Conclusion If papillary projections, solid components, and thick septations are picked up, and with the added advantage of doppler study, a satisfactory characterisation of ovarian lesions can be done with ultrasound imaging.

Correlative study of endometrial lesions by transvaginal ultrasound (tvs) and magnetic resonance imaging (mri)

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Research purpose This study was aimed to establish role of TVS in characterisation of endometrial lesions and correlating the findings with MRI and to assess diagnostic potential of TVS and MRI in terms of sensitivity and specificity with histopathology as gold standard.
Materials and Methods This cross sectional study was conducted in 65 Indian women presenting with abnormal uterine bleeding, who underwent TVS (Esaote mylabseven)) and subsequently pelvic MRI on 3T scanner, in the Department of Radio-diagnosis, MGM Medical College & associated Hospitals, Indore (India). Diagnosis was confirmed by histopathology and analyzed statistically.
Results and Discussion A total of 65 Indian women with abnormal uterine bleeding were investigated. Majority of Indian women in our study belonged to age group of 50 to 59 years (46%). The most common presenting complain of patients in our study was abnormal vaginal bleeding (94%), followed by discharge PV (49%). The specificity of MRI (98%) is although more but comparable to that of TVS (93%), however the sensitivity of MRI (95%) is much higher compared to TVS (59%) for detecting malignant lesions. We also found that accuracy of TVS for detection of malignant lesion was 82%, while for MRI accuracy was 97%.
Conclusion TVS and MRI, both hold unique role in the imaging workup of endometrial lesions. Although MR is superior for detection of extent and invasion of lesions, however there is inherent limitation of MRI in detecting micrometastasis. So in resource poor setting TVS can be used as optimal diagnostic modality for endometrial lesions.

Automatic assessment of mitral regurgitation severity using mask R-CNN algorithm on color doppler echocardiography images

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Objectives MR is a common clinical disorder. Accurate assessment of MR severity is critical in diagnosis, therapeutic planning, and perioperative management of patients with mitral valve (MV) disease. Echocardiography is the main method to diagnose and evaluate MR in patients. However, no single echocardiographic method has been recommended for MR quantification so far, and current evaluations rely on a complex, multiparametric appraisal. We sought to define the feasibility and accuracy of Mask Regions with Convolutional Neural Network (Mask R-CNN) algorithm based on deep learning (DL) in qualitative evaluating of mitral regurgitation (MR).
Method The authors collected 1132 cases from hospital A and 295 cases from hospital B respectively, and divided them into the following four types according to the 2017 American Society of Echocardiography (ASE) guidelines: mild (grade Ⅰ), moderate (grade Ⅱ), moderate (grade Ⅲ) and severe (grade Ⅳ). After image marking with LabelMe software, a technique using Mask R-CNN algorithm based on DL was used for evaluation of MR severity. We use the data from hospital A to build the artificial intelligence (AI) model and conduct internal verification, and we use the data of hospital B for external verification.
Results According to classification, the accuracy of mild, moderate and severe MR was 0.90, 0.89 and 0.91, respectively. According to grading, the accuracy of grade Ⅰ, grade Ⅱ, grade Ⅲ and grade Ⅳ was 0.90, 0.87, 0.81, and 0.91, respectively.
Conclusions Assessment of MR severity is feasible by Mask R-CNN algorithm using color doppler echocardiography images collected based on 2017 ASE guidelines, and the model demonstrates a reasonable performance, and also provides reliable qualitative result of MR severity.

Quantitative assessment of normal middle deltoid muscle elasticity at various arm abduction using ultrasound shear wave elastography

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Objective The objective of this study is to assess the change in the normal MD elasticity using shear wave elastography (SWE) through measuring the middle deltoid (MD) elasticity in healthy participants at various arm abduction (with bilateral arms at 0 degrees abduction and 90 degrees active abduction) and analyzing the factors affecting normal MD elasticity.
Methods Mean shear wave velocity (SWV) of the MD in healthy right-handed participants were evaluated using SWE at different arm abduction, and potential factors (gender, MD thickness, age, body mass index) affecting MD elasticity were analyzed. Different arm abduction positions of each participant were as follows: (i) 0° abduction of bilateral arm (L0° and R0°), (ii) 90° active abduction of bilateral arm (L90° and R90°).
Results Mean SWV was significantly higher at L90° than L0°, higher at R90° than R0°, higher at R0° than L0°, and higher at R90° than L90° (all $P< 0.0001$). SWV was significantly higher in males at both L0° ($P< 0.05$) and R0° ($P< 0.01$) than in females. Neither MD thickness, age nor body mass index influenced MD elasticity. Reference ranges of normal MD elasticity were 2.4-3.1 m/s in males

and 2.2-2.9 m/s in females at L0° and 2.5-3.3 m/s in males and 2.4-3.2 m/s in females at R0°, and were 4.9-6.7 m/s at L90°, 5.2-7.1 m/s at R90° for both males and females.
Conclusion SWE is a feasible technique to assess normal MD elasticity at various arm abduction. Our results suggest that these reference ranges may serve as quantitative baseline measurements for assessment of normal MD elasticity in the future. To lay the foundation for determining the normal MD muscle elasticity reference value range through large-sample clinical studies in the next step, we speculate that this may provide a quantitative baseline reference range for whether the early elasticity values of MD muscle disorders are abnormal in the future.

Changes of bilateral intracranial arteries after unilateral indirect revascularization surgeries in patients with moyamoya disease

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Research purpose Indirect revascularization surgery is a promising treatment for Moyamoya disease (MMD). The postoperative ultrasonographic parameters of ipsilateral superficial temporal artery (STA) are known to correlate with collateral grades on external carotid angiography. It remains elusive about the influence of unilateral surgery on bilateral intracranial arteries in MMD patients.
Material and Methods MMD Patients who would undergo the first unilateral indirect revascularization surgeries were prospectively included, receiving pre- and postoperative ultrasound examinations at 1, 3, 6 months. The pre- and postoperative examinations before contralateral-side operation were analyzed, focusing on the hemodynamic changes in the extracranial and intracranial arteries.
Results A total of 53 patients (24 pediatric, 24 male) were enrolled. Nineteen patients (36%) had pre-operative no flow in ipsilateral MCA or ACA. All parameters (peak-systolic velocity [PSV], end-diastolic velocity [EDV], resistance index [RI], and flow volume [FV]) of ipsilateral STA and external carotid artery (ECA) were significantly different between pre- and post-operation ($P<0.001$ or $P=0.001$). The postoperative pulsatility index (PI) of ipsilateral MCA was higher than pre-operative one ($P=0.048$). The postoperative PSV, EDV and FV of ipsilateral STA were lower and the RI was higher in the group 2 (pre-operative no flow and postoperative detectable flow) compared with the group 1 (pre- and postoperative no flow) in the ipsilateral ACA, contralateral ACA, and MCA. In contrast, the ipsilateral MCA had a revered pattern. In patients with pre-operative velocities of ipsilateral ACA lower than normal range, the postoperative velocity parameters of this artery were significantly correlated with EDV, RI, and FV of ipsilateral STA. In those with pre-operative low velocity in contralateral ACA, its postoperative velocity parameters were correlated with RI of ipsilateral STA.
Conclusions This study showed hemodynamic changes not only in the ipsilateral but also in the contralateral intracranial arteries after unilateral indirect revascularization surgeries in MMD patients.

Evaluation of hemodynamic changes in retrobulbar blood vessels using color doppler imaging in diabetic patients

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Aims and Objectives To evaluate hemodynamic alterations in retrobulbar arteries among diabetic patients and compare those changes with non - diabetic patients using color doppler imaging.
Methods Total of 50 patients diagnosed with diabetes were recruited who were then divided on the basis of ophthalmoscopic examination into two groups. Group I comprising of diabetics with no diabetic retinopathy (DR) and group II with DR. All these patients underwent orbital color doppler ultrasound using 7.5-10 MHz high frequency linear probe. Peak systolic velocity (PSV), end diastolic velocity (EDV) and resistivity index (RI) values of ophthalmic artery (OA), central retinal artery (CRA) and short posterior ciliary arteries (SPCA) were recorded. 50 controls were taken who underwent similar doppler ultrasound examination. Findings from all three groups were compiled and compared.
Results and Discussion On comparing the color doppler findings with clinical findings we found that, the patients with diabetic had significantly higher RI (Group I – 0.77 ±0.08 cm/sec; Group II – 0.81 ±0.08 cm/sec) of ophthalmic artery as compared to non-diabetic patients (0.73 ±0.07 cm/sec). Further, the increase in RI was significant between group – I and group – II. There was higher PSV and EDV of OA in diabetic patients as compared to non-diabetics. However, this difference was not significant (P>0.05). PSV and EDV of central retinal arteries of both group – I and group – II [12.41 ±3.81; 3.51 ±1.07; and 9.82 ±2.42; 2.27 ±0.94; respectively] were significantly lower than that in non-diabetics [14.51 ±3.25; 4.53 ±1.17]. The difference was also significant between group – I and group – II. RI values of central retinal arteries in both group – I and group – II [0.75 ±0.12 and 0.82 ±0.13 respectively] were significantly higher than controls [0.67±0.09]. The rise in RI was also significant between two diabetic groups.
Similar significant changes in PSV, EDV and RI of short posterior ciliary arteries were found in diabetics. All changes in doppler parameters signifies increased resistance to blood flow in intraorbital microvessels depicting long term hemodynamic compromise which is progressive in nature, as these differences were significant in Group I and Group – II. These hemodynamic changes can be picked up early on color doppler, as compared to retinopathic changes occurring as a result of it. It can provide an opportunity for early intervention in the form of medical therapies such as anti-VEGF pharmacologic agents and could prevent the need for photocoagulation which is used in late severe stages of retinopathies.
Conclusion Diabetic retinopathy is the most frequent cause of preventable blindness in working age adults (20-74 years). In our study, we found significant changes in color doppler parameters of orbital vessels in diabetic patients, which can be used as an index to assess progression of retinopathy in diabetics.

The application of ultrasound shear wave elastography in the prediction of paradoxical upgrading reaction in tuberculous lymphadenitis. a pilot study

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Research purpose Paradoxical upgrading reaction (PUR) indicates the unanticipated deterioration, including pain, pus, swelling, or appearance of new nodes, during appropriate therapy in patients with tuberculous lymphadenitis (TB LAP). This study aimed to investigate the diagnostic

performance of ultrasonography and shear wave elastography (SWE) in predicting the therapeutic response of peripheral TB LAP.
Materials and Methods A prospective observational study was conducted from December 2017 to August 2020. Participants diagnosed with peripheral TB LAP were included for a longitudinal follow-up utilizing ultrasonography to collect sonographic features and two-dimensional SWE to record the maximum elasticity value (Emax). The development of PUR was defined as the development of any worsening symptoms of the pre-existing TB LAP within one month after the previous ultrasonography.
Results A total of 108 sonographic and SWE examinations were performed in 20 enrollees (75% woman), and their mean (± standard deviation) age was 49.6 (± 22.7) years. Sonographic features at diagnosis included hilum loss, heterogeneous echogenicity, and round shape. On predicting the next-month PUR by using the Emax, the area under the receiver operating characteristic curve (AUROC) was 0.906. The cut-off value of Emax 85 kPa attained the highest accuracy of 87.0% (95% CI: 79.2－92.7) with a sensitivity of 81.1% and a specificity of 87.9%. Multivariate analysis indicated that Emax > 85 kPa (OR: 24.85, 95% CI: 4.01－154.08, p<0.001), Emax increment rate > 2 kPa / month (OR: 15.14, 95% CI: 4.24－54.06, p<0.001), and heterogeneous echogenicity (OR: 4.37, 95% CI: 1.16－16.43, p=0.029) were independent sonographic predictors for PUR in the coming month.
Conclusions SWE is a promising tool for monitoring the treatment response of TB-LAP. A high and non-decreasing Emax level time during treatment and heterogeneous echogenicity were associated with PUR within the following month. The potential of SWE as a pivotal sonographic marker in TB LAP treatment warrants future study with a larger sample size.

Role of b-mode and color doppler ultrasound in evaluation of hand and wrist joints in patients of rhumatoid arthritis

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Research purpose Rheumatoid arthritis (RA) is a chronic, systemic, autoimmune disease. It is characterized primarily by joint inflammation that affects both large and small joints. The development of imaging modalities such as magnetic resonance imaging (MRI) and musculoskeletal ultrasound (MSUS) have enabled more accurate assessment of RA patients. However, need to evaluate B-mode USG and CD findings other than synovitis and tenosynovitis like bone erosions, tendon damage, bursitis, enthesopathy, rheumatoid nodules and their correlation to DAS-28 Score (to monitor disease activity). So, this study was aimed to evaluate pathological changes of hand and wrist joints using ultrasonography and color doppler in patients of rheumatoid arthritis and to monitor disease activity using ultrasonography and color doppler
Materials and Methods This Hospital based prospective observational study was conducted in 32 known rheumatoid arthritis patients who were assigned a clinico-pathological score (DAS-28 score) using high frequency ultrasound probe and color doppler in the Department of Radio-diagnosis, MGM Medical College & M.Y. Hospital, Indore. All the diagnosed patients of rheumatoid arthritis (as per the 2010 ACR/EULAR criteria) who gave consent were classified into two group according to DAS-28 score. Group 1 included those patient whose DAS-28 Score <5.1 (low to moderate DAS Score) And Group 2 included DAS-28 Score ≥ 5.1 (High Score). Duplex scan of wrist joint and hand joints performed. Rheumatic arthritis usually affects joint symmetrically on both side but in case of asymmetric involvement, worse joint considered for Statistical analysis. All Data were tabulated in the Microsoft Excel sheet for the analysis of data. Mean, median and standard deviation of quantitative variables were computed. Appropriate statistical tests were applied.
Results and Discussion In the study of wrist joints, the most common joint involved was radio-carpal joint followed by radio-ulnar joint. Joint synovitis was the common finding observed (50%)

followed by tenosynovitis (25%), 5 patient (15.6%) show bone erosions of wrist joint. and only one patient (0.3%) show both synovitis and bone erosion.
Among small joints of hand examined, most common finding observed was synovitis (40%) followed by erosions (25%). In patients with DAS-28 score <5.1, abnormality on B-mode USG was detected in 1/10 patients (10%). In patients with DAS-28 score ≥5.1, abnormality on Gray scale USG was detected in 16/22 patients (72.72%). Thus, we found that patients having high DAS-28 score had higher significant pathological changes in hand and wrist joints on ultrasound ($p<0.001$) and similar significant correlation seen in between DAS-28 score and color dopppler findings. This is comparable to the results observed by Liliana Uribe et al. which demonstrated a good correlation between DAS-28 score and ultrasound findings and Naredo et al. found a moderate to good correlation between swelling joints count and musculoskeletal ultrasound (MSUS)-detected synovitis for both B-Mode and Power Doppler.
Conclusion Gray scale and color doppler ultrasound of hand and wrist joints can be reliably used for the visualization of pathological process in patients of rheumatoid arthritis correlation with clinico-pathological score (DAS-28 score). Synovitis grading in conjunction with color doppler grading demonstrated a good correlation with disease activity, with higher grades being assigned to patients with high disease activity and vice versa. Thus, these can be applied for monitoring disease activity.

Super-resolution ultrasound imaging monitors type 2 diabetes progression and anticytokine immune therapy in preclinical models

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Super resolution ultrasound (SR-US) imaging breaks the diffraction limit of traditional ultrasound imaging, can reconstruction capillary morphology and precisely quantified the relative measurements, is widely used in tumor or inflammation-related diseases. Type 2 diabetes (T2D) is considered a chronic inflammatory disease, and the denser microvasculature reorganized with disease progression. The microvascular changes usually occur before the decline of β-cell function and are highly related to the blood-flow of pancreas. However, there is a lack of validated clinical approaches for specifically and non-invasively imaging T2D progression. Here we apply SR-US of pancreas microvessel changes to noninvasively and predictively assess disease progression in T2D pre-clinical models. High-fed-diet (HFD) and STZ-treated rats demonstrate altered islet blood-flow dynamics during the T2D, consistent with islet microvasculature reorganization. SR-US could monitor both microvascular function and morphology changes of pancreatic islet. Thus SR-US of pancreas microvessels may provide a clinically deployable method for progression in T2D and therapeutic reversal.

Ultrasound targeted microbubble destruction alleviates immunosuppression induced by CD71+ erythroid progenitor cells and promotes PDL-1 blockade in the advanced Luis Lung Cancer model

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The $CD71^+$ erythroid progenitor cells (CECs) exhibit distinctive immunosuppressive properties and regulate antitumor immunity to enable tumor growth. Here we presented a novel and non-invasive approach to mitigate immunosuppression caused by CECs through ultrasound targeted microbubble destruction (UTMD). We found out that the improved immunity induced by the reduction of PDL-1-expressing CECs benefits the PDL-1 blockade therapy. In the Luis Lung Cancer (LLC) model, the study group was treated by UTMD for 10 minutes at the splenic area with or without anti-mouse PDL-1 intraperitoneal injection. The frequency of splenic CEC, lymphocyte, and cytokine production（INF-γ, arginase-1, TNF-α, TGF-β）was analyzed by flow cytometry. Serum artemin and interleukin-2 (IL-2) were tested by ELISA. Tumor volume was evaluated by two-dimensional ultrasound. The UTMD treatment consisted of ultrasound sonication and Sonazoid™ microbubble injection through the caudal vein. The mechanic index (MI) of ultrasound was set between 0.98 and 1.03. The results showed a significant reduction of splenic CECs and the increase of $CD8^+$ T cells treated by UTMD treatment in the late-stage tumor. Tumor growth could be inhibited by UTMD combined with PDL-1 blockade therapy. The frequency of INF-γ producing $CD8^+$ and $CD4^+$ T cells was significantly increased. These preliminary findings suggest that UTMD enhances the antitumor immune response by targeting immunosuppressive CECs in the spleen, and the combination of UTMD and PDL-1 blockade inhibits tumor growth. So UTMD has promising potential to alleviate the immunosuppression caused by CECs and promotes the PDL-1 blockade immunotherapy in the LLC mouse model.

Oral-Case Study

Rare and special primary hepatic neuroendocrine carcinoma with CEUS: a case report and review of literature

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Background The incidence of primary hepatic neuroendocrine carcinoma (PHNEC) is very low, accounting for 0.46% of primary liver malignant tumors, while the incidence of neuroendocrine tumors (NETS) is about 0.3%. [1]。Search for relevant literature in pubmed database, so far less than 150 cases, because of its rarity, the clinical features of the disease and survival results are still not fully understood.

Due to the rarity of PHNEC, the diagnosis process includes from preoperative to postoperative, the current various diagnostic techniques are still not enough to make a clear diagnosis of surgery[2, 3]. Therefore, surgical resection is the recommended treatment option [4-6].

In existing reports, tumor markers have no diagnostic value in PHNEC, such as AFP, CEA or CA 19-9 are all within the normal range[7-10]. Here, we introduce a rare case of PHNEC with tumor markers raise. The pathological diagnosis is primary hepatic neuroendocrine carcinoma.

Case presentation An 86-year-old male patient came to the hospital with more than half a year due to poor appetite and abdominal distension. Other symptoms such as abdominal pain, diarrhea, and weight loss were not obvious. On physical examination, it was found that the liver was enlarged, which was palpable 6 cm below the xiphoid process, and there was tenderness in the upper abdomen. In the patient's liver function test, Direct bilirubin was slightly elevated (7.9 umol/L) [normal value range 1.7-6.8 umol/L], γ-GGT glutamyl transpeptidase was elevated (337 U/L) [Normal value range 7-45U/L], Cholinesterase (ChE) (3895 U/L) decreased (normal value range 5000-12000U/L), tumor markers increased, such as CEA increased (43.12 ng/ml) [Normal is less than 5.0ng/ml], CA125 (37.5 U/ml), CA153 (31.8 U/ml), CYFRA21-1 (4.50 ng/ml), other tests are normal, such as blood routine, stool routine, urine routine, etc.

Ultrasound examination showed that the left lobe of the liver was enlarged, and a space-occupying mass with an area of about 9.0cm×7.0cm×6.5cm was seen in it. The tumor appeared as a large, heterogeneous, slightly hyperechoic area, with unclear borders, irregular shapes, and no obvious capsule. A diffuse hyperechoic spot is seen in the mass, the diameter of the hyperechoic spot is about 2mm, and part of the liver parenchyma echoes can be seen in the mass, part of the dilated bile duct can be seen in the mass, and the left hepatic vein is compressed and thinned. Scattered, slightly higher echogenic nodules can be seen in the right lobe of the liver, with unclear borders, and the larger ones are about 1.5cm×1.0cm. Contrast-enhanced ultrasound showed that the sheet-like hyperechoic area in the arterial phase showed mildly uneven and high enhancement, and the portal phase and delayed phase enhancement slightly decreased, showing uneven low enhancement. Whole-body CT scan and contrast enhancement showed that the heterogeneous low-density mass in the left lobe of the liver showed mild enhancement in the arterial phase, and some enhancement was slightly reduced in the venous phase and the delayed phase. Multiple similar low-density nodules can be seen in the liver. No obvious similar lesions and masses were seen in other parts such as lungs, pancreas, gastrointestinal and so on. Both CT and ultrasound revealed liver cancer with multiple metastases in the liver. Both CT and ultrasound diagnosed liver cancer with multiple intrahepatic metastases. A needle biopsy of the liver mass was performed under ultrasound guidance. The pathological results showed that a large number of epithelioid cells were seen under the microscope, some of which were short fusiform and mildly atypia. Consider tumorous lesions. Immunohistochemical staining: tumor cells PCK (+), EMA (+), CgA (+), Syna (+), CD56 (+), HCC (-), GPC-3(-), AFP(-), Ki-67/MIB-1(+,25%). Combined with the results of

morphology and immunohistochemical staining, the histological type of the tumor was primary hepatic neuroendocrine carcinoma.

The patient had an ECOG score of 3, was older, and had multiple metastases in the liver. Combined with the economic situation, the patient and his families did not choose surgery or chemotherapy and went home. After discharge from the hospital, he had regular CT examinations of the whole body, and no other primary lesions were found after 10 months of follow-up. The mass in the upper right abdomen gradually increased, the abdominal distension increased, and the condition worsened. He died one year after discharge. Since no other primary tumors were found in the follow-up CT examination of the chest and abdomen, he was diagnosed as primary endocrine carcinoma of the liver, NEC grade 3 (G3).

Discussion and Conclusions Primary hepatic neuroendocrine carcinoma (PHNEC) is a rare disease, and most of current literature reports are case reports. In the SEER database, from 1988 to 2015, only 291 patients were diagnosed with PHNEC[11]. Because of the rarity of the disease, the clinical features and survival results of PHNEC are still not fully understood.

PHNEC is often misdiagnosed as liver cancer, Or preferentially diagnosed as metastatic neuroendocrine tumors, commonly sourced from the intestine and pancreas[12]. Existing research shows that common clinical tumor markers are negative in PHNEC, such as alpha-fetoprotein (AFP), carcinoembryonic antigen (CEA), and cancer antigen (CA199), etc[9, 10]. We reported a rare case of PHNEC with elevated tumor markers. This manifestation led all doctors to believe that liver cancer is the most likely diagnosis. From this case, we can break through the existing impression that PHNEC may also have the possibility of increased tumor markers, so as to further understand the diversity of PHNEC and provide some reference significance for the future diagnosis of PHNEC.

PHNEC mostly occurs in Middle-aged and elderly people, studies have shown no difference in the incidence of male and female[4, 11, 13].Patients often seek medical attention with abdominal pain or occasionally finding a liver mass, only a few patients show carcinoid syndrome (such as skin flushing, abdominal pain and episodic diarrhea)[4, 14]. Common tumor markers are negative. Serum serotonin (5-HT), 24-hour urine 5-hydroxyindole acetic acid (5-HIAA) and serum chromogranin A are the markers of NEC[5, 15].

Due to the low incidence of PHNEC, there is no recognized characteristic image performance at present. We searched the PUBMED database through related subject terms and free words (hepatic neuroendocrine neoplasm, ultrasound, CT, MR, image, etc.). 537 in the studies (excluding case report), only four studies are with more than 10 patients and researching the imaging characteristics about PHNEC, than we summarize the characteristic image performance below. The ultrasound manifestations of PHNEC: (1) The number of tumors can be single or multiple. The tumors are relatively large, with an average of about 4-5 cm. Most of the tumors are hyperechoic or mixed echoes (some are hypoechoic) with clear borders, no change in echo behind the tumor, and no echogenic halo around them. (2) In contrast-enhanced ultrasound (CEUS), the tumor parenchyma in the arterial phase is uniformly enhanced, and the parenchymal enhancement in the portal phase and delayed phase is reduced. When necrosis are present, it can show unevenly enhancement[2, 16]. The CT manifestations of PHNEC: (1) Tumors are low-density, with unclear borders, and necrotic areas can be seen when it is lager, and no obvious calcifications are seen. (2) CT contrast enhanced suggest that the tumor showed obvious nodular enhancement in the arterial phase, and it dropped in the portal phase and late stage. It was similar to the enhancement pattern of liver cancer, and it was not easy to distinguish.[2, 17]. The MRI manifestations of PHNEC: (1) Tumor parenchymal showed hypointensity in T1-weighted imaging and hyperintensity in T2-weighted imaging. Enhancement is similar to CT. (2) MRI also found that the tumor has a capsule-like enhancement (a thin edge-like enhancement along the tumor in the portal vein or the delayed phase, and is related to the fibrous capsule in histopathology). The researchers believe that this can be regarded as PHNEN's feature. In addition, DWI performance of high intensity and low ADC value also has a diagnostic prompt effect[17, 18]. PHNEC imaging characteristics and features of HCC similar, and therefore rely solely on imaging methods are difficult to be made to accurately determine. There are currently studies show that the sensitivity of octreotide radionuclide imaging for the diagnosis of PHNEC can reach 85%-90%, and it can also be used to predict the sensitivity of NET to somatostatin therapy[19, 20].

Regarding the treatment of PHNET, the current clear treatment opinions are mostly based on surgical treatment. Others include radiofrequency ablation, catheter arterial embolization (TECA), liver transplantation, somatostatin therapy, etc[10, 11]. The 5-year survival rate after surgery is between 70 and 80, and about 20%-40% will relapse, so close follow-up is required [15, 21].
There are two especially rare features in our case. (1) The tumor markers CEA, CA125, CA15-3, and CYFRA21-1 are elevated. CEA, CA125, and CYFRA21-1 are all produced in epithelial cell tumors and expressed in malignant epithelial cancers[22-24], while CA15-3 is often elevated in metastatic cancers[25]. There are three mainstream theories about the origin of primary hepatic neuroendocrine carcinoma. One is that it originates from intrahepatic bile duct epithelial cells or translocated pancreatic cells[26]. Therefore, it is theoretically possible that the tumor markers associated with epithelial tumors are elevated in PHNEC. Due to the low incidence of PHNEC, most of the tumor markers are currently considered to be of no diagnostic significance. Our case just provided evidence of increase. Multiple small lesions in the liver are intrahepatic metastases, so CA15-3 is elevated. (2) Diffuse strong echo points (about 2mm in diameter) can be seen on ultrasound. The strong echo points seen in the ultrasound in our case are not reported in other literature. We think that this is the crystallization of secretory tumors, which can be used as a feature to differentiate from liver cancer.

Contrast-enhanced ultrasound findings of hemolymphangioma of the kidney: a case report

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Case presentation A 68-year-old male patient was admitted to our hospital with a history of ambiguous lumbodynia for the past two months. He had no medical history of abdominal trauma or operation. Laboratory examination revealed no abnormality of the liver, renal function, blood and urine sediment analysis. He then underwent an ultrasound examination of the urinary system. A gray-scale ultrasound image demonstrated a separated cystic mass in the upper part of the left kidney. The mass was approximately 9.1 x 6.4 cm in size with an irregular shape and slightly unclear margin. Calcification can be seen on some septum. The thickness of the thickest septum is about 6 mm. Color Doppler displayed dot-linear blood flow signals in the mass septum. For further diagnosis, the patient agreed to undergo CEUS. The septum of the lesion was homogeneously hyper-enhanced in the cortical phase. In the medulla and the delayed phase, the lesion displayed hypo-enhancement. The combination of lesion B-Mode (separated cystic lesion) features and enhancement pattern (hyper-enhancement in the cortical phase, and hypo-enhancement in the medulla and delayed phase after contrast agent administration) yielded a diagnosis of cystic renal carcinoma. Laparoscopic radical left nephrectomy was performed to remove the mass. The renal mass was mainly located in the upper part of the left kidney and measured 9.0 cm x 8.0 cm x 7.0 cm. The tumor cyst fluid is clear. Microscopic examination revealed a tumor that was composed of blood and lymphatic vessels with polycystic spaces, thin wall, and dyed red lymph and blood cells within the lumen. Immunohistochemistry staining results were as follows: CD31(+), CD(34+), and ERG(+), PAX8(+), D2-40(±), and no expression for CA9(-), CK7(-)in the lesions. The final pathological diagnosis of the lesion was a renal hemolymphangioma. The patient was discharged 12 days after surgery. He is currently enjoying normal life without complaints or signs of recurrence.
Discussion Hemolymphangioma is a very rare and benign tumor. By consulting the literature, it is found that clinical symptom is non-specific, and atypical abdominal pain or compression discomfort of nearby anatomic structures is the primarily reported manifestation. The conventional US faces difficulties in determining the nature of some complicated cystic renal lesions. CEUS can show the enhancement pattern of the solid part of cystic lesions, with high sensitivity. The irregular

thickening of the cystic lesions, the nodules, the solid and cystic components in the cysts are clearly outlined. However, there are few reports of ultrasound imaging of hemolymphangioma. Conventional ultrasound manifested as a separated cystic mass with the thickened septum (maximum about 6 mm), CDFI detected dot-liner color blood flow signals at the septum. CEUS showed fast-in and fast-out enhancement patterns, which is easy to be confused with the enhancement pattern of cystic renal cell cancer. In the case, hemolymphangioma is large in size with blood flow signals on the septa obviously. A retrospective review of the literature found that compared with hemolymphangioma, cystic renal cell carcinoma maybe has wall nodule, more and thicker septa in ultrasonography. Known as a benign tumor, there is a tendency of postoperative recurrence even after curative resection. Nephrectomy surgery is recommended after a full evaluation of the tumor in this case. Thus, long-term postoperative follow-up is necessary to detect the tumor evolution.

Ultrasonic diagnosis of traumatic vesicovaginal fistula: a case report

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Case data The patient, female, 27 years old, unmarried. In 2018, she came across a vaginal intermittent leakage due to toilet genital trauma.The symptoms was obvious while she was holding urine, without frequent micturition, urgent urination,odynuria, and gross hematuria. Her menstrual cycle is irregular, there has been a little colporrhagia in the intermenstrual period. Her last menstrual period was 2019-04-25. Medical examination: Weight 86kg, BMI:35.3. 2019-05-02 Admission mitted routine urine test: RBC-U 2283.00 /μL ↑ ↑ ↑, WBC-U 1452.00 /μL ↑ ↑ ↑, BLD 3 +, PRO + -. Mid-stream urine culture: Escherichia coli-positive.

Ultrasonic examination: when the bladder filling volume is enough, there is no obvious abnormal echo in the vagina. When the bladder is overfilled with abdominal pressure, echofree area can be seen in the vagina; Echo continuity between the posterior bladder wall and anterior vaginal wall breaks off and there is an abnormal channel which urine flows into the vagina. During dynamic scanning, echofree area increased gradually in the vagina. Color Doppler Flow Imaging: there is a blue blood flow from the abnormal channel toward the vagina.

Ultrasonic diagnosis: there is echofree area in the vagina, and the echo continuity between the posterior bladder wall and the anterior vaginal wall breaks off, combined with the history of perineal trauma, considering the vesicovaginal fistula.

Urinary enhancement CT scan: The local fat clearance between the posterior bladder wall and the anterior vaginal wall is unclear, and there is cervical contrast agents persisted in the vaginal and cervix. Considering the vesicovaginal fistula, please combine with clinical practice.

Urology combined with gynecological surgery: stiff urinary tract, no obvious fistula in mucous membrane of urethra or urinary bladder, methylene blue test was negative, no obvious fistula was found, and the operation was completed.

After the operation, the patient complained to dare not hold back urine, no more significant vaginal urine leakage.

Discussion Vesicovaginal Fistula is a disease that causes bladder, vaginal injury and thus causes vaginal interruption or continuous leakage of urine, and is the most common female urinary genital fistula[1]. VVF is common in birth injury, iatrogenic surgical injury, radiation damage, invression of pelvic malignant tumor, chronic inflammation, trauma, etc,few cases are congenital malformations. The most common cause in developing countries is birth injury, and developed countries are mostly caused by obstetrics and gynecology surgical injury[2-5]. Its core clinical manifestation is vaginal involuntary urine leakage, and urine leakage is related to the fistula size, location and position of the patient's body, and can be secondary to the vulva and hip skin secondary dermatitis, urinary infection.

Imaging diagnosis preferred intravenous pyelography or Urinary enhancement CT scan and 3D reconstruction[6]. Cystoscopy also helps in the diagnosis of a bladder-vaginal fistula, but the bladder capacity is also important [7]. Ultrasound can find the location of the fistula and the relationship between the fistula and bladder, which can be used as an effective method of diagnosis bladder and vaginal fistula. The ultrasound performance mainly the continuous interruption or partial thinning between the bladder and vagina; the bladder has echofree in the vagina, smaller after urine; color blood flow signal is visible between bladder and vagina, one way or bidirectional, abdominal probe pressure, and the color blood flow signal is strengthened [8].

Vesicovaginal Fistula in this case was caused by relatively rare trauma. The clinical symptoms, ultrasound performance and urinary enhancement CT scan results all suggested the disease, but no obvious fistula was seen in the operation, and the methylene blue test was also negative. Through the analysis, the possible reason for this condition is the insufficient intraoperative bladder filling. The following reasons are given for: (1) When our department first received the patient, the patient's bladder filling was in line with the requirements of gynecological color ultrasound examination, but there was no abnormal echofree area in the vagina of the patient, but in the case of excessive bladder filling and abdominal pressure, the abnormal echofree area in the vagina appeared and gradually increased; (2) From the comparison of bladder measurement diameter in Fig. 5 and 6, the patient could see that the bladder filling of CT imaging was different. The amount of solution injected into the bladder in the patient was 500ml, and the bladder volume of FIG. 5 was about 400ml, was about 500ml, and did not include the vaginal and spillover contrast agent, and it can be inferred that the intraoperative bladder filling was insufficient.

Finally, through this case, the author got the following tips: (1) in the treatment of bladder and vaginal fistula, the bladder filling is very important, if the bladder filling is insufficient, we may miss many different cases; (2) whether in the diagnosis and treatment, multidisciplinary consultation of other diseases. Different disciplines have different perspectives on diagnosis and treatment. Through different perspectives, we can expand our different horizons, so as to make more accurate judgments. Although (3) ultrasound department is an auxiliary department, but in the process of clinical diagnosis and treatment, ultrasound doctors can also give clinicians different help, so clinicians should also listen to the aspirations of "Superman".

Posterior nutcracker syndrome：cases report

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Background Post nutcracker syndrome (PNCS) is a frequently encountered venous anomaly with a reported incidence of 1 –3.2%. The left renal vein (LRV) passes between the aorta and vertebral body in PNCS. The main clinic symptom of PNCS is hematuria. Ultrasound is used as the first-line examination of the diagnosis.

Method We searched our ultrasound workstation from 2010 to 2021, and we found 7 cases diagnosed as PNCS. Then we reviewed all of these cases in the electronic medical record system in our hospital to attend patient demographics including age, gender, laboratory results, and other imaging reports.

Result Age ranged from 27 to 34 years. Gender distribution was three females and four males. Six were PNCS and one was ring-NCS. One had varicocele with intermittent flank pain and the other six all had no symptom, just finding it occasionally in physical examination. None of them dealt with the PNCS or ring-NCS. According to one case, a 30 years old man had the symptom of left flank pain, bilateral varicocele, and did an operation to treat it. But it relapsed. The US figures showed the LRV in retro-aorta space, with no compression. And the enhanced-contrast CT had the same performance. Besides, there were two left renal arteries and a right renal artery as well as an accessory renal artery. Dynamic renal imaging demonstrated the function of the right kidney was damaged slightly. Besides, there was another case, a 30 years old female, who had ring-NCS, in which there was duplication of the LRV such that it had both a pre-and retro-aortic course. The

ultrasound images indicated the narrow and dilate part of LRV in pre-aortic space is 0.21cm and 0.79cm respectively, and 0.16cm and 0.85cm in the retro-aortic space respectively.
Conclusion When patients come to hospital with hematuria, we should judge whether it is non-glomerular hematuria by examination. If so, the radiologist should rule out NCS. After excluding NCS, PNCS should be considered.

Transcatheter closure of atrial septal dissection with recurrent cerebral infarction: a case report

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This case is a young women with atrial septal dissection, mainly manifested as intermittent dizziness and stagger. Computed Tomography(CT) and Magnetic Resonance Imaging(MRI) showed multiple new and remote cerebral infarction lesions irregularly scattered with varying size. other examinations showed no obvious abnormalities. After excluding the risk factors of common cerebrovascular diseases, we considered the possibility of anomalous cerebral embolism caused by right to left shunt in the lung. Then we performed the triple examination of transthoracic echocardiography, transesophageal echocardiography and contrast echocardiography, which indicated that the formation of atrial septal dissection and thrombosis in the dissection were not excluded. No ischemic stroke occurred after transcatheter closure of atrial septal dissection.

Successful sotalol therapy of supraventricular tachycardia in a fetus

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A 29-year-old woman, gravida 2, para 1, was referred at 33 weeks' gestation after her obstetrician detected a fetal heart rate of >200 beats/min. There was no history of infectious diseases, thyrotoxicosis, or consumption of any drugs. The echocardiogram confirmed the tachycardia with fetal heart rate of 208 bpm with 1:1 AV relationship and short VA interval.The fetal echocardiogram showed normal cardiac anatomy and no signs of hydrops. The mother was given sotalol 80mg bid orally for 3 consecutive days. After 3 days, the mother's heart rate was decreased from 102bpm to 76bpm and the QTc interval was extended from 418ms to 430ms. Fetal's heart rate was slowed down between 130bpm and 180bpm, and fetal heart monitoring showed that fetal heart rate was in the normal range most of the time. After two weeks of taking the drug, the fetal heart rate was not well controlled, which was more than 180bpm most of the time, so the sotalol dosage was increased to 120mg orally, bid. During this period, the mother's heart rate was 80bpm,QTc was 462ms, and the fetal heart rate was controlled between 130bpm and 180bpm. Considering that the mother's QTc had been relatively long, the dosage of sotalol was reduced to 80mg bid. Then QTc gradually decreased to 440ms. The mother's heart rate was maintained for 70-80bpm, QTc 440-460ms, and the fetal heart rate was between 130bpm and 180bpm until 40 weeks of gestation to term, and a healthy female baby was born. The newborn electrocardiogram showed sinus rhythm with heart rate of 150 bpm. The goal of treatment in utero is the conversion to sinus rhythm or reduction of the ventricular rate to tolerable levels, preventing or even reversing fetal hydrops. This is only a report case, but we hope that through this case report of successful treatment of fetal SVT, more SVT fetuses can get timely treatment.

Ultrasonography and Imaging of a right atrial thrombus in a patient with antiphospholipid syndrome

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Antiphospholipid syndrome (APS) is an autoimmune disease with abnormal antibody in blood present mostly in young women. People with this disorder may suffer from an underlying disease, most frequently systemic lupus erythematosus (SLE). A patient with APS may have thrombosis in the legs, kidneys, lungs and brain. In pregnant women, APS also can result in miscarriage and stillbirth. APS affects women five times more commonly than men. It is typically diagnosed between the ages of 30 and 40. While up to 40% of patients with SLE will test positive for the anti-phospholipid autoantibodies, only half will develop thrombosis and/or experience miscarriages. A 33-year-old female with SLE and APS presenting with right atrial thrombus is herein reported.

The patient has suffered from SLE for 15 years under prednisolone treatment. She also has thalassemia and APS under enoxaparin and dabigatran. She presented to the emergency room with one-day history of fever 38.3 ^{0}C, associated with dyspnea, chest tightness, and bilateral back pain for one month. Laboratory studies showed elevated inflammatory markers, normal WBC and platelets counts. Anti-phospholipids including Anti-B2-Gp1 IgG, Cardiolipin-IgM, and Phospholipid-IgG were positive. Chest radiograph showed bilateral pleural effusion. Enhanced CT showed pulmonary embolism, pericardial effusion and an incidental finding of a right atrial nodule which was also seen by transthoracic echocardiography. Subsequently, cardiac MRI showed a lobulated nodule at the right atrium near RA-IVC junction which measured 2.1 x 1.3 cm. The lesion featured no enhancement on Gd-enhanced T1-weighted fat-suppressed images, a finding which suggested that the mass is hypo-vascular. A trans-esophageal echocardiography (TEE) revealed the nodule was lobulated and papillary.

Cardiac surgery disclosed the mass abutted on the lower interatrial septal, inferior to the margin of fossa ovalis, and just lateral to the Eustachian ridge of the orifice of coronary sinus. The mass was fragile and yellowish white. Surgical pathology of the excised specimen revealed that the mass was an organized thrombus.

Ruptured scar pregnancy secondary to ingestion of misoprostol: a case report

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Scar pregnancy is a rare form of ectopic pregnancy. If not diagnosed early and managed appropriately, it may lead to serious complications such as uterine rupture and hemorrhage. We present a case of a 29-year-old female with a history of prior three caesarean sections who presented to our clinic with abdominal pain. She had taken misoprostol to terminate her 6 weeks pregnancy while being unaware that she had a scar pregnancy. Transvaginal ultrasound revealed a ruptured scar pregnancy with hematoma. Emergency laparotomy was performed and uterus was repaired. Through this case report, we aim to highlight the importance of transvaginal ultrasound with regards to the diagnosis of scar pregnancy, whilst also highlighting the necessity to use Misoprostol with caution in women with previous caesarian sections.

Sonographic features of borderline phyllodes tumor of the breast:a case report

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Breast phyllodes tumors (PTs) is a very rare fibroepithelial neoplasm, accounting for 0.3-1.0% of breast tumors [. PTs are classified histologically as benign, borderline, or malignant according to the presence of tumor margins, cellular atypia, mitotic activity, and overgrowth in the stroma.PTs have a high recurrence rateand may transform into malignant disease, leavingno margin for errors in the initial diagnosis.In the following,we report a breast borderline phyllodes tumor female,her presentation to hospital was due to the enlargement of the tumor for 1 month.Phyllodes tumors of the breast are rare fibroepithelial neoplasm,they are generally divided into benign, borderline, or malignant.In this report, a 40-year-old female was noticed with an asymptomatic right breast mass, which was histologically diagnosed as borderline phyllodes tumor. Sonographicfeatures are described in detail, and data from the literature arepresented.

Sonographic features of lymphoepithelial carcinoma of parotid gland: a case report

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A 38 year old male patient was admitted to the outpatient department of our hospital because of "3 years of left infraauricular mass". Three years ago, the patient complained that no obvious inducement was found in the left ear tumor, no redness, swelling, heat and pain, no palpitation, chest tightness, no neck movement disorder, no hand tremor, fear of cold, night sweats history, psychiatry, no significant weight loss. He was healthy in the past. Physical examination: 4 * 3cm mass was touched under the left ear, the boundary was still clear, the quality was hard, and the activity was general. Four days ago, color Doppler ultrasound showed that the volume of the left parotid gland was enlarged, with hypoechoic mass of about 4.0 * 3.0 * 2.3cm in size, unclear boundary, irregular shape, uneven internal echo, multiple strips of hyperechoic, grid like changes, and enhanced echo in the rear. CDFI: abundant blood flow signals were seen in the left parotid gland, with disordered distribution. Considering the possibility of adenolymphoma, contrast-enhanced ultrasound is recommended. On the second day after admission, superficial parotidectomy and facial nerve exploration were performed under general anesthesia. On the second day after operation, pathological diagnosis: lymphoepithelial carcinoma was considered in the left parotid gland. It is suggested to check the nasopharynx to exclude the possible source of metastasis, and no obvious mass was found after nasopharyngoscopy.

Discussion lymphoepithelial carcinoma (LEC) is a special type of differentiated carcinoma that occurs in salivary gland and is characterized by lymphoid tissue proliferation, infiltration, and containing poorly differentiated or undifferentiated carcinoma tissue. LEC of salivary gland is a rare salivary gland tumor. LEC of salivary gland accounts for 2.4% of salivary gland tumors, and parotid gland accounts for most of them. The average age of onset in Chinese is 49 years old. Male patients have multiple cases. The clinical manifestations are long-term local swelling and sometimes rapid growth in the near future. This disease is related to EB virus infection. It should be differentiated from malignant lymphoma, benign epithelial lesions and adenolymphoma. In addition, the incidence of cervical lymph node metastasis is relatively low. Because of the low incidence rate of this disease, clinicians and ultrasound doctors are not aware of this case. This case can give us a good understanding of the ultrasonographic findings of parotid gland lymphoepithelial carcinoma.

Ultrasonic diagnosis of a case of catheter rupture in infusion port

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Case Brief The patient, a 64-year-old male, was clinically diagnosed as having metastatic tumors in both lungs and pelvis after comprehensive treatment of rectal cancer. He was implanted under local anesthesia on February 14, 2017. The internal jugular vein was selected as the puncture point and the clavicle Cut the skin 4cm horizontally 3cm below the midpoint, tighten the lock sleeve and bury the infusion port in the separated subcutaneous port zone. After the operation, he was sent to the radiology department for an orthographic examination of the chest, which showed that the tip of the catheter had reached the superior vena cava. 2017-9-28The infusion port suddenly suffered from poor infusion. Considering that the infusion port was blocked, and no improvement after urokinase thrombolytic therapy, chest radiographs indicated that the infusion port was in place, so I went to the ultrasound department for an infusion port inspection. The ultrasound findings: The lumen of the right internal jugular vein and subclavian vein is unobstructed, there is no thrombus, no echo from the infusion port catheter, tubular echo in the subcutaneous soft tissue of the right suprasternal fossa, and changes in the surrounding soft tissue with fluid accumulation and gas accumulation (Figure 1) After the sonovue is injected into the infusion port, it can be seen that the contrast agent enters the subcutaneous soft tissue (Figure 2). Combined with the chest radiograph, it is considered that the infusion port is ruptured. After the patient went to the ward to remove the infusion port under aseptic local anesthesia, there was a breach in the middle of the catheter, about 0.5 cm long (Figure 3).

Discuss The reason for the rupture of the catheter in this patient is speculated: 1. The internal jugular vein is used as the puncture point, and the catheter is connected to the base of the infusion port through a subcutaneous tunnel. The catheter is likely to be twisted and angled. When the patient's upper limbs move or breathe, the catheter is squeezed Lead to rupture; 2. The infusion port catheter is made of polyurethane as the main material. Its disadvantage is that it is prone to be buckled and clamped when the catheter is placed at an acute angle.

Ultrasound plays an important role in the follow-up after implantation of the infusion port. If the patient has poor infusion, the patency of the lumen can be evaluated by ultrasound to determine whether there is thrombus and fibrin sheath. In this patient, the position of the catheter was judged by chest radiograph to be normal. Ultrasound failed to show the catheter in the venous lumen. It is speculated that the catheter was too close to the wall and there was fluid accumulation in the subcutaneous soft tissue of the right episternal fossa. Later, the catheter was confirmed by contrast-enhanced ultrasound. Rupture, contrast-enhanced ultrasound helps to display the catheter running and tip position after catheter placement.

Ora-Superficial tissue and vascular ultrasound

Development and validation of a nomogram for discriminating benign and malignant breast nodules by ultrasound and shell in two-mode elastography -a multicenter study

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Objectives Developing and validating an ultrasound nomogram to evaluate conventional ultrasound and two-mode elastography in differentiating breast lesions.
Methods During 2016 to 2021, 499 patients from 4 different centers participated in our study before undergoing breast nodules puncture or surgery. In the development cohort, 293 different ultrasound features were obtained from ultrasound imaging. Univariable logistic regression and Lasso regression was used for reduction and visualization of data. Multivariable logistic regression analysis was performed to develop prediction model and ultrasound nomogram. Using receiver operating characteristic curve (ROC), calibration curve, integrated discrimination improvement (IDI) and Net Reclassification Index (NRI) to evaluate the performance of nomogram while using decision curve analysis (DCA) and clinical impact curve to estimate clinical usefulness.
Results After exclusion, 234 patients were enrolled in this study**.** In the development cohort, margin, Posterior features, shape, Vascularity, Shell Mean/A Mean1.5(E), B/A'1.5 were selected to be the predictors of multivariable logistic regression analysis，which constitute the model1. In the five cohorts, model1 performs best，for the area under the curve (AUC) of model1are 0.922, 0.839, 0.865, 0.933, 0.893 respectively, the AUC of model2（margin+ Posterior features +shape+ Vascularity）are 0.901, 0.822, 0.829, 0.909, 0.853 respectively, and the AUC of model3 （Shell Mean/A Mean1.5(E)+ B/A'1.5）are 0.796, 0.755, 0.773, 0.87, 0.799 respectively.
Conclusions The ultrasound nomogram offers characteristic and visualized exposure rate in breast cancer. Shell Mean/A Mean1.5(E), B/A'1.5 integrated with margin, Posterior features, shape, Vascularity can be better at identifying breast cancer, worthy of clinical promotion.

Based on GBM, neural network, and random forest to predict the expression of her2 in breast cancer under ultrasound ,dual-mode elastography and mammography

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Purpose Developing and validating three machine learning methods: gradient boosting machine (GBM), neural network(NN), and random forest(RF) to predict the expression of her2 in breast cancer under mammography, ultrasound and dual-mode elastography.
Methods During 2016 to 2021, 100 patients diagnosed with breast cancer received mammography, ultrasound and dual-mode elastography and 302 indicators were measured. Of the randomly 75 patients in the development set, RF, GBM, and NN are applied to select indicators related to her2 expression. The five most important indicators of the three algorithm models were included in the logistic model respectively, and the nomogram is elaborated on the algorithm model performed best. Using decision curve analysis and bland-altman to compare the different predictions between

models and using receiver operating characteristic curve, calibration curve to evaluate the performance of nomogram.
Results Compared with RF and NN, GBM performs best. The area under curve (AUC), sensitivity and specificity of GBM model are 0.88, 78%, 100% respectively while of NN model are 0.83, 72%, 91% respectively and 0.89, 78%,91% respectively of RF. So we choose the five variables selected by GBM to be included in the logistic model to plot nomogram. Finally, mammography same side calcification, Shell Mean/A Mean（2.5）(E) , A-Min(Cs), A' Min-0.5(Cs) and Min（G) were selected to formula nomogram.
Conclusions We have developed and validated the nomogram to predict the expression of her2, having a great prediction effect, so we believe that the nomogram can provide help for clinical treatment.

Application of ultrasonic dual-mode artificially-intelligent architecture in assisting radiologists with different diagnostic levels on breast masses classification

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Purpose We aim to compare the diagnostic performance and inter-observer variability of different radiologists in breast tumor classification with or without the aid of an innovative Dual-Mode artificial intelligence (AI) architecture which could automatically integrates information from US-mode and SWE-mode.
Methods Diagnostic performance assessment was performed with a test subset, containing 599 images (from September 2018 to February 2019) from 91 patients including 64 benign and 27 malignant breast tumors. Six radiologists (three inexperienced radiologists and three experienced radiologists) were assigned to read images independently and then make secondary diagnosis with knowledge of AI results (Independent-Diagnosis mode and Secondary-Diagnosis mode). Sensitivity, specificity, accuracy, receiver-operator characteristics (ROC) curve analysis and Cohen's k statistics were finally calculated.
Results As for the inexperienced radiologists' group, from Independent-Diagnosis mode to Secondary-Diagnosis mode, the average area under the ROC curve(AUC) of US-mode increased from 0.722 to 0.765(P = 0.0497) and from 0.794 to 0.834(P = 0.0187) for Dual-Mode significantly. The average AUC of experienced radiologists'group was significantly higher with AI system on US-Mode(P = 0.0390), but not for Dual-Mode(P=0.4582). At the Secondary-Diagnosis mode, the better inter-observer agreement for all radiologists was obtained on US-Mode (P=0.003) from fair agreement to moderate agreement. On Dual-Mode, substantial agreement was seen among the experienced radiologists (0.65 to 0.74, P=0.017) and all the radiologists (0.62 to 0.73, P=0.001).
Conclusions The diagnostic performance improvement is more distinguished for the inexperienced radiologists with AI assistance, meanwhile, the experienced radiologists benefit more from AI in reducing inter-observer variability.

Application value of contrast-enhanced ultrasound quantitative analysis in differential diagnosis of different molecular types of breast cancer

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Objective To investigate the application value of contrast-enhanced ultrasound (CEUS) in the differentiation of different molecular types of breast cancer.
Method Retrospective analysis was performed on 86 breast cancer patients diagnosed by pathology after surgery in the Department of Breast Surgery of our hospital from December 2019 to September 2020. The CEUS time-intensity curve was recorded to obtain the CEUS blood perfusion parameters in the focal area, and pathological molecular classification of all patients was conducted. The correlation between the perfusion parameters and pathological molecular typing was analyzed.
Results The slope of ascending branch was an independent factor affecting LuminalB type, while the peak time was an independent factor affecting HER-2 overexpression type ($P < 0.05$).
Conclusion There is significant correlation between CEUS perfusion parameters and pathological molecular typing. Quantitative analysis of CEUS can be applied in the diagnosis of molecular typing of breast cancer patients.

Ultrasonic multimodality imaging features and the classification value of non-puerperal mastitis

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Objective To explore the value of ultrasonic multimodality imaging for characterizing NPM lesions and feasibility of distinguishing different subtypes.
Methods Thirty-eight NPM lesions were assessed using conventional ultrasonography (US), strain elastography (SE), and contrast-enhanced ultrasound (CEUS). The lesions were confirmed pathologically and classified as granulomatous lobular mastitis (GLM), plasma cell mastitis (PCM), or non-specific mastitis (NSM). Furthermore, diagnostic indicators were evaluated. The diagnostic performances of the modalities were compared using the area under the receiver operating characteristic curve (AUC).
Results The overall morphological features on US differed significantly between the GLM and PCM groups ($P = 0.002$). Lesion size (≤10 mm) ($P = 0.003$) and mean SE score ($P = 0.001$) differed significantly between the PCM and NSM groups. The frequent NPM characteristic on CEUS was hyperenhancement with (or without) increased lesion size; intergroup differences were not significant. Breast Imaging Reporting and Data System (BI-RADS) > 3 was considered to indicate malignancy; accordingly, the accuracy of US alone, US with CEUS, and US with SE was 10.5%, 21.1%, and 65.8%, respectively. Moreover, the AUC for US with SE for classifying GLM and PCM was 0.616.
Conclusion CEUS cannot accurately classify NPM subtypes, while US and SE are valuable in classifying.

The follow-up of post-mastectomy patients: Should the ipsilateral side be assessed with ultrasound?

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Backgrounds With diagnosis of breast cancer at earlier stages and improvements in locoregional and systemic treatments, the proportion of survivors needing follow-up care has increased. As recurrence surveillance poses an increasing work-load on imaging centres, use of cost-effective follow-up regimens is essential. Especially for patients who have undergone total mastectomy, whether the ipsilateral chest wall needs ultrasound surveillance is worth considering.
Objective This study was undertaken to retrospectively assess the contribution of sonographic surveillance in the early detection of metachronous ipsilateral breast cancer and local recurrence.
Methods A total of 3,461 patients (5,826 person-times) who underwent total mastectomies in one institution in 2019 were consecutively enrolled. We retrospectively reviewed the pathologic, mammographic, and sonographic records of them. 114 of the patients showed abnormal in chest wall ultrasound. 102 patients were finally included in the study (92 patients were confirmed by pathology, 10 people had no change in size after more than 1 year of observation, and 12 people were lost to follow-up); A doctor with more than 30000 breast ultrasound experience classified the lesions into suspicious recurrence and benign according to the level, shape, margin and internal blood flow of the lesions.
Results It was confirmed by pathology or no change in one-year follow-up (65/102 for malignant, 37/102 for benign), ultrasound interpretation (83/102 for suspected recurrence, 19/102 for benign). The sensitivity, specificity, positive predictive value, negative predictive value, and accuracy rates of ultrasound in determining chest wall local recurrence are (100.0%, 51.4%, 78.3%, 100.0%, 82.4%), respectively. Among them, the age is >50 years and the lesion is located in the muscle. Intra-layer, internal blood flow, and multiple lesions were related to recurrence, and were statistically significant between the two groups. The location of the lesion (surgical incision or other location) was not statistically significant in the two groups. 18 false-positive cases of ultrasound interpretation (10 cases of inflammatory lesions/fatty necrosis/granulomatosis, 1 case of encapsulated effusion, 2 cases of no abnormalities in puncture, 5 cases of no change in 1-year follow-up).
Conclusion Ultrasound is a relatively accurate and objective method for distinguishing local recurrence of chest wall from other benign lesions after total breast cancer resection. Therefore, we need to regularly supervise the ipsilateral chest wall and regional lymph nodes.

Assessment and differentiation of breast cancer metastatic and reactive sentinel lymph nodes with perfusion contrast-enhanced ultrasound in mouse models: a longitudinal study

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Purpose To explore the potential of perfusion contrast-enhanced ultrasound (CEUS) for longitudinal assessment and differentiation of metastatic and reactive sentinel lymph nodes (SLNs) in breast cancer and inflammation mouse models.
Materials and Methods Breast cancer (n=20) and inflammation (n=6) mouse models were built by inoculation of either 4T1 breast cancer cells or Complete Freund's Adjuvant (CFA) to the 4th mammary fat pad in female BALB/c mice. Perfusion CEUS and quantitative analysis were performed for SLNs from tumor-bearing mice (T-SLNs) and CFA-injected mice (C-SLNs) every

seven days. After the last imaging session (day35), all examined T-SLNs and C-SLNs were harvested after euthanizing all the mice and subjected to HE staining and immunofluorescence staining using anti-CD31 primary antibodies. Total microvascular density (TMVD), large MVD (LMVD; diameter≥10μm) and small MVD (SMVD; diameter<10μm) were counted using ImageJ software.

Results HE staining showed that eight of the 20 T-SLNs displayed metastasis. LMVD was greater in T-SLNs than in C-SLNs (26.4±4.7 vs. 21.8±4.2, *P*=0.047). In T-SLNs, both TMVD (85.1±13.4 vs. 67.4±10.2, *P*=0.01) and LMVD (26.1±5.7 vs. 10.6±3.0, *P*<0.001) were greater in the non-metastatic part than in the metastatic part. At day 35, time to peak (TTP) was longer in metastatic T-SLNs (MT-SLNs) (4.7±2.1s) than in non-metastatic T-SLNs (NMT-SLNs) (2.6±0.9s, *P*=0.02) and C-SLNs (2.5±0.5s, *P*=0.042); from day 7 to day 28, no significant difference was shown in TTP between MT-SLNs, NMT-SLNs and C-SLNs (all *P*>0.05). From day 7 to day 35, no significant difference was observed in peak intensity (PI) between MT-SLNs, NMT-SLNs and C-SLNs (all *P*>0.05). A positive correlation was observed between PI and LMVD with a correlation coefficient of 0.89 (95% confidence interval: 0.84, 0.97; *P*<0.001). The typical appearance of SLNs on PI color maps was hyper-perfusion in the center and hypo-perfusion at the margin. The abnormal appearance of MT-SLNs on PI color maps was central hypo-perfusion or entire inhomogenous hypo-perfusion. The sensitivity, specificity, and accuracy of TTP (5s as cut-off) and PI color maps (abnormal appearance as cut-off) for diagnosing MT-SLNs were 50% and 50%, 100% and 94.4%, 84.6% and 80.8%, respectively.

Conclusions By perfusion CEUS, TTP and PI color maps can aid to the diagnosis of metastatic SLNs, but with a low sensitivity.

Dual mapping technique-microbubbles in combination with blue dye in sentinel lymph node biopsy in early breast cancer

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Objective To investigate a new dual mapping technique- microbubbles in combination with blue dye in sentinel lymph node biopsy in early breast cancer

Material and method 16 cases of early breast cancer patients underwent either breast conserving surgery(14/16) or mastoectomy(2/16) together with sentinel lymph node biopsy(16/16) in Shanghai Jiahui International hospital from 2019.05-2020.12. 2 hours before surgery, subdermal microbubbles(Sonovue) injection was performed at areola area, and under contrast ultrasound mode, lymphatic vessels were traced from the areola area to the axilla. Sentinel lymph nodes were shown as microbubble-filled nodular structure in continuity with lymphatic vessels. Under ultrasound guidance, localization wire was inserted into the sentinel lymph node. 10 minutes before surgery, subdermal blue dye injection was performed at areola area.

Results Sentinel lymph node biopsy was successfully done in all 16 early breast cancer patients. Microbubbles filling lymph nodes ranged from one to two, which were all wired successfully and blue dyed. Blue dying lymph nodes ranged from one to four.

Conclusion The dual dying technique- microbubbles in combination with blue dye could be reliably applied in sentinel lymph node biopsy in early breast cancer.

Clinical study on optimization of the process of sentinel lymph node biopsy in breast cancer by synchronous dual tracing method with sonazoid and methylene blue

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Background Sentinel lymph node biopsy (SLNB) has become a standard protocol for evaluation of the status of axillary lymph node (ALN) in breast cancer patients. The key point of this technique is how to accurately trace, locate and completely remove all the sentinel lymph node (SLN). At present, radioisotopes combined with blue dye has been recommended as the first line SLNB tracing method, but the involvement of radioisotopes creates logistical challenges, including isotope handling and disposal, staff training, and legislative requirements. Constraints of radioisotopes have led to the development of non-radioactive alternative methods. Ultrasound contrast agent (UCA), as a new SLN tracer, had been proved to be able to identify SLN. Percutaneous contrast enhanced ultrasonography(CEUS) can image lymphatic vessels and SLN in real time. Sonovue(SNV),as the most commonly used UCA, is injected preoperatively, and SLN is then imaged by CEUS and localized by body mark. Surgeons resect SLN according to the body mark and blue dye during the surgery. Compared with radioisotopes, this method lacks of the ability to trace SLN intraoperatively. There exists about a margin of error of 2.71%-19.29% between the enhanced lymph nodes and the resected blue stained nodes. How to optimize the SLN-CEUS procedure is still under exploration. Sonazoid(SNZ), as a macrophage friendly contrast agent, is easy to be engulfed by macrophages and stay in SLN for a long time. It is expected to be imaged continuously during the operation, so as to realize the whole process of real-time dynamic monitoring of SLN and ensure the accurate resection of all the SLN.

In addition, reasonable screening of patients is also very important before SLNB. Almost nearly 74% early breast cancer patients had received unnecessary SLNB. Besides, according to the American Association of Surgeons Oncology Group (ACOSOG) Z0011 randomized clinical trial, patients with T1-2N0M0, 1-2 positive SLN, breast conserving therapy, postoperative whole breast radiotherapy and systemic adjuvant therapy can be exempted from ALND. This conclusion indicates that ALND is not the only choice for patients with positive SLN. Therefore, it is important to identify the status of SLN and the high tumor burden of ALN before SLNB. As a newly emerging imaging modality, enhancing patterns of SLN with CEUS may have the potential to accurately predict the status of ALN.

Objective 1. Compare the life span of SNV and SNZ in SLN, and to explore the feasibility and reliability of the intraoperative tracing method, which uses SNZ blended with MB as SLN tracer, and was in combination with invitro verification.**2.** Besides, we aimed to explore the detection efficacy and clinical value of the new method of SNZ-CEUS.**3.** To explore the diagnostic value of percutaneous CEUS enhancing patterns for SLN metastases and the tumor burden of ALN.

Methods 1. Five patients were enrolled in the first part of this study. 2 ml SNV and 0.4 ml SNZ solution were injected intradermally at the areola subsequently. The enhancing time span of these two different contrast agents in SLN were observed. If the contrast agent kept staying in SLN, the node was then resected and observed to see whether the imaging can last after resection. The UCA that is suitable for real-time monitoring of SLN during operation was selected.**2.** A total of 341 patients with breast cancer were enrolled in this study, including 92 patients in Methylene blue(MB)group,134 patients in SNV+MB group and 115 patients in SNZ+MB group. Patients in MB group received an intradermal injection of 1ml of MB resolution. After 10-15minutes, incision was made according to usual experience and blue stained nodes were found and resected. SNV+MB group received an intradermal injection of 2 ml of SNV followed by 1 ml of MB. Then we immediately observed and labeled the enhancing lymphatic vessels and the SLN connected. Surgical incision was made according to the mark on the body surface and blue stained nodes were resected. If the surgeon couldn't find blue stained nodes, SLNB was considered as a failure and ALND was executed. Patients in SNZ+MB group received an intradermal injection of mixture of SNZ(0.4ml)and

MB(0.6 ml). Then enhancing SLN was observed and labeled. Blue stained nodes were resected and the nodes had to be soaked in saline water and examined again by in vitro CEUS to ensure that all the enhancing SLN were removed. When it is difficult for surgeons to find the enhancing SLN intraoperatively, we could relocate the SLN with CEUS in real time, and the surgeon was guided to obtain the SLN in real time, and then the above steps were repeated until all the enhancing SLN imaged by CEUS were removed. The number of SLN detected by UCA and MB was recorded and compared.**3.** The enhancing patterns of SLN resected and the characteristics in grey scale ultrasonography of ALN in SNZ group were recorded and compared with the final pathological results.

Results 1. The average enhancing time of SLN in SNV group was 351.8±53.6（290-425）seconds, and the average enhancing time in SNZ group was longer than 1896.0±301.8（1560-2340）seconds. SNZ had a longer enhancing time span in SLN than SNV.**2.** The identification rates of SLN were 92.39%, 97.01% and 94.78% respectively in MB group, SNV+MB group and SNZ+MB group. The difference was not statistically significant(P=0.264). The average number of SLN stained by MB were 2.39±0.83(MB group), 2.20 ± 1.10 (SNV+MB group) and 1.84 ± 0.97 (SNZ+MB group), which was decreasing(P＜0.001). The average number of all resected nodes was also decreasing gradually, which were 4.06±1.75(MB group), 3.31±1.74 (SNV+MB group)and 2.97±1.43(SNZ +MB group)（P＜0.001）respectively. The number of SLN detected by CEUS was less than that stained by MB in the same group (both P < 0.001). **3.** Seven enhancement patterns were observed in this study. SLN with high perfusion, complete annular perfusion and uniform low perfusion was considered negative. The diagnostic sensitivity and specificity of CEUS for SLN were 90.91% and 84.50%, and the negative predictive value was 97.32%. The FNR was 9.09%. The diagnostic performance of CEUS for SLN is better than that of gray scale ultrasonography. When "Cortical thickness measured in gray-scale ultrasonography≥3mm", "Number of suspicious lymph nodes in gray-scale ultrasonography ≥3" and "CEUS enhancement patterns" were combined in a serial test to diagnose ALN high tumor burden, the accuracy, specificity and false positive rate were 91.01%, 94.94% and 5.06%, respectively, which were better than that of gray-scale ultrasonography or CEUS alone.

Conclusion 1. Percutaneous SNZ-CEUS combined with MB and in vitro confirmation is a simple, feasible and accurate method for localization of SLN in early breast cancer patients. **2.** There are no significant differences in the detection rates among MB group, SNV+MB group and SNZ+MB group, but there were less nodes being removed in SNZ+MB group, which indicated that there might be less harmful for patients in SNZ+MB group.**3.** CEUS enhancing patterns could be helpful in determining the status of SLN and the tumor burden of ALN, which has the potential to free patients with negative SLN from SLNB or select patients with high tumor burden to directly receive NAC or ALND without unnecessary SLNB.

A prediction equation to estimate vascular endothelial function in different body mass index populations

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Objective Develop a simple equation for the prediction of endothelial injury in different body mass index(BMI) populations.

Methods 275 volunteers with different body mass indexes were recruited in our study, 92 of which were randomly selected as the training sample, and the remaining 183 constituted the verification sample. Then measured the flow-mediated dilation (FMD) to investigate endothelial function in them. Finally, carried out the anthropometric measurement and laboratory analysis, finding the variables related to FMD in the training group and developing the multiple linear regression equation, then testing it in the verification sample.

Results Using a data subset, we developed two equations, one of which included BMI, age, waist-to-hip ratio(WHR), and fasting blood glucose(FBG), and a simplified version (only the first three variates)**.** In the former model, R2=0.615, adjusted R2=0.596, and the equation expression was FMD1=-0.095BMI-0.052age-6.695WHR-0.156FBG+19.275. R2 after verification in the test set was 0.566, and adjustment R2=0.564. The latter R2=0.587, adjusted R2=0.572, and the equation expression was FMD2=-0.106BMI-0.065age-6.401WHR+18.822. R2 after verification in the test set was 0.567, and adjustment R2=0.565.
Conclusions We developed and validated two equations to predict vascular endothelial function, the second of which was more convenient and efficient, which can be evaluated only by routine anthropometric measurement. This provided a convenient and reliable method for clinical doctors, especially for grass-roots doctors, to evaluate endothelial injury early or monitor the progress of lesions and follow-up after treatment.

Study on carotid artery plaque characteristic model based on ultrasound and contrast-enhanced ultrasound in cerebrovascular events

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Objective To establish carotid artery characteristic plaque model by conventional ultrasound combined with contrast-enhanced ultrasound, identify high-risk plaques that may lead to cardiovascular and cerebrovascular events, and provide clinical risk warning of high-risk plaques of stroke.
Methods In October, 2018 to November 2019 to our hospital for ultrasound examination in 5053 patients, 205 cases of patients with carotid plaques of conventional ultrasound and contrast-enhanced ultrasound image characteristics, using 147 cases as a training set, characteristics of plaque model, analyzing the characteristic of the plaques and the relationship between cerebrovascular event, with 58 cases as a test set, Verify the model. Routine carotid ultrasound and contrast-enhanced carotid ultrasound were performed in all enrolled patients.
Results The gray-level characteristics of conventional ultrasound in the training concentration showed statistical differences in plaque morphology, fibrous cap morphology, uniformity and calcification degree in cardiovascular and cerebrovascular events. The contrast enhanced ultrasound characteristics of plaques showed statistical differences in neovascularization and perfusion mode in cardiovascular and cerebrovascular events. In the test set, there were statistical differences in the above conventional gray scale features and CEUS features.
Conclusion The vulnerable plaque model established by conventional ultrasound combined with contrast-enhanced ultrasound has good diagnostic value for the characteristic plaque of carotid artery with cerebrovascular events.

Diagnostic value of 2020C-TIRADS and 2020C-TIRADS combined with FNA in follicular papillary thyroid carcinoma

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Objective The purpose of this study was to evaluate the diagnostic value of 2020 C-TIRADS and 2020 C-TIRADS combined with ultrasound-guided fine-needle biopsy （FNA） in follicular papillary thyroid carcinoma (FV-PTC) by analyzing the ultrasonographic features of the FV-PTC.
Methods 105 FV-PTC patients (115 lesions) and 97 classic papillary thyroid carcinoma (C-PTC) patients (112 lesions) who underwent conventional ultrasonography and FNA before surgery were

enrolled. The diagnostic efficiency of 2020 C-TIRADS and its combined FNA for FV-PTC was determined by comparing the ultrasonographic characteristics of FV-PTC and C-PTC and the differences between the diagnosis of 2020 C-TIRADS and FNA.
Results From the clinicopathological characteristics, the incidence of FV-PTC group was higher in women, and the rate of cervical lymph node metastasis was lower. Ultrasound images showed that the maximum diameter < 10mm and aspect ratio ≥1 were more common in FV-PTC nodules, while very low echo and microcalcification were more common in C-PTC nodules. Most of the FV-PTC and C-PTC groups were diagnosed with PTC or suspicious PTC by FNAC. There was no statistical difference in C-TIRADS stratification between the FV-PTC group and the C-PTC group, but the overall C-TIRADS classification in the FV-PTC group was low, in which the C-TIRADS IVa, IVb, IVc and class V accounted for 3.4%, 32.5%, 59.0%, and 2.6%, respectively.
Conclusion 2020 C-TIRADS and 2020 C-TIRADS combined with FNA can be used for the diagnosis of FV-PTC, and there is no statistical difference in the diagnostic efficiency between C-PTC and 2020 C-TIRADS.

Ultrasonic diagnosis of atypical breast fibroadenoma and analysis of the cause of misdiagnosis

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Objective To explore the sonographic features of atypical breast fibroadenoma, and summarize and analyze the reasons for misdiagnosis.
Methods The atypical sonographic features of 392 patients (401 masses) confirmed by operation and pathology were retrospectively analyzed. The misdiagnosis rates of different ages, sizes and pathological types were compared, and the causes of misdiagnosis were analyzed.
Results Among 401 masses, 123 cases were found to have atypical features by ultrasound, including 40 cases of correct diagnosis and 83 cases of Misdiagnosis; 278 cases of typical ultrasonic features were correctly diagnosed. The misdiagnosis rate of lesions with diameter < 1cm and maximum diameter > 3cm was significantly higher than that of lesions with diameter of 1-3cm, the misdiagnosis rate of atypical features ≥ 2 was significantly higher than that without atypical features and with one atypical feature, the misdiagnosis rate of complex fibroadenoma was significantly higher than that of non complex fibroadenoma.
Conclusion The manifestations of atypical fibroadenoma are complex and diverse. The more atypical features, the larger or smaller the diameter, and the masses belonging to complex fibroadenoma are more likely to be misdiagnosed.

BRAFV600E gene mutation combined with C-TIRADS classification in judging lymph node metastasis in central group of papillary thyroid carcinoma

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Objective To explore the combination of BRAFV600E and the 2020 Chinese version of TIRADS classification (C-TIRADS) in determining the lymph node metastasis (LNM) of papillary thyroid carcinoma (PTC).
Methods 260 cases were included in the study, which excludes patients without surgical pathology and BRAFV600E mutation detection results. The patients' clinicopathological data, ultrasound characteristics, BRAFV600E and C-TIRADS classification were collected, and the analyse of its

relationship with LNM are calculated on SPSS26.0. The sensitivity and specificity of BRAFV600E gene mutation detection combined with C-TIRADS classification are calculated by parallel test and series test of the combined diagnostic test. Bayes probability method of multivariate discriminant analysis was used to calculate the probability of LNM of PTC.
Results Univariate and multivariate analysis show that the size of thyroid nodules on ultrasound is related to LNM. The ultrasound features including aspect ratio, nodule composition, echo, calcification, boundary, shape, size, capsule contact, and BRAFV600E gene mutation are brought into the formula, the multiple discriminant Bayes probability analysis method can be used to initially obtain the occurrence of the probability of LNM. In the parallel and series experiments of the diagnosis experiment, the sensitivity and specificity of BRAFV600E combined with C-TIRADS in the diagnosis of LNM are 96.2% and 53.2%, respectively, which were higher than the two methods alone.
Conclusion The size of nodules on ultrasound is an independent risk factor for LNM. BRAFV600E combined with C-TIRADS is highly effective in judging cervical lymph node metastasis, and ultrasound characteristics and the BRAFV600E gene mutations obtained from biopsy specimens can determine the possibility of cervical LNM in patients with PTC, which can help clinicians determine the patients' treatment plan.

Diagnostic performance of artificial intelligence-based computer-aided diagnosis system in longitudinal and transverse ultrasonic views for differentiating thyroid nodules

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AIM To evaluate the diagnostic performance of different ultrasound sections of thyroid nodule (TN) using computer-aided diagnosis system based on artificial intelligence (AI-CADS).
Materials and Methods Patients with preoperative thyroid ultrasound data and postoperative pathological results were enrolled and divided into two groups: lower risk group (ACR TI-RADS 1, 2 and 3) and higher risk group (ACR TI-RADS 4 and 5). The malignant risk scores (MRS) of TNs were obtained from longitudinal and transverse sections using AI-CADS. The diagnostic performance of AI-CADS and the consistency of each US characteristic were evaluated between these sections. Four diagnostic criteria were designed [Criterion 1 (Maximun MRS), Criterion 2 (MRS in transverse plane), Criterion 3 (MRS in longitudinal plane), Criterion 4 (Average MRS)].The receiver operating characteristic (ROC) curve and the Cohen *κ*-statistic were performed.
Results A total of 203 patients with 221 TNs were enrolled. The area under the ROC curve (AUC) of criterion 3 [0.86 (95%CI: 0.80~0.91)] was lower than criterion 1 [0.94 (95%CI: 0.90~ 0.99)], 2 [0.93 (95%CI: 0.89~0.97)] and 4 [0.94 (95%CI: 0.90, 0.99)] significantly (P<0.001, P=0.01, P<0.001, respectively). In the higher risk group, the MRS of transverse section was higher than longitudinal section (P<0.001), and the agreement of extrathyroidal extension and shape was moderate and fair (κ =0.48, 0.31 respectively).
Conclusion The diagnostic performance of AI-CADS in longitudinal and transverse ultrasonic views for differentiating TN was different, which was higher in the transverse section. It was more dependent on the section selection for the AI-CADS diagnosis of suspected malignant TNs.

The diagnostic performance of conventional sonography and strain elastography in thyroid nodules with indeterminate cytology

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Objective To evaluate the diagnostic performance of conventional sonography and strain elastography in thyroid nodules with indeterminate cytologic（i.e. BethesdaⅢ/Ⅳ/Ⅴ）findings.
Methods A total of 135 thyroid nodules from 128 patients who underwent both fine needle aspiration biopsy and surgical treatment were enrolled. Differences in sonographic characteristics between the benign and malignant nodules were assessed.The diagnostic performance of conventional sonography and strain elastography in thyroid nodules with indeterminate cytology were investigated.
Results 112/135 (83%) nodules were malignant and 23/135(17%) nodules were benign in this study. There were significant differences in composition，taller-than-wide shape，margin，blood flow distribution，and elasticity score between the two groups（$P < 0.05$）. There were no significant differences in the age , gender or other mentioned conventional ultrasound characteristics between the two groups.The association of conventional sonographic features identified 107 of 112 thyroid malignancies（sensitivity， 95.54%; specificity，56.52%; accuracy，88.89%;positive predictive value，91.45% and negative predictive value，72.22%）,whereas the association of conventional sonographic features plus elastographic scores of ≥3 identified 110 of 112 thyroid malignancies（sensitivity， 98.21%; specificity， 30.43%; accuracy， 86.67%;positive predictive value， 87.3% and negative predictive value，77.78%）.
Conclusion Conventional sonography and strain elastography are valuable in the differential diagnosis of nodules with indeterminate cytologic findings. But the combination of conventional sonographic features and elastographic scores show inferior diagnostic performances in predicting malignant nodules with indeterminate cytology results in comparison with the association of conventional sonographic features alone.

Role of high-resolution USG in diagnosis of thyroid lesions

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Introduction The thyroid gland is an endocrine gland. Its superficial location helps in the evaluation of its normal anatomy, normal anatomical variants and pathological conditions by high resolution real-time grey-scale sonography. To resolve the overlapping spectrum of thyroid lesions USG guided FNAC is useful adjuvant technique but is an invasive procedure. Hence the need for a non-invasive, painless dynamic, reliable test which can be achiveved by High resolution USG.(HR-USG)
Aim To assess the utility of high resolution USG in different thyroid lesions and correlation with histopathology outcome.
Materials and methods 50 Patients were subjected to USG thyroid on GE LOGIQ F8 EXPERT and LOQIC E9 sonography machines. Patients were evaluated by the linear array probe of 7.5 to 15 MHz. Proper settings for evaluation of the thyroid gland was done. Thyroid function tests and histopathological correlation (FNAC) was done. The lesions were characterised into malignant and benign depending on shape, size, vascularity and calcification.
Results Majority of the patients had features of thyroiditis on USG which showed diffuse parenchymal involvement and had a female predominance. All patients with a malignant etiology on FNAC had USG correspondence of nodules with heterogenous echopattern and irregular

margins, were hypervascularity. Microcalcifications were noted in 21% of the cases of which all were malignant on FNAC.
Conclusion HR-USG is an easily available, inexpensive, noninvasive, and highly sensitive imaging modality for the diagnosis of thyroid lesions. Microcalcifications were exclusively found in malignant lesions. Female predominance was noted in diffuse thyroid lesions.

A retrospective study of ultrasonography in the investigation of primary hyperparathyroidism: a new perspective for ultrasound echogenicity features of parathyroid nodules

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Objective To identify and understand parathyroid lesions of primary hyperparathyroidism (PHPT) patients more accurately under ultrasound (US).
Methods This retrospective study involved 423 adult PHPT patients bearing a single parathyroid nodule with positive parathyroid ultrasonography between 2018 and 2019. The clinical characteristics of the study patients and histopathological sections were reviewed.
Results According to the main grayscale echogenicity features of parathyroid nodules, 423 cases were divided into groups: the iso-hyperechogenicity solid group (61/423), the hypoechogenicity solid group (304/423) and the mixed-echogenicity cyst-solid group (58/423). Comparison among the three groups showed iso-hyperechogenicity group was included more asymptomatic PHPT patients and fewer patients with severe symptoms like bone fractures ($p<0.05$). Mixed-echogenicity group showed higher median serum parathyroid hormone (PTH), serum calcium and lesion sizes ($p<0.05$), while the iso-hyperechogenicity group showed the lowest median serum PTH level. No difference was in lesion size between the two solid groups, but the median serum PTH level in the hypoechogenicity group was higher than that in the iso-hyperechogenicity group ($p<0.05$). According to histopathology, the hypoechogenic area of the samples may contain more functional components (chief cells), while the iso-hyperechogenic area has more nonfunctional components (such as lipocytes and connective tissues).
Conclusion The PHPT nodules distinguished by US echogenicity features showed different histopathologic components, reflected by different clinical characteristics of the PHPT patients.

Follicular lymphoma of the thyroid gland：ultrasonographic and clinicopathological features

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Follicular lymphoma presenting in the thyroid gland is rare, and only a few cases have been reported.We retrospectively reviewed 9 patients diagnosed with follicular lymphoma of the thyroid gland between 2012 and 2020. We have addressed this disease by studying the clinical, ultrasonographic,immunophenotypic and genetic features of 9 such cases. The typical ultrasound appearance consisted of a solid, marked hypoechoic mass with increased vascularity . enhancement of posterior echoes, and linear echogenic septations All cases showed morphology characteristic of follicular lymphoma, 7 cases are pure FL,1 case contained with DLBCL,and another 1 case suggested advanced follicular lymphoma developed into diffuse large B-cell

lymphoma of germinal center subtype.Furthermore, 3 of 8 cases for whom sufficient evidence was available had clinical and/or histological evidence of chronic lymphocytic thyroiditis.There were 1 men and 8 women with a median age of 53years (range, 37-72 years). 7(77%) patients presented with a rapidly growing neck mass,and 1 patient presented with pain in the right neck,1 payient presented with epigastric discomfort. 5(56%)patients presented with localized (stage I/II) and 4(44%) patients with disseminated (stage III/IV) disease.4 were of WHO grade 1-2,and 5 were often of WHO grade 3-4(44%) carried a t(14;18)/*IGH-BCL2* and/or expressed Bcl2, and were mostly CD10-positive(78%). At the end of the study period, 8 patients were alive:5 in complete remission ,1 in complete remission after having a relapse and 2 with persistent disease. 1 patient died with persistent disease(median follow-up, 33 months; range, 9-68 months). Appreciation of the spectrum of ultrasonographic ,morphological immunophenotypic and genetic characteristics of follicular lymphoma presenting in the thyroid gland should aid both diagnosis and clinical management.

Diagnostic performance of artificial intelligence-based computer-aided diagnosis system combined with ACR TI-RADS and Bethesda category in cytologically indeterminate thyroid nodules

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Purpose The purpose of this study was to assess the diagnostic performance of AI-CADS combined with Thyroid Imaging Reporting and Data System (TI-RADS) and Bethesda category for predicting the malignant risk of CITN.
Materials and Methods Between January 2019 and July 2020, 234 CITNs were enrolled retrospectively, which were confirmed by pathology. The malignant risk scores (MRS) were obtained using AI-CADS. The diagnostic performance of AI-CADS and TI-RADS for differentiating CITNs were compared. The AI-CADS, TI-RADS and Bethesda category were combined for scoring CITNs and the malignant rate of each point was calculated.
Results In 234 CITNs [from 213 patients (46 ± 12 years, 47 men)], there were 42 benign and 192 malignant. The area under the receiver operating characteristic curve of AI-CADS (0.82) was higher than TI-RADS (0.64) (Z=2.815, P=0.005). The optimal cutoff value of MRS was 0.81. The sensitivity of TI-RADS was higher than AI-CADS (X^2=13.298, P<.001). However, the specificity, positive predictive value and Youden's index of TI-RADS were lower than AI-CADS (X^2=16.056, P<.001; X^2=6.834, P=0.009; Z=2.893, P=0.004). When Bethesda category, AI-CADS and TI-RADS combined for scoring, the malignant rate was lower than 10% for CITNs with 1-2 points, 30%-70% for CITNs with 3 points or 4 points, and almost 90% for CITNs with 5 points or 6 points.
Conclusion The artificial intelligence-based computer-aided diagnosis system (AI-CADS) based on ultrasonic images could be used to predict malignant risk of cytologically indeterminate thyroid nodules after fine-needle aspiration, and its performance was superior to Thyroid Imaging Reporting and Data System (TI-RADS). The combination of AI-CADS, TI-RADS and Bethesda category is helpful for the management of thyroid nodules with indeterminate cytology.

Efficacy of B/M ultrasound on rehabilitation training in patients with refractory swallowing dysfunction after stroke

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Objective To evaluate the efficacy of rehabilitation training in patients with refractory swallowing dysfunction after stroke by B/M ultrasonography.Methods A total of 40 elderly stroke patients with deglutition dysfunction admitted to the Department of Rehabilitation Medicine of our hospital from June 2019 to January 2021 were selected (case group). During the same period, 40 elderly patients with normal deglutition function were recruited (control group).Ultrasound was used to detect hyoid bone displacement and the proximity rate of hyoid bone to thyroid cartilage in inpatients before rehabilitation training, two weeks after rehabilitation training and normal elderly people during swallowing 5ml food (composed of 100ml water mixed with 3g suloxin).
Results The rate of hyoid bone displacement and the approximate rate of hyoid bone to thyroid cartilage were 1.81±0.32cm and 38.43±4.83%, respectively.In stroke patients with deglutition dysfunction before rehabilitation training, the rate of hyoid bone displacement, the rate of hyoid bone and thyroid cartilage approaching were (1.39±0.33cm) and (26.27±4.26%), respectively.After two weeks of rehabilitation training, the hyoid bone displacement and the proximity rate of hyoid bone to thyroid cartilage in stroke patients with deglution-dysfunction were (1.58±0.36cm) and (35.63±4.32%), respectively.The difference between the control group and the case group was statistically significant. After rehabilitation training, the hyoid bone displacement and the proximity rate of hyoid bone to thyroid cartilage were both increased compared with before rehabilitation training, and the difference was statistically significant.
Conclusion B/M ultrasound can detect hyoid bone displacement and the proximity rate of hyoid bone to thyroid cartilage in pharyngeal stage, which can provide a quantitative index for the efficacy of rehabilitation training for refractory swallows after stroke.

Using multiple ultrasonographical examinations of salivary glands as a practical alternative to biopsy in classification of primary sjögren's syndrome

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Objective This study aimed to investigate the multiple ultrasonographical features of major salivary glands (SGs) in primary Sjögren's syndrome (pSS), and assess the diagnostic accuracy of a combination of salivary gland ultrasonography examinations in differentiating pSS from non-immune-mediated sicca syndrome.
Methods Candidates with xerostomia and/or xerophthalmia were enrolled from the Rheumatology Department of the First Affiliated Hospital of Wenzhou Medical University. All participants received comprehensive ultrasonographic evaluation of the parotid and submandibular glands, including greyscale ultrasonography (US),colour Doppler sonography (CDS), and contrast enhanced ultrasonography (CEUS). Clinical correlation analysis and receiver operating characteristic curve (ROC) analyses were performed to evaluate the classification capacity of a combination of multiple ultrasonographical examinations of the major SGs for pSS.
Results A total of 227 eligible patients were enrolled, including 161 pSS and 66 non-pSS patients. Compared with non-pSS, pSS patients had significantly higher greyscale US scores and CDS blood grades in the parotid gland, and significantly higher greyscale US and CEUS scores in the submandibular glands. Diagnostic model combined ultrasonographic signatures and anti-SSA/Ro60 and keratoconjunctivitis sicca (KCS) tests showed a remarkable discrimination (mean area under curve: 0.963 in submandibular glands and 0.934 in parotid glands) for pSS, and the

nomogram provided excellent prediction accuracy and good calibration in individualised prediction of pSS.
Conclusion A combination of multiple ultrasonographical examinations of the major SGs is a promising technique that may be used as a practical alternative to minor salivary gland biopsy in the early detection of pSS.

Oral-Abdominal ultrasound

Prediction of liver cirrhosis by ultrasound elastography using F Index

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Research Purpose F index is a new indicator of ultrasound elastography for predicting liver stiffness. We compared the ability to diagnose cirrhosis in patients with chronic liver disease of the F index and conventional methods.
Materials and Methods The subjects were 138 patients with chronic liver disease who underwent liver biopsy at our hospital from April 2018 to August 2020 and were evaluated for liver stiffness including F index, Vs, and LFI by ARIETTA 850® within one month. 37 cases were pathologically diagnosed with liver cirrhosis. We used ARIETTA 850® as the ultrasonic device, and measured the liver stiffness 5 times at the liver parenchyma in the anterior segment of the right lobe of the liver, and calculated the average value. We created ROC curves of liver cirrhosis diagnostic ability for F Index, Vs, LFI, M2BPGi, FIB4 index, and APRI, and compared the area under the ROC curve (AUROC). We made similar comparisons by liver disease background, obesity, and presence of liver inflammation.
Results The AUROC values of F Index, Vs, LFI, M2BPGi, FIB4 index, and APRI are shown below in order. The AUROC value of liver cirrhosis predictive ability was 0.848, 0.800, 0.658, 0.747, 0.725, 0.663 in all cases. In the analysis by liver disease, hepatitis C (45 cases) were 0.777, 0.787, 0.498, 0.727, 0.651, 0.690, and NAFLD (39 cases) were 0.893, 0.774, 0.700, 0.862, 0.864, 0.773. In the analysis by presence or absence of obesity, BMI less than 25 (82 cases) were 0.876, 0.874, 0.577, 0.694, 0.754, 0.703, BMI 25 or more (56 cases) were 0.876, 0.760, 0.766, 0.821, 0.664, 0.558. Analysis by the presence or absence of hepatitis, liver pathology A0 or 1 (68 cases) were 0.901, 0.920, 0.612, 0.823, 0.765, 0.725, liver pathology A2 or 3 (70 cases) were 0.794, 0.711, 0.670, 0.644, 0.702, 0.582.
Conclusions In all cases, the F Index was superior to Vs and LFI and liver fibrosis markers in diagnosing liver cirrhosis. Obesity and liver inflammation are known as factors related to the diagnostic ability of hepatic fibrosis in ultrasonic elastography, but the F Index was also useful in obesity or liver inflammation cases.

A retrospective comparison of liver steatosis scoring from conventional ultrasound using scalable deep learning vs fibroscan

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Research Purpose Conventional ultrasound (US) is the frontline screening modality for liver steatosis, but associated diagnoses are highly subjective, with low intra- and inter-rater consistency. Quantitative ultrasound tools, like FibroScan, can offer non-invasive objective scores, but their availability is limited. Ideally, a quantitative score could be produced from conventional US. Deep learning (DL) algorithms, powered by large volumes of data, have the potential to produce objective computer-aided diagnosis systems from conventional US, which could provide more widely

available quantitative liver steatosis scores. Toward this end, we develop an accurate and generalizable scoring system for liver steatosis from US, using scalable deep learning and the largest algorithmic training cohort to date.
Materials and Methods We trained a deep learning neural network called ResNet18 with retrospectively collected US images from 3310 patients (19513 studies and 228075 images) from the clinical archives of the **** Hospital. The deep learning algorithm was trained to diagnose steatosis grades along an ordinal scale: healthy, mild, moderate, or severe. From these, a continuous image-wise score is produced for each US image in a study, which is then aggregated together to produce a study-wise score. Images must belong to one of four common liver viewpoints. We validated performance on two histopathology-proven patient cohorts: HP-U and HP-T, which include 147 and 80 patients respectively (10-14 images per study), and we compared diagnostic performance with control attenuation parameter (CAP) scores from FibroScan. The labels in HP-T were blind to researchers during the algorithmic development.
Results The proposed deep learning algorithm outperformed or performed at least comparably to FibroScan on the clinical test cohorts. For HP-T our algorithm reported AUCs of 0.93, 0.97, and 0.92 for diagnosing >=mild, >=moderate, or =severe steatosis, respectively, while FibroScan reported AUCs of 0.89, 0.923, and 0.82, respectively.
Conclusions Our algorithm could be used for liver steatosis patient screening and longitudinal monitoring to provide decision support for clinicians.

Detection of pediatric hepatic steatosis by ultrasound Nakagami imaging

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Objectives Nonalcoholic fatty liver disease (NAFLD) is the most common pediatric liver disease worldwide. Assessment of fatty liver for overweight and obese children is recommended for inclusion in guidelines. The aim of this study was to evaluate the feasibility of using ultrasound Nakagami imaging to produce a parametric image for analyzing the echo amplitude distribution to assess pediatric hepatic steatosis.
Methods A total of 166 pediatric participants were enrolled in this study. Using ultrasound backscattering analysis based on Nakagami imaging was applied to raw data acquired from each participant. The Nakagami parameters were compared with the hepatic steatosis index (HSI) and the steatosis grade (G0: HSI < 30; G1: 30 ≤ HSI < 36; G2: 36 ≤ HSI < 41.6; G3: 41.6 ≤ HSI < 43) using correlation analysis, one-way analysis of variance (ANOVA), and receiver operating characteristic (ROC) curve analysis.
Results The Nakagami parameter increased from 0.62 ± 0.09 to 0.87 ± 0.03 with increasing severity of hepatic steatosis from G0 to G3 as an upward trend and was significantly different between the different grades of hepatic steatosis ($p < .05$). The areas under the ROC curves were 0.96, 0.92, and 0.85 for diagnosing hepatic steatosis ≥ G1, ≥ G2, and ≥ G3, respectively.
Conclusions The Nakagami parameter value quantifies changes in the echo amplitude distribution of ultrasound backscattered signals caused by fatty infiltration, providing a novel, noninvasive, and effective data analysis technique to detect pediatric hepatic steatosis.

Risk factors for gallbladder polyps observed through second-look abdominal sonography in patients with fatty liver disease

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Background Multiple studies have provided varied results on the relationship between gallbladder polyps (GBPs), fatty liver disease (FLD), and metabolic factors.
Goals The purpose of this study was to determine the possible risk factors related to GBP formation in Taiwanese population through the use of health examinations.
Study In this retrospective study, 1311 subjects who underwent abdominal sonography for health evaluations from September 2019 to August 2020 were randomly enrolled. Baseline characteristics of the study subjects were recorded. Risk factors related to GBP formation were analyzed. All participants' series of abdominal sonography examinations in our hospital were also retrospectively reviewed to reveal the presence of GBPs through second-look sonography.
Results Among 1311 participants, 946 participants (72.2%) had clinically evident FLD, as documented using abdominal sonography; GBPs were found in 233 (24.6%) subjects with FLD. The incidence of FLD was significantly associated with the presence of GBP ($p < 0.001$; OR: 4.16, 95% CI: 10.67-35.55). However, the severity of FLD was not found to be associated with GBP ($p = 0.052$). In a multi-variate analysis, GBP formation was found to be significantly correlated with the incidence of FLD ($p < 0.0001$, OR = 4.262, 95% CI: 2.17-8.34), younger group ($p = 0.002$; OR: 0.973, CI: 0.95-0.99), and alcohol consumption ($p = 0.009$; OR: 3.368, CI: 1.34-8.42). Among 1049 subjects in the non-GBP group, 56 (5.34%) persons were found to have had a GBP at least once in the other series of abdominal sonographies ($p < 0.0001$).
Conclusions FLD, younger group, and alcohol consumption are major risk factors of GBP formation in Taiwanese population. The presence of GBPs might be revealed in second-look examinations of abdominal sonographies.

Clinical value of acoustic radiation force impulse imaging in evaluating rejection of liver transplantation

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Objective To quantitatively analyze the changes of liver tissue hardness in patients with acute rejection of liver transplantation (AR) before and after treatment by acoustic radiation force impulse imaging (ARFI), and to explore its clinical application value.
Methods 36 patients with AR confirmed by liver biopsy pathology were selected as the research objects. According to the liver function outcome after 14 days of treatment, they were divided into abnormal liver function outcome group (15 cases, group B) and normal liver function outcome group (21 cases, group A). ARFI was used to measure the shear wave velocity (SWV) of liver tissue at each time point (before treatment and 14 days after treatment), and the levels of aspartate aminotransferase (AST), alanine aminotransferase (ALT) and total bilirubin (TBIL) were measured at the same time. 30 normal volunteers were selected as the control group. The differences of SWV value and serological indexes among the groups were compared.
Results Before treatment, SWV, AST, ALT and TBIL of AR patients were significantly higher than those of control group (all $P < 0.05$). After 14 days of treatment, SWV, AST, ALT and TBIL in group B were higher than those in group A and control group ($P < 0.05$). After 14 days of treatment, SWV, AST, ALT and TBIL in group A decreased significantly compared with those before treatment ($P < 0.05$), but there was no significant difference compared with the control group ($P > 0.05$). SWV in

AR patients was positively correlated with various serum indexes, and the correlation between SWV and TBIL was the highest (r = 0.68, P < 0.05). SWV > 1.58 M / s was the best cut-off point, the area under the curve of SWV was 0.92, 95% confidence interval was 0.783-0.899, sensitivity and specificity were 88.5% and 78.3%, respectively.
Conclusion ARFI can quantitatively analyze the hardness of liver tissue during AR, indirectly reflect the degree of liver function damage, and provide valuable reference for clinical evaluation of the prognosis of AR.

Bedside contrast-enhanced ultrasound： in the assessment of acute hepatic arterial thrombosis in early liver transplant

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Purpose Our aim in this prospective study was to investigate the application and clinical value of beside contrast-enhanced ultrasound (CEUS) in assessment of Hepatic arterial thrombosis (HAT) during the early post-liver transplant period.
Methods and materials From March 2016 to May 2020, bedside color Doppler ultrasound (CDUS) and CEUS examination were performed for liver transplantation recipients on the post-operative day 0, 1, and 2, if the recipient was still in the intensive care unit （ICU）after post-operative day 3, more bedside ultrasound (US) examinations were performed to meet the clinical request. Real time CEUS was performed after a bolus injection of SonoVue (1ml, Bracco, Italy) followed by 5ml of saline solution. Using pulse inversion harmonic (*PIH)* technique (Philips CX50) with a 1–5-MHz transducer. CEUS were performed to mainly observe the proper, left, and right Hepatic arterial (HA)s. Digital Subtraction Angiography (DSA) or computed tomographic angiography （CTA） were used as reference.
Results March 2016 - March 2020, 585 liver transplant recipients underwent a total of 1967 bedside CDUS and CEUS examinations. Intra- and extra- HA disappeared in 21 cases on CDUS, and among these 21 patients, CEUS showed HA in 9 cases, while detected 12 cases of HAT, and all the 12 HAT cases were confirmed by DSA. Among the 11patients without left HA flow on CDUS, CEUS showed left HA in 5, still failed to display left HA in 6. Among the 4 cases without right HA flow on CDUS, CEUS showed right HA in 3, still failed to display it in 1. All these 15 cases were confirmed with open HA by follow-up CEUS and CTA. There was no omission in HAT for CEUS.
Conclusion Bedside CEUS corrected the false positive of CDUS in time and avoided further examination. Left/right HA may disappear on CEUS in few cases, but HAT could be usually excluded when the extrahepatic artery and the other intrahepatic artery appear.

Ultrasound-based diagnostic nomogram for differentiation of benign and malignant focal solid pancreatic lesions

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Objective The purpose of this study was to develop and validate an ultrasound-based diagnostic model for differentiation of benign focal pancreatic lesions (BFPL) and malignant focal pancreatic lesions (MFPL).
Material and Methods From March 2011 to June 2021, a total of 143 patients with pathologically confirmed focal pancreatic lesions (FPL) were enrolled in this retrospective study, including 98

MFPL and 45 BFPL. The patients were randomly assigned to training (n=73) and validation set (n=71). Imaging characteristics were extracted from base-line ultrasound and contrast enhanced ultrasound (CEUS). The features of images were initially evaluated by univariate logistic regression and significant variables were further assessed by multivariable logistic analysis. A nomogram was constructed on the basis of the predictors and the diagnostic efficacy of the model was evaluated using ROC curves on both the training and validation sets.
Results A nomogram model of diagnosing MFPL in regarding to dilated pancreatic and bile ducts, obscured margin, focal pancreatic swelling, invading or compressing adjacent vessels and hypo-enhancement in the venous phase on CEUS was derived from the training set. This prediction model showed excellent diagnostic efficacy in both the training and validation sets with AUC value of 0.952 and 0.938, sensitivity of 95.9% and 91.8%, specificity of 82.6% and 68.2%, and accuracy of 91.7% and 84.5%, respectively.
Conclusion Sonographic features are diverse in benign and malignant focal pancreatic lesions. The diagnostic nomogram model incorporating baseline ultrasound and CEUS features provided an effective way to differentiate BFPL from MFPL which may be helpful in clinical decision-making.

Diagnostic value of three-dimensional ultrasound surface mode imaging in gastric bulgy lesions

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Abstract Objective To evaluate the value of Three-dimensional(3D)ultrasound surface mode imaging in diagnosis of gastric bulgy lesions.
Methods 66 patients with gastric bulgy lesions were prospectively studied. All patients underwent routine Two-dimensional(2D) ultrasound imaging assessment of the stomach and the acquisition of 3D imaging.Analyze the 2D and 3D ultrasonographic manifestations of the gastric bulgy lesions, made a respective contrast between gastroscope and（or） surgical pathological results and cheek-up results by 2D and 3D ultrasonography，then figured out diagnostic accordance rates and made a chi-square test ofthem.
Results 3D ultrasound diagnosis coincidence rate was 84.8%, the 2D was 69.6%, the statistics shows there is significant differences between them（P<0.05）.3D imaging can clearly display the lesions' number, size, shape and extent of tumor invasion of the gastric wall. which were superior to 2D imaging.
Conclusions 3D imaging in the diagnosis of gastric bulgy lesions is more comprehensive, intuitive and vivid than the 2D.On the orientation, quantitative, qualitative changes to make up for 2Dimaging，which can improve the accuracy of diagnosis.

Diagnostic value of ultrasonography in different types of acute colonic diverticulitis

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Objective To explore the diagnostic value of ultrasonography in uncomplicated and complicated acute colonic diverticulitis.
Materials and Methods A total of 17 patients with pathologically or clinically confirmed acute colonic diverticulitis from January 2019 to January 2021 in Peking Union Medical College Hospital were enrolled in this study. The clinical and imaging features of acute colonic diverticulitis were retrospectively analyzed. The ultrasound features of uncomplicated and complicated (combined

with perforation and/or abscess formation) types were compared with computed tomography (CT) results.
Results Among the 17 patients, there were 13 uncomplicated diverticulitis and 4 complicated diverticulitis. 13 of them were right-sided (ascending colon, cecum), 4 of them were left-sided (descending colon, sigmoid colon). The diagnostic accuracy of ultrasound for acute colonic diverticulitis was 90.91%, of which uncomplicated diverticulitis was 87.50% and complicated diverticulitis was 100%. 9 cases underwent ultrasound and CT tests at the same period, and the concordance rate was 88.89%. Among the 6 uncomplicated cases, outpouchings with or without hyperechoic gas or fecaliths of the colonic wall were detected in 5 patients. The outpouchings have distinct boundary and short segmental colonic wall thickening with hyperechoic fatty tissue around them. Only 1 of the uncomplicated case was not detected by ultrasound. Hypoechoic masses with echogenic debris and gas bubbles were detected in all the 3 complicated cases，which had indistinct boundary and were adhere to the adjacent intestine and bladder. 1 patient with uncomplicated diverticulitis was evaluated by ultrasound during follow-up period.
Conclusion Ultrasound is of great value in the diagnosis of acute colon diverticulitis. It is comparable to CT in diagnosing complicated diverticulitis. We should emphasize the value of ultrasound in diagnosis and follow-up of this disease.

Role of ultrasonography in evaluation of patients with renal failure

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resident

Introduction Kidney failure do not cause specific symptoms which leads to their delayed diagnoses, resulting in patients admitted only with elevation in serum urea and creatinine. Ultrasonography of the kidneys is essential in the diagnosis and management of kidney-related diseases.
Aim To investigate the potential utility of renal Ultrasonography to distinguish acute from chronic renal failure.
Materials and Methods Patients were subjected to USG Whole Abdomen on GE LOGIQ F8 EXPERT and GE VOLUSON S8 sonography machines. Proper setting of the overall gain – system gain and TGC/DGC was adjusted to optimally visualize each kidney.
Results combined gray scale and color doppler has higher sensitivity, specificity, PPV, NPV rather than just gray scale or color doppler USG in isolation.
Conclusion USG plays a great role in evaluation of patients with ARF and CKD. Duplex color doppler plays a major role as it can detect damage to renal parenchymal vascular resistance.

A methodological study of 2D-SWE for noninvasive quantitative assessment of renal fibrosis in patients with CKD

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Purpose To determine the optimal measurement method of 2D shear wave elastography (2D-SWE) for noninvasive quantitative assessment of renal fibrosis in patients with chronic kidney disease (CKD), which can lay the methodological foundation for clinical application.
Methods From April 2019 to March 2021, a total of 190 patients with CKD who were admitted to the Department of Nephrology of the Fifth Affiliated Hospital of Sun Yat-sen University and needed renal biopsy were enrolled in this study. 2D-SWE of the right kidney was performed at different

measurement sites, body positions and depths, respectively. The success rates, coefficients of variation and pathological correlation of different measurement sites, body positions and depths were compared. And the reproducibility of 2D-SWE under the optimal measurement method was evaluated.

Results (1) Measurement sites: The success rate of 2D-SWE in the middle part of the kidney (100%) was higher than that in the lower pole (97.3%), but the difference was not statistically significant (P >0.05). The coefficient of variation in the middle part (10.2%) was lower than that in the lower pole (16.4%), and the difference was statistically significant (P <0.05). The correlation between renal stiffness of the middle part and degree of fibrosis (r =-0.452, P <0.05) was higher than that of the lower pole (r =0.097, P ＞0.05). (2) Body positions: The success rate of 2D-SWE in lateral decubitus position (100%) was higher than that in supine (99.4%) and prone position (99.4%), but there was no statistical difference in pairwise comparison (P >0.05). The coefficient of variation in prone position (11.9%) was lower than that in supine position (13.8%) and lateral decubitus position (13.9%), and the differences were statistically significant (P <0.05). The correlation between renal stiffness and degree of fibrosis was highest in prone position (r =-0.256, P <0.05), then in supine position (r =-0.249, P <0.05), and lowest in lateral decubitus position (r =-0.158, P >0.05). (3) Measurement depths: The success rate of 2D-SWE at depth <4 cm (100%) was higher than that at depth ≥4 cm (98.8%), but the difference was not statistically significant (P >0.05). The coefficient of variation at depth <4 cm (11.1%) was lower than that at depth ≥4 cm (14.4%), and the difference was statistically significant (P <0.05). The correlation between renal stiffness and degree of fibrosis at depth <4 cm (r =-0.303, P <0.05) was higher than that at depth ≥4 cm (r =-0.156, P >0.05). (4) The reproducibility test under the optimal measurement method: The intra-operator reproducibility of both operators was excellent (ICC =0.879~0.915, all P <0.05). The inter-operator reproducibility was moderate (ICC =0.542, P <0.05).

Conclusion Based on the comprehensive evaluation of success rates, coefficients of variation and pathological correlation, the optimal measurement method of 2D-SWE for noninvasive quantitative assessment of renal fibrosis in patients with chronic kidney disease was finally obtained: prone position, renal middle part, and measurement depth <4 cm. Under the optimal measurement method, the intra-operator reproducibility of both operators was excellent while the inter-operator reproducibility was moderate.

Oral-Interventional ultrasound

Ultrasound-guided microwave ablation of small lesions of hepatic echinococcosis to achieve complete inactivation

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Objective To study the clinical application of microwave-assisted ablation of small lesions of hepatic echinococcosis under the guidance of ultrasound to define the complete inactivation range.
Methods Forty cases of hepatic alveolar hydatid lesions (less than 3cm) were divided into microwave ablation group (20 cases) and microwave ablation combined with surgical resection group (20 cases). The size, shape, internal echo, surrounding anatomical relationship, growth position, clear boundary of the lesion before and after surgery, CDFI, contrast ultrasound, elastography, MRI, etc. The inactivation of the microwave ablation group was compared with the microwave ablation combined with the surgical resection group, including the length of operation, postoperative complications, recurrence rate, trauma size, and speed of recovery. Using SPSS 19. 0 Statistical software was used for data analysis, and measurement data were expressed as mean ± standard deviation; mean comparison between two groups was by t test. All indexes were analyzed by $\chi 2$ test, and $P < 0.05$ was considered statistically significant.
Results There were statistically significant differences in the incidence of postoperative complications between the two groups of patients ($P < 0.05$). The degree of inactivation and the range of inactivation were evaluated based on the postoperative pathology. The ablation ranges of different sizes of lesions were compared by comparing the microwave ablation group And boundary, further laid a solid foundation for minimally invasive treatment of small lesions of hepatic echinococcosis.
Conclusions Small lesions of hepatic echinococcosis can be completely inactivated under ultrasound guidance under microwave ablation, which has certain advantages over surgical resection. It has fast recovery, fewer postoperative complications, and reduced economic burden. Early treatment has a positive effect and is worthy of clinical application and promotion.

Paclitaxel-loaded phospholipid microbubbles modified with dual-targeting ligands combined with ultrasound for enhancing chemotherapeutic efficacy of pancreatic cancer

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Object Chemotherapy plays an important role in treatment of pancreatic cancer, but pancreatic cancer has excessive extracellular matrix deposition and low vascular density which decrease the accumulation of chemotherapeutic drugs into the tumor site and led to poor chemotherapeutic efficacy. Therefore, how to increase the precise targeted delivery of chemotherapeutic drugs to the tumor site is an important scientific subject. In this study, we propose to prepare dual targeting ligands (cRGD and cCLT1) modified ultrasound microbubble contrast agents loading chemotherapeutic drug paclitaxel (PTX-RCMBs). We aim to increase the drug delivery to the tumor using the cavitation effect induced by ultrasound irradiation to precisely target and control the release of paclitaxel. This study will provide a modality for increasing the concentration of paclitaxel at the tumor site and improving the efficacy of the chemotherapeutic drug.
Methods Firstly, PTX-RCMBs were prepared by thin film hydration. Then, their properties of stability, drug release and imaging characteristics were studied. Next, Cy5 was used to mimic paclitaxel and the enhanced cellular uptake of the drug by pancreatic cancer cells PANC-1 using

PTX-RCMBs combined with ultrasound was investigated by flow cytometry and confocal laser scanning microscopy. Finally, the safety of the drug carrier RCMBs and the enhanced cytotoxicity of PTX-RCMBs combination with ultrasound were examined using CCK-8.
Results 1. PTX-RCMBs could be stable for 3 days at 4 ℃, showing their good stability; the drug release rate of PTX-RCMBs was 77.10 ± 3.21 % with ultrasound irradiation, indicating that paclitaxel can be released rapidly from PTX-RCMBs; the imaging time of PTX-RCMBs could be maintained for 20 min in vitro, suggesting their good imaging capability.**2.** In vitro cellular uptake, PTX-RCMBs combined with ultrasound were able to increase the cellular uptake of Cy5 compared to other groups, confirming the effect of targeting ligands and ultrasound in increasing drug delivery to tumor cells.**3**. In vitro cytotoxicity assay, PTX-RCMBs combined with ultrasound could enhance the cytotoxicity of paclitaxel, whose cytotoxicity were 3 fold higher than the control group. This result was consistent with the cellular uptake, showing that targeting ligands and ultrasound could increase the drug delivery to tumor cells and thus enhance the therapeutic effect of chemotherapy.
Conclusion The use of dual targeting ligands (cRGD and cCLT1) modified ultrasound microbubble contrast agents loading chemotherapeutic drug paclitaxel can increase the accumulation of chemotherapeutic agents in pancreatic cancer cells and enhance their chemotherapeutic efficacy, making targeting ligand-modified microbubbles in combination with ultrasound can be used as a modality to improve the efficacy of tumor chemotherapy.

US-responsive TRAIL gene delivery system for therapy of orthotopic pancreatic cancer

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Purpose Pancreatic cancer is one of the major diseases threatening human health. Traditional treatment methods cannot meet the needs of pancreatic cancer treatment. Its five-year survival rate is less than 5%. Therefore, it is very important to explore new treatment methods for pancreatic cancer. In recent years, gene therapy has become a research hotspot in the treatment of pancreatic cancer, but traditional non-carriers are not stable in the blood circulation, easy to be phagocytosed and cleared by lysosomes, and limited intracellular release capacity, which limits their application. Therefore, the design of a new type of gene carrier is imminent.
Methods Based on the ROS-responsive cationic polymer BPDEAEA, while loading the TRAIL gene, and wrapping it with IR780 liposomes, we constructed BPDEAEA/TRAIL@IR780Liposome (BTIL) nanoparticles for effective gene delivery. The encapsulated liposomes on the surface can improve the blood stability of BPDEAEA/TRAIL, increase the circulation time, and increase the EPR effect. In addition, IR780, as a traditional sonosensitizer, can generate ROS under the stimulation of ultrasound. By choosing an appropriate enrichment time, under the stimulation of ultrasound, the BPDEAEA/TRAIL polymer can be depolymerized at a specific point, so that the nano-platform has an instant controllable effect.
Results The successful construction of BTIL nanoparticles was successfully characterized by TEM, UV-vis., DLS and other means. The charge reversal ability of the nanoparticle was successfully verified by gel electrophoresis and zeta potential, and the optimal N/P transfection ratio was determined by the luciferase transfection experiment, and TRAIL expression was verified by WB and immunofluorescence assays. Through flow cytometry, we determined the best time to take up the nanoparticles. At this ingestion time, we used a confocal laser microscope (CLSM) to further verify the process of nanoparticles entry, lysosome escape, and BPDEAEA/TRAIL depolymerization release. Subsequently, through CCK-8 experiment and flow cytometry experiment, we further verified the tumor-killing effect of the nanoparticles. In addition, we have determined the accumulation time of BTIL particles at the tumor site through fluorescence enrichment experiments. Through the use of small animal *in vivo* imaging, the combination of the nanoparticles and ultrasound has a significant therapeutic effect on the animal level, and effectively

inhibits the growth of pancreatic cancer. Through immunohistochemistry, hemolysis experiments and animal blood biochemical tests, it is determined that the nanosystem has good biological safety. **Conclusion** Compared with traditional gene carriers, this new type of nano-gene delivery system has the following advantages: 1. Rapid cell uptake ability; 2. Enhanced lysosome escape ability; 3. Nuclear localization and targeting ability; 4. Ultrasound regulation Real-time gene release capability under the environment. We believe that the nano-system can play an important role in the treatment of pancreatic cancer for the combination of sonodynamic therapy and gene therapy.

Microwave ablation without subsequent lumpectomy versus breast-conserving surgery for early breast cancer: a propensity score matching study

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Objectives To compare the efficacy of ultrasound-guided percutaneous microwave ablation (MWA) without subsequent lumpectomy and breast-conserving surgery (BCS) in patients with early breast cancer (BC).
Materials and Methods This retrospective cohort study included 106 patients with early invasive BC (T0/1/2 N0/1 M0) treated by BCS or MWA from October 2014 to December 2020 in a single institution. Propensity score matching (PSM) was performed at 1:1 to balance the baseline characteristics. The tumor progression, overall survival (OS), disease-specific survival (DSS), complications, and cosmetic results were compared.
Results Before PSM, 21 patients underwent MWA and 85 patients underwent BCS were enrolled. After PSM, 21 pairs of patients were allocated into each group with comparable tumor size (P=0.32) and subrogate molecular subtype (P=0.23). MWA needed shorter operative time (60min vs 101min, P<0.001) under local anesthesia compared to the BCS under general anesthesia. For the management of metastatic lymph nodes, five(5/21, 24%) patients with six nodes underwent ablation in MWA group and three patients (3/21, 14%) underwent axillary lymph node dissection in BCS group. Less patients in MWA group received postoperative adjuvant chemotherapy (14% vs 48%, P=0.04) and radiation therapy (14% vs 81%, P <0.001) for comorbidities. During a median follow-up of 25 months (range, 5-70 months), there was no significant difference in tumor progression (10% vs 0%, P>0.99), OS (96% vs 100%, P>0.99), DSS (100% vs 100%, P>0.99), and complications (0% vs 19%, P=0.58). All the patients in MWA group reported excellent cosmetic results but 29% of BCS patients didn't report excellent results for breast asymmetry (10%) and scar formation (29%).
Conclusion This preliminary study showed that in selected early breast cancer patients, microwave ablation without subsequent lumpectomy has comparable tumor control effect with breast-conserving surgery and better cosmetic results during an intermediate follow-up. Microwave ablation provides a safe and feasible choice for patients reluctant or intolerant to breast-conserving surgery.

Erythrocyte-camouflaged mesoporous titanium dioxide nanoplatform for an ultrasound-mediated sequential therapies of breast cancer

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Background The hypoxic microenvironment promotes tumor resistance to most treatments,especially highly oxygen-dependent sonodynamic therapy (SDT).
Method and Results In view of the aggravation of hypoxia by oxygen consumption during SDT, a biomimetic drug delivery system was tailored to integrate SDT with hypoxiaspecific chemotherapy. In this system, mesoporous titanium dioxide nanoparticles (mTNPs) were developed to deliver the hypoxia-activated prodrug AQ4N with high loading efficiency.Subsequently, a red blood cell (RBC) membrane was coated onto the surface of mTNP@AQ4N. RBC-mTNPs@AQ4N inherited the immune escape ability from RBC membranes, thus efficiently reducing the immunological clearance and improving the work concentration. Upon activation by ultrasound (US), mTNPs as sonosensitizers generate reactive oxide species (ROS), which not only induce apoptosis and necrosis but also disrupt RBC membranes to achieve the US-mediated on-demand release of AQ4N. The released AQ4N was activated by hypoxia to convert into toxic products, which effectively supplemented the inefficiency of SDT in hypoxic tissues. Importantly, SDT-aggravated hypoxia further potentiated this hypoxia-specific chemotherapy of AQ4N.
Conclusion Based on the sequential strategy, RBC-mTNPs@AQ4N exhibited an excellent synergistic therapeutic effect, thus potentially advancing the development of SDT in cancer treatments.

The long-term efficacy of ultrasound-guided neural injection with 5% dextrose in carpal tunnel syndrome

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Research purpose Carpal tunnel syndrome is the most common entrapment neuropathy. Recently, ultrasound-guided neural injection with 5% dextrose in treatment of carpal tunnel syndrome with uplifting effect and fewer adverse effects has been reported. However evidence supporting its long-term efficacy is lacking. Hence, the aim of this retrospective study was to investigate its long-term outcome.
Materials and Methods A total of 185 patients diagnosed with all grades carpal tunnel syndrome who had received ultrasound-guided neural injection with 10 ml 5% dextrose at least one year prior were enrolled. Through structured telephone interviews, all patients were asked about the post-injection outcome compared with the pre-injection condition. Symptom relief ≥50% was considered as an effective outcome while symptom relief < 50% was rated as a poor outcome.
Results Total 88.6% patients reported effective outcome and 11.4% rated a poor outcome after a mean of 2.2 injections with a mean 1 to 3 years' post-injection follow-up. Additionally, 80% patients (12/15) with failure of surgery or post-surgery recurrence got effective outcome with a mean of 2.3 injections. The outcome is significantly related with severity grade that the patients rating poor outcome significantly have higher incidence of severe grade compared to effective outcome (52.4% v.s. 31.7%, p = 0.03). Patients with mild, moderate and severe grades respectively need an average of 1.7, 2.4, and 2.6 injections to reach effective outcome (p=0.006) (Severe v.s. mild, p = 0.008; Moderate v.s. mild, p = 0.062).
Conclusions Ultrasound-guided neural injection with 5% dextrose is a novel approach for CTS with outstanding long-term effect.

Using shear wave ultrasound elastography for follow up after anti-spastic intervention among stroke patients

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Spasticity is a major problem in stroke patients and affects performance of hand function, gaits and quality of life. Commonly used physical tests, such as modified Ashworth Scale (MAS), are examiner-dependent and susceptible to inadequate reliability. One of the recent applications is to use the ultrasound shear wave image, which correlated with the muscle stiffness caused by post stroke spasticity. However, there are no longitudinal studies to show the validity of this measurement for follow up. Our goal is to quantify the change of elbow flexors by shear-wave ultrasound elastography after intramuscular injection with botulinum toxin, which has proved to be an effective treatment in reducing spasticity.

This was a prospective, longitudinal follow up study and enrolled 24 stroke patients receiving botulinum toxin (Botox®, Allergan) injection for post-stroke spasticity. Fourteen of them received injection in the biceps brachii and brachialis muscles. The shear wave velocity (SWV) was evaluated with TOSHIBA Aplio 500 for the biceps brachii and brachialis muscles before treatment, and 1 and 3 months after treatment. MAS and self-reported improvement was evaluated at 1-month follow up.

The results showed that 41.7% of the participants had improved spasticity (at least one grade of decrease in MAS) of elbow flexor during 1-month follow up. The injection group (receiving botulinum injection at elbow flexors) had no significant change of SWV (extension position: -0.575 m/s, p=0.07; flexion position: +0.079 m/s, p=0.55) by Wilcoxon signed rank test, but the improved group had at biceps brachii (extension position: -0.71 m/s, p=0.047; flexion position: -0.39 m/s, p=0.013). At 3-month follow up, no more SVW reduction was noted in all the participants. Our results supported that the change of SWV was parallel to the clinical evaluation of spasticity and suggested the potential of using SWV as a tool for monitoring spasticity change and treatment response.

Mannose-derived carbon dots amplify microwave ablation-induced antitumor immune responses by capturing and transferring “danger signals” to dendritic cells

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Hepatocellular carcinoma recurrence and metastasis after microwave ablation (MWA) are challenges in the clinic. This study showed that mannose-derived carbon dots (Man-CDs) could effectively capture several “danger signals” (DS) after MWA treatment and then deliver DS specifically to dendritic cells (DCs). This improved delivery of DS to DCs enhanced the processing and presentation of tumor-associated antigens by DCs. The results demonstrated that intratumoral injection of Man-CDs after MWA therapy elicited a potent tumor-specific immune response and finally led to the effective suppression of both primary and distant tumors. MWA + Man-CD treatment could efficiently reject tumor cell rechallenge *in vivo*. This study demonstrated that Man-CD nanoparticles are effective adjuvants that can improve MWA therapy by eliciting a tumor-specific immune response.

Ultrasound combined with microbubble mediated construction and preparation of a targeted cell-mimetic mesoporous silica nanoplatform with methotrexate loaded

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Purpose We aimed to design and construct folate acid targeted mesoporous silica nanoparticles loaded with MTX for targeted therapy of RA. In this chapter, MSN-MTX@PDA@RBCM-FA NPs were prepared and characterized. The drug release in vitro mediated by different pH, temperature and ultrasound combined with microbubble (US + MB) was evaluated, providing experimental basis for the safety, targeting and therapeutic efficacy of MSN-MTX@PDA @RBCM-FA NPS in vitro.
Methods MSN-MTX and MSN-MTX@PDA nanoparticles were prepared by dopamine self-polymerization method. Folate targeted mesoporous silica nanoparticles with MTX loaded (MSN-MTX@PDA@RBCM-FA NPs) were prepared by Michael addition reaction and erythrocyte membrane coating methods.
Results We have successfully prepared a targeted drug-loading nanoplatform with high drug loading rate, good stability, small nanoparticle size and uniform dispersion, and confirmed that it has the dual role of slow-release drugs and promote drug release to regulate drug release.
Conclusion We successfully prepared mesoporous silica nanoparticles loaded with MTX and coated with RBCM and FA with high stability, good, dispersion and high drug loading rate. MSN-MTX@PDA@RBCM-FA NPs showed dual drug release effect, and can promote the release of MTX mediated by ultrasound and microbubbles (US + MB).

Correlative study on the evaluation of invasiveness of thyroid cancer by contrast- enhanced ultrasound and MVD

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Objective 1. To explore the correlation between contrast-enhanced ultrasound mode and cervical lymph node metastasis, cervical lymph node subdivision of thyroid cancer and the possibility of predicting cervical lymph node metastasis.**2.** To explore the relationship between ultrasound contrast mode and thyroid cancer pathological type and TNM stage.**3.** To analyze the relationship between MVD of thyroid cancer and cervical lymph node metastasis, and provide a pathological basis for the correlation between ultrasound contrast mode and invasiveness of thyroid cancer.
Methods and materials A total of 228 patients who were diagnosed as thyroid cancer by surgical pathology after undergoing thyroid ultrasonography were selected and observed. The second-generation ultrasound contrast agent is used. The instrument uses Hitachi HiVison Ascendus color Doppler ultrasound diagnostic instrument, L18-5 broadband linear array probe, the contrast probe uses L7-3MHz transmission frequency, and the mechanical index during contrast is 0.13. Cases were divided into high contrast ultrasound, equal enhancement group, and uneven weak enhancement group. The correlation of contrast ultrasound mode with cervical lymph node metastasis and different lymph node partitions and the possibility of predicting lymph node metastasis were analyzed. Re-analyze the correlation between contrast enhancement mode and thyroid cancer pathological type, TNM stage, and general pathological features such as gender, age, lesion size, calcification and so on. Immunohistochemical staining used mouse anti-human CD34 monoclonal antibody to treat the pathological specimens by S-P method. Two experienced

doctors counted the microvessels of the specimens by double-blind method to obtain the average of the two. Taking the mean value of the overall microvessel density as the cutoff value, cases can be divided into high MVD group and low MVD group, and their correlations with ultrasound contrast mode, lymph node metastasis and other characteristics are analyzed. SPSS20.0 statistical software was used for data processing: Chi-square test was used for thyroid cancer angiography mode and lymph node metastasis analysis; Fisher 's exact probability method was used for the relationship between ultrasound angiography mode and metastatic lymph node divisions; ultrasound contrast mode was used to predict lymph node metastasis using Logistic regression analysis. Chi-square test was used to compare the general clinicopathological data of ultrasound contrast mode with TNM stage, pathological type and other clinical pathological characteristics between different MVD groups.

Results 1. Up to 76.2% of patients with inhomogeneous hyper and iso-enhancement group developed cervical lymph node metastasis; only 49.7% of patients with inhomogeneous hypo-enhancement group developed cervical lymph node metastasis, the difference between the groups was statistically significant ($x^2 = 30.02$, $P < 0.05$). In inhomogeneous hyper- enhancement group, cervical VI area (central area) lymph node metastasis is the highest 64.52%, followed by III area 24.19%, and the remaining areas are relatively few; in inhomogeneous hypo-enhancement group, cervical VI area lymph node metastasis is the highest, and the remaining areas are rare. The difference within the group was statistically significant ($x^2 = 11.396$, $P < 0.05$). The OR value of ultrasound contrast mode and cervical lymph node metastasis was 3.612, the area under the ROC curve was 0.682, the sensitivity was 56.2%, and the specificity was 90.3%; the OR value was 6.844, the area under the ROC curve was 0.728, and the sensitivity was 47.1%. , With a specificity of 98.4%; an ultrasound contrast mode combined with capsule interruption to form a comprehensive index area under the ROC curve of 0.783, a sensitivity of 73.1%, and a specificity of 81.0%.**2.** Inhomogeneous, hyper-enhancement ultrasound contrast modes accounted for 66.7% of medullary carcinoma, followed by follicular carcinoma 51.4% and papillary carcinoma 19.9%; inhomogeneous hypor-enhancement group had the highest proportion of papillary carcinoma was 80.1%, followed by follicular carcinoma 48.6% and medullary carcinoma 33.3%, the difference was statistically significant ($x^2 = 21.193$, $P < 0.05$). In inhomogeneous hypor-enhancement group, the proportions of TNM stage I, II, III, IVA, and IVB were 82%, 15%, 2%, 1%, 1%, respectively, hyper-enhancement group were 63%, 32%, 2%, and 3%. The difference was statistically significant ($x^2 = 11.066$, $P < 0.05$).**3.** In the high MVD group, 51% were inhomogeneous, hyper-enhancement mode, and 49% were inhomogeneous hypor-enhancement mode, while in the low MVD group, all were inhomogeneous hypor-enhancement mode. Papillary thyroid carcinomas accounted for 40.32% and 59.68% of the high MVD group and 59.68% of the low MVD group respectively; follicular carcinomas were 97.22% and 2.78%; 6 cases of medullary carcinoma and 1 case of undifferentiated carcinoma were all high MVD groups. The proportions of TNM I phase high MVD and low MVD groups were 39.77% and 60.23%; TNM II phase was 90.91% and 9.09% respectively; 3 cases of TNM IIIa phase and 1 case of TNM IIIb phase were all high MVD group. The nodule ≤1cm group accounted for 10.89%, 89.11% (90/101) of the high MVD and low MVD groups; 79.80%, 20.20% (20/99) of the ≤2cm group; 97.34%,> 2cm group 2.64%. The proportion of high MVD and low MVD groups in lymph node metastasis group was 98.08% and 1.92%; the group without lymph node metastasis was 12.10% and 87.90%, respectively. The differences were statistically significant ($P < 0.05$).

Conclusions 1. The inhomogeneous hyper and iso-enhancement mode of ultrasound contrast is closely related to the occurrence of cervical lymph node metastasis in thyroid cancer. The contrast enhancement mode of ultrasound contrast may become a predictor of invasiveness of thyroid cancer.**2.** The contrast enhancement mode of ultrasound is related to the pathological type of thyroid cancer and the TNM stage, and can provide more effective information for clinical treatment.**3.** The enhancement mode of thyroid cancer ultrasound contrast has a strong correlation with the level of microvessel density. The higher the microvessel density, the stronger the invasiveness, which provides a pathological basis for the evaluation of invasiveness of thyroid cancer by ultrasound contrast.

Ultrasound-guided core needle biopsy for pediatric tumor under non-intubation general anesthesia: experience from a single cancer center

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Background Pediatric cancer poses a great threat to children's health and its incidence is increasing in recent years. Imaging-guided core needle biopsy (CNB) is a minimally invasive technique which used to obtain a qualified sample for pathologic examination. The number of studies on the diagnostic performance of ultrasound-guided CNB in the pediatric population is limited.
Objective Evaluate the diagnostic yield, accuracy, and safety of ultrasound-guided CNB under non-intubation general anesthesia and its potential role in the management of pediatric tumors.
Materials and Methods This study retrospectively analyzed the data of patients who underwent ultrasound-guided core needle biopsies under non-intubation general anesthesia for suspicious pediatric tumors from October 27th, 2010 to January 14th, 2021. Data collection mainly included demographics, imaging features, CNB details, pathological information, and clinical follow-up information.
Results A total of 305 biopsies were performed on 299 patients. 273 biopsies were performed to establish an initial diagnosis and 32 biopsies were performed on patients suspected of disease progression or recurrence. A total of 287 CNBs were diagnostic and 18 CNBs were non-diagnostic. The diagnostic yield was 94.1% (287/305). Pathological analysis methods are significantly different between diagnostic CNB and non-diagnostic CNB (p=0.001). The addition of immunohistochemistry improves the diagnostic yield (p=0.002). Of the 186 cases with the final diagnosis, 176 final diagnoses were consistent with the CNB diagnosis, and the diagnostic concordant rate was 94.6% (176/186). There was only one case of hemothorax as the major complication (1/305, 0.3%).
Conclusion Ultrasound-guided CNB under non-intubation general anesthesia is highly accurate and safe in the diagnosis of the pediatric tumor, and may become the preferred diagnostic method for the pediatric tumor to triage the children to undergo management respectively.

Oral-Other

Ultrasonic manifestation and pathological comparison of chromophobe renal cell carcinoma

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Objective To investigate ultrasonic manifestations of Chromophobe renal cell carcinoma(chRCC), and analyze its correlation with pathological features, evaluating ultrasonic value in preoperative diagnosis of chRCC.
Methods It is a retrospective and observational case series. Sixty-five patients admitted to the Department of Urological Surgery of Peking University Third Hospital between 2014 and 2020 were included. Clinical notes, pathological records, and imaging findings including tumor site, size, shape, boundary, internal echo, flow distribution, hydrops and lymph nodes surrounding the kidney, vascular invasion, and relationship between tumor and renal cortex, tumor and renal sinus were reviewed in all the patients. Spearman's correlation was used to verify the correlation between tumor size and tumor shape, boundary, echo, flow distribution and renal sinus or perirenal fascia invasion.
Results Among all the 65 patients, cases of tumor stage T1, T2, T3 and T4 were 36(55%), 6(9%), 21(32%) and 2(3%), respectively. All chRCC were in unilateral kidney, mainly solid (94%), only 4(6%) of them showed central liquefaction necrosis. And except for 2(3%) cases, all chRCC were solitary. Main features of chRCC in ultrasound images were hypoecho or isoecho (48/65, 74%), round or oval (49/65, 75%), clear boundary (59/65，91%), mainly located in renal cortex (41/65, 63%), with blood flow of grade 0-1 (38/65, 59%). Other manifestations include lobulation (6/65, 9%), calcification (7/65, 11%), vesicles (15/65, 23%), hydronephrosis (10/65, 15%), perirenal lymph nodes (4/65, 6%), and carcinoma thrombus in renal venous and postcava (1/65, 2%). Correlation analysis showed that tumor size was associated with tumor shape ($P<0.05$, $R=0.30$), necrosis ($P<0.01$, $R=0.33$), vesicles ($P<0.01$, $R=0.41$), hydronephrosis ($P<0.01$, $R=0.35$), renal sinus invasion ($P<0.01$, $R=0.56$), and blood flow($P<0.01$, 0.58), respectively. Renal sinus invasion was associated with hydronephrosis ($P<0.05$, $R=0.31$), length of tumor protruding to the renal sinus ($P<0.01$, $R=0.41$), ratio of tumor perpendicular diameter to the adjacent renal cortex thickness ($P<0.01$, $R=0.41$), respectively.
Conclusion The major sonographic appearance of chRCC was solid, sharply demarcated, round or oval, hypoechoic or isoechoic nodules with blood flow of grade 0-1. Large tumors often showed affluent blood flow, which prone to be bleeding and necrotic causing heterogeneous echo inside. Large tumors also can oppress renal sinus causing hydronephrosis, with higher probability of renal sinus and blood vessels invasion, as well as distant metastasis. Ultrasonographic measurement of the height of tumor protruding toward the renal sinus, tumor perpendicular diameter and ratio of tumor perpendicular diameter to the adjacent renal cortex thickness can indicate the possibility of renal sinus invasion and contribute to preoperative staging of chRCC.

2D-shear wave elastography , latest aid for diffuse liver pathologies.

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AIMS AND OBJECTIVES To evaluate the veracity of shear-wave elastography (SWE) in patients with diffuse liver disease and to hence to determine the staging of liver fibrosis.

METHODS A total of 100 subjects were selected from pool of patients enrolled for executive health check up including preventive ultrasound abdomen. All had undergone a routine grey scale ultrasound and in addition were subjected to liver shear wave elastography and stiffness of liver was measured at the upper right lobe where the ROI was placed 1-2cm from the liver capsule. 52 patients had features of hepatic steatosis on grey scale US, however fibrotic changes were noted in 63 on 2D SWE .The Metavir criteria was used for classification and to categorise the liver fibrosis.
RESULTS Apart from the subjects having features of liver disease on grey scale US,2D SWE could also identify early cases of diffuse liver diease which had a normal appearance on grey scale US. Majority of the patients of our study having stetotic changes fell into the category F2 and was observed more commonly in male subjects.
CONCLUSION 2D SWE study of the liver has proved to be reliable method for liver fibrosis evaluation and can potentially be used as a noninvasive test to differentiate intermediate degrees of liver fibrosis in patients with diffuse liver diseases.

Imaging evaluation of periatumoral liver fibrosis after TACE treatment in a modified rabbit VX2 liver tumor model

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Objective To investigate the changes of periatumoral hepatic fibrosis after transcatheter arterial chemoembolization (TACE) in a modified rabbit VX2 liver cancer model with imaging method.
Methods Twenty New Zealand white rabbits were randomly divided into control group and experimental group with 10 rabbits in each group. The rabbit VX2 liver cancer model was established by ultrasound-guided coaxial puncture technique. The tumor tissue was transported into the liver parenchyma through the coaxial needle channel, and then gelfoam was used to plug puncture needle tract. The tumor size, the rate of tumor formation, ectopic implantation, the procedure times, puncture numbers, complications and mortality were recorded after implanting. Ten rabbits in the experimental group were treated with TACE during 2-3 weeks after implanting. Through the femoral artery approach, the microcatheter and guide wire were selected to enter the proper hepatic artery under X-ray fluoroscopy. The micro guide wire was pulled out and hepatic arteriography was performed. 10 mg pirarubicin was dissolved by adding 5 ml glucose injection, and then emulsified with lipiodol in a ratio of 2:1. The mixture was pumped in at a speed of 2.0 ml / h by microinjection pump. The control group did not experience any treatments. Evaluation was performed at the end of 2 weeks after TACE: ① Shear wave elastography (SWE) and diffusion weighted imaging (DWI) were used to detect liver parenchyma within 1-2 cm of the tumor edge (Hereinafter referred to as near liver); ②Collecting blood through the ear artery and centrifuging the blood sample to obtain the serum, which was used to test the alanine aminotransferase (ALT), aspartate transaminase (AST), and creatinine (Cr) Blood urea nitrogen (BUN) to evaluate liver and kidney function; ③Finishing above-mentioned test, the rabbits are sacrificed, and samples of close liver tissues are taken and stained by Hematoxylin and Eosin (H&E) To evaluate the pathological morphology; Masson's three-color staining method (hereinafter referred to as masson staining) to evaluate the degree of liver fibrosis and the distribution of collagen fibers; ④The Western blot (WB) was used to detect the expression level of collagen I and collagen III protein molecules. In this study, the independent sample t test was used for the data conforming to the normal distribution, and the Mann-Whitney U test was used for the non-normal distribution data. Furthermore, Pearson correlation coefficient was used to analyze the correlation between the Apparent diffusion coefficient (ADC) or elastic hardness of SWE and the gold standard of Masson pathological staining. And using the receiver operating characteristic curve to analyze SWE and DWI for evaluation Diagnostic efficacy of liver fibrosis.
Results The tumor formation rate of rabbit VX2 liver cancer model established by ultrasound-guided percutaneous coaxial puncture combined with gelatin sponge was 100% (20/20). The

maximum diameter of intrahepatic tumor in 20 rabbits was 0.59 ± 0.11 cm and 1. 62 ± 0.32 cm in the first and second weeks after establishing. Ectopic implantation of abdominal wall was observed in 1 (5%, 1/20) rabbit at the end of 2 weeks after establishing. The modeling operation time is 8.53 ± 1.24 min；The median puncture number was 1 time (Range: 1-3 times); No complications such as bleeding, infection and death were observed. Consecutive 10 rabbits in the experimental group were experienced TACE treatment, and the success rate of the operation was 100%. The rabbits began to eat 2 - 3 days after procedure, and no death and other complications, such as groin infection, fever and diarrhea, was observed during and after procedure. Ultrasonic SWE evaluated liver elastic hardness value in two groups, which was 7.75 ± 0.59 kPa in the control group and 10. 66 ± 1.38 KPa in the experimental group； Compared with the control group, the elastic hardness value of the experimental group was higher, the difference was statistically significant ($P < 0.001$). After DWI scanning, the SI corresponding to different b values (b values represent 400, 800, 1000, respectively) were obtained by workstation processing. The SI of the control group was 201.47 ± 58.53、151.02 ± 16.85、114.14 ± 28.36 and the experimental group was 312.51 ± 82.58、184.52 ± 41.22、161.14 ± 26.9. The SI of the experimental group was higher than that of the control group at the same b value (b = 400, $P = 0.003$; $P = 0.001$); b = 800，$P = 0.035$； b = 1000，$P = 0.001$; respectively). The ADC of liver tissue detected by DWI was 1641.93 ± 244.45 (10^{-6} mm^2/s) in the control group and 1365.6 ± 97.72 (10^{-6} mm^2/s) in the experimental group. Compared with the control group, the ADC value of the experimental group was significantly lower ($P = 0.006$). The serum levels of ALT, AST, Cr and BUN in the control group were 54.55 ± 9.51 U/L、39.52 ± 15.21 U/L、17.26 ± 3.5 umol/L and 63.02 ± 13.64 mg/dL, and 136.56 ± 97.72 U/L、223.43 ± 291.00 U/L、20.64 ± 6.13 umol/L and 80.93 ± 13.51 mg/dL in the experimental group. The difference was statistically significant in two groups ($P = 0.012$, 0.014, 0.034, 0.009, respectively). H & E staining showed that there was extensive hepatocyte edema in the experimental group and a small amount of hepatocyte edema in the control group. The degree of liver fibrosis evaluated by SWE and DWI was significantly correlated with Masson staining ($r = 0.84$, $P < 0.001$; $R = 0.73$, $P < 0.001$; respectively), and the corresponding area under the receiver operating characteristic curve were 0.945 and 0.865, respectively. The result of WB test showed that the expression levels of collagen I and collagen III in the experimental group were significantly higher than those in the control group ($P = 0.011$, $P = 0.016$).

Conclusions Ultrasound guided coaxial puncture assisted injection of Gelfoam is safe for the construction of rabbit VX2 liver cancer model. This technology significantly reduce the seeding rate of tumor abdominal wall and omentum. After TACE treatment, the degree of peritumoral fibrosis is aggravated. SWE and DWI can be used to evaluate the changes of peritumoral fibrosis in rabbit VX2 liver tumor.

Application value of ultrasonic convex array probe and phased array probe in predicting the dysfunction of TIPS coated stent

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To analyze the surgical prognosis of patients undergoing Transjugular intrahepatic portal shunt (TIPS), and to compare and analyze the application value of convex array probe and phased array probe in judging the dysfunction of coated stent. The successful intervention of hospital of coated stent TIPS surgery were retrospectively analyzed 226 patients, according to the clinical symptoms, screening out suspicious shunt dysfunction patients with digital subtraction angiography (DSA) inspection, with its DSA angiography as the reference standard, on the basis of ultrasonic judgment standard, convex array probe respectively analysis and phased array probe in judging distributary channel function Sensitivity of obstacles. Receiver operating characteristic curve (ROC)

was used to evaluate the accuracy of the two probe diagnoses. Among 226 surgical patients, a mean follow-up of (31±16) months resulted in shunt dysfunction in 35 patients (overall incidence 15.5%) and death in 27 patients (overall survival 88.1%). Through statistical analysis, the area under the ROC curve of the phased array probe is much larger than that of the convex array probe (0.95 vs 0.88,P= 0.01). CDFI mode with phased array probe is more accurate than CDFI mode with convex array probe to display the whole blood flow signal in the shunt, and the prediction value of shunt function disturbance is significantly higher than that with convex array probe.

Tissue elasticity evaluation of different methods of acupuncture and acupoint selection in the treatment of neck-shoulder myofascial pain syndrome

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Objective To observe the difference of Young's modulus of the upper trapezius of the neck before and after acupuncture in patients with neck-shoulder myofascial pain syndrome (MPS) by using real-time shear wave elastography.
Method The 30 patients, who was diagnosed as neck-shoulder myofascial pain syndrome in Longhua Hospital Affiliated to Shanghai University of Traditional Chinese Medicine from February, 2016 to December, 2017, are selected as the research object. 60 bilateral upper trapeziuses are randomly divided into two groups, which are simple acupuncture group and acupuncture electro acupuncture group, and received acupuncture treatment of traumatology. All patients have not taken painkillers, muscle relaxants, non-steroidal anti-inflammatory drugs, antianxiety drugs and antidepressants, etc. during the whole period of treatment. The elasticity of upper trapezius are measured at different time points, which are before therapy and immediately after therapy, 2 weeks after therapy and 4 weeks after therapy, by the application of real-time shear wave elastography.
Results Both treatments significantly reduced the elasticity of the upper trapezius muscle in patients with cervical and shoulder myofascial pain syndrome.
Conclusion According to the comparison of statistical value of Young's modulus of upper trapeziuses, The maximum Young's modulus of the distal superior trapezius acupoint selection group was 94.91±9.19 before treatment and 34.88±4.08 after treatment, and there was a significant statistical difference before and after treatment ($P < 0.05$). The maximum Young's modulus of the proximal acupoint selection group was 95.76±10.38 before treatment. The maximum Young's modulus after treatment was 34.88±4.08, and there was a statistically significant difference before and after treatment ($P < 0.05$). There was a statistically significant difference in E value between the two treatment groups at different time points of treatment ($P < 0.05$). There were significant statistical differences in Young's modulus between the two treatment groups before and after acupuncture treatment. There was also significant statistical difference in the efficacy evaluation before and after acupuncture treatment between the two treatment groups.

The clinical value of high frequency ultrasound in the identification of subclinical psoriatic arthritis

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Objective To explore the clinical value of high-frequency ultrasound in identifying subclinical psoriatic arthritis and monitoring clinical efficacy and the necessity of ultrasound examination.

Methods 1. 205 cases without the clinical symptoms of skeletal muscle were incorporated into our study and were individed into psoriasis patients group, osteoarthritis patients group and healthy controls respectively . They were examined by ultrasound. We focused on blood flow of large joints attachment points of upper and lower limbs joints 、 blood flow at the attachment point of the extensor digitorum tendon and nail bed blood flow signal. The same parts were evaluated by ultrasound and were graded in ultrasound scores after 3 months' clinical treatment again .The comparison before and after treatment was made.At the same time, NAPSI and PASI scores were performed to explore the consistency of ultrasound scores and clinical scores.**2.**To investigate whether there are differences in the prevalence of attachment inflammation and changes in nail bed blood flow signals between psoriasis patients' fingers without nail lesions and healthy controls' fingers without nail lesions.
Results 1. A total of 205 patients were included in this study, including 125 patients in the psoriasis group. 1500 large joints and 1250 small joints (DIP) were examined. In 30 patients with osteoarthritis, 360 large joints and 300 small joints were examined. In the healthy control group of 50 cases, 600 large joints and 500 small joints were examined. In the psoriasis group, the prevalence of small joint attachment point of both hands (44.0%) was significantly higher than that of large joint attachment point (10.4%).The psoriasis group was significantly different from OA group and healthy control group in the small joint attachment point inflammation($P < 0.001$), but there was no significant difference ($P > 0.05$) in the large joint attachment point inflammation. In the psoriasis group, the blood flow scores at the facet joint attachment site and nail bed were significantly different before and after treatment ($P < 0.001$), and the changes were consistent with the clinical NAPSI and PASI scores (Spearman coefficient: 0.877/0.805/0.782/0.621) , respectively.
2. There were significant differences in nail attachment inflammation and the change of nail bed blood flow signal between psoriasis patients' fingers without nail appearance lesions and healthy controls' fingers without nail appearance lesions ($P < 0.01$).
Conclusion 1. Ultrasound should pay attention to the screening of facet joints in early subclinical psoriatic arthritis. Ultrasound has the dual clinical value of early recognition and monitoring efficacy.**2.** psoriasis patients without nail psoriatic disease also need to carry out ultrasound examination in order to avoid missed diagnosis.

Comparison of ultrasound rectus femoris muscle parameters: thickness vs cross-sectional-area vs volume for discriminating sarcopenia in community dwelling adults

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Objectives Sarcopenia patients require more medical attention and caretaking. As such, early detection of sarcopenia and appropriate interventions are crucial for decreasing medical costs and meeting the challenges of aging populations. The aim of the present study was to develop a reliable and accurate method to predict muscle mass using ultrasound-derived cross-sectional areas (CSAs) to reconstruct the muscle volume (MV) of the rectus femoris (RF).
Design Cross-sectional study.
Setting and subjects A total of 91 community-dwelling adults (35 men and 56 women) were enrolled in this study.
Measures Ultrasound measurements of RF muscle thickness (MT), CSA, and MV were performed in B-mode using a linear probe. Muscle strength and physical performance were examined. Multivariate linear regression was used to build models for the prediction of RF mass based on MT, CSA, and MV values. The accuracy of ultrasound RF measurements for predicting sarcopenia was evaluated using receiver operating characteristic curve (ROC) analysis.

Results The regression equations used for ASMI prediction (adjusted BMI, sex, and leg length) had high precision and low error. Moreover, the MV model results were close to those of the CSA model and higher than those of the MT model. The ROC analysis showed that both MV and CSA had excellent discrimination when assessing sarcopenia (AUC = 0.83 and 0.82, respectively), whereas MT showedacceptable discrimination (AUC = 0.75).
Conclusions/Relevance Ultrasound-derived RF MV was accurate when predicting ASMI and diagnosing sarcopenia in community-dwelling adults.

A comparative study of melanocytic nevi classification with dermoscopy and high-frequency ultrasound

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Background 28 Melanocytic nevi (MN) are among the most frequently encountered neoplasms in dermatology clinics. MN can be classified into 3 different histological subtypes according to the depth of the nests of nevus cells, and the correct classification is important for differential diagnosis and management. High frequency ultrasound (HF-US) has been attached much attention in dermatology since it can reveal the lesion size, contour, depth and internal structures objectively and clearly. However, the HF-US studies of MN are limited, and none of them compared the clinical and dermoscopic manifestations with the ultrasonic features according to MN subtypes.
Objectives To describe the HF-US features of MN and explore its value in accurate classification of MN subtypes.
Methods A retrospective study was conducted from January 2018 to November 2019. 85 patients with MN were included and examined by 50 and 20 MHz HF-US. The HF-US features were recorded including morphological flatness, depth, shape, boundary, internal echogenicity, hyperechoic spots, lateral acoustic shadow, posterior echoic patterns, mushroom signs and straw-hat signs. Each ultrasonic image was evaluated by 2 physicians independently and the consistency was tested.
Results 11 lesions could not be detected by HF-US. The rest 74 lesions included 3 junction nevi, 5 compound nevi, and 66 intradermal nevi. MN appeared as strip-shaped or oval, hypoechoic areas localized in the epidermis and dermis under ultrasonography. A strong consistency between HF-US and dermoscopy of determining the lesion depth was achieved (κ=0.871， $p<0.001$). The hyperechoic spots were found in 57.6% intradermal nevi. The mushroom signs were seen in 34.8% intradermal nevi, which histopathologically associated with the appearance of hair follicles in intradermal nevi. The straw-hat signs were seen in all the compound nevi, which histopathologically related to the distribution of nevus cell aggregation. The inter-operator agreement for the ultrasonic features ranged from 0.844 to 1.000.
Conclusion Three subtypes in MN can be categorized using HF-US and it had a strong correlation with dermoscopic and clinical classification. And HF-US could further reveal the internal morphological features of MN, which may support more precise classification and management.

Comprehensive analysis of prognostic value and immune infiltration of gasdermin members in skin cutaneous melanoma

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Objective Skin cutaneous melanoma (SKCM) is one of the refractory malignant cancers threatening human beings worldwide. Gasdermin family proteins are involved in a variety of cellular functions and regulate the biological activity in diverse tissues. However, the function of distinct Gasdermin members in SKCM has not been completely investigated.
Methods In current research, the transcriptional level, genetic alternation, prognostic survival and interaction network of Gasdermins in SKCM were evaluated by Oncomine, GEPIA, cBioPortal, GeneMANIA, and Metascape online websites. In addition, the correlation between Gasdermins expression and tumor immune infiltration was also analyzed by TIMER database.
Results The transcription levels of Gasdermin D/E are significantly elevated in SKCM, and Gasdermin A/C expression was obviously related to the pathological stage of SKCM patients. The abnormal expression of GSDMB and GSDMD was significantly associated with the clinical prognosis of SKCM patients. More interestingly, the function of distinct expressed Gasdermins and their neighboring genes was primarily correlated with pyroptosis, defense response to bacterium, response to bacterium, regulation of cell killing and antimicrobial humoral response. Moreover, different Gasdermin expression was apparently related to the immune infiltration, such as B cells, macrophages, dendritic cells, $CD4^+$T cells and $CD8^+$ T cells.
Conclusion Our research not only describes an immune-stimulatory type of cell pyroptosis based on distinct roles of Gasdermins, but also provides a proof-of-principle salvage therapy concept for skin cutaneous melanoma.

Enhancement of nanozyme permeation by endovascular interventional treatment to prevent vascular restenosis via macrophage polarization modulation

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The long-term prognosis of vascular restenosis after endovascular interventional treatment is a critical challenge in clinic. Over-production of reactive oxygen species (ROS) are major factors to aggravate vascular restenosis. Current clinical pharmacological interventions for vascular restenosis are still unsatisfactory. Based on the intrinsic ROS scavenging properties, nanozymes have been widely applied in the treatment of inflammatory-related diseases. However, vascular endothelial cells barrier hindered the delivery efficiency of intravenously injected nanomaterials in most diseases. Herein, an effective therapeutic strategy for vascular restenosis is developed based on endothelial cells exfoliation by endovascular interventional treatment through vascular balloon injury (VBI), which provides an opportunity to enhance nanozymes passive permeation into vascular intima and uptake by macrophages to alleviate long-term vascular restenosis in vivo. Moreover, the macrophages polarization modulation mechanism of vascular restenosis prevention was further investigated. This interesting discovery that endothelial cells exfoliation enhanced nanoparticle vascular permeation by endovascular interventional treatment may provide applicative perspectives in treatment of other disease by nanomaterials.

A retrospective study of polidocanol sclerotherapy for treatment of ovarian endometriosis cyst

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Background Ultrasound-guided aspiration and ethanol sclerotherapy (EST) is a useful alternative method to surgical treatment for ovarian endometriotic cyst (OEC). However, the widely used sclerosing agent ethanol is highly irritating and causes serious side effects when improperly conducted, so it is quite necessary to look for mild hardeners.
Purpose To evaluate the safety and effectivity of ultrasound-guided aspiration and polidocanol sclerotherapy (PST) in the treatment of OEC.
Methods This retrospective study included 110 cysts from 77 woman (mean age, 31.6±5.8 years) who underwent PST for OEC in the Ultrasound Department of Shanghai Tenth people's Hospital from January 2020 to October 2020. The diagnosis of OEC depends on symptoms, imaging and cytologic analyses. The preoperative, intraoperative and postoperative follow-up data of the patients were recorded. The safety of PST was evaluated according to the incidence of severe complications during and after operation, while the effectiveness according to the clinical efficacy of ultrasound follow-up at 1, 3 and 6 months after operation. The cyst size, Serum cancer antigen 125 (CA125) and cancer antigen 19-9 (CA19-9) were compared before treatment and 6 months after PST.
Results The operation successful rate of PST was 100% with no severe complications related to PST observed. The cure rates of 110 cysts at 1, 3 and 6 months after operation were 90.7%, 93.3% and 91.8%, respectively. Statistically, the cyst volume (52.6(23.0~111.2) mL vs 0(0~4.8) mL, p<.001), CA125 levels (50.6(36.0 ~ 79.7) U/mL vs 20.0(14.2 ~ 27.9) U/mL, p<.001) and CA19-9 levels (19.1(11.7~40.4) U/mL vs 13.9(9.5~23.3) U/mL, p=.007) were all significantly reduced as compared with those before treatment.
Conclusion Ultrasound-guided aspiration and polidocanol sclerotherapy is safe and effective in the treatment of ovarian endometriosis cyst and is expected to be an alternative therapy for ethanol sclerotherapy.

Oral-Echocardiography

Early quantitative assessment of left ventricular subclinical dysfunction in systemic lupus erythematosus by a left ventricular pressure-strain loop

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Objective Systemic lupus erythematosus (SLE) is a chronic autoimmune connective tissue disease that affects multiple systems and organs. The heart is one of the most important organs involved. Conventional echocardiography cannot fully evaluate left ventricular (LV) systolic function or detect subclinical myocardial alterations. Noninvasive myocardial work (MW) is a new technology that is based on myocardial strain technology after considering the load influence on myocardial deformation. This study aimed to investigate the feasibility of quantitatively assessing left ventricular myocardial work (LVMW) in patients with SLE using a left ventricular pressure-strain loop (LVPSL).
Methods Forty-nine SLE patients who were hospitalized in the Rheumatology Department at Shenzhen People's Hospital from May 2020 to February 2021 and had a left ventricular ejection fraction (LVEF) >55% were included in the case group (group A). Patients with nephritis were divided into a lupus nephritis group (LN, A1 group) and a non-lupus nephritis group (A0 group). During the same period, 30 sex- and age-matched healthy volunteers were selected as the control group (group B). Routine echocardiography was performed in groups A and B using speckle tracking imaging (STI) and LVPSL analysis. Left ventricular global longitudinal strain (GLS), longitudinal peak strain dispersion (PSD), global myocardial work index (GWI), global constructive work (GCW), global wasted work (GWW), and global work efficiency (GWE) were obtained.
Results 1: The E/A ratio, septal E', GWE and GLS (absolute value) were decreased in group A compared with group B, while LV end-diastolic anteroposterior diameter (LVDd), LV end-systolic anteroposterior diameter (LVDs), left atrial maximum anteroposterior diameter (LAD), systolic blood pressure (SBP), GWW and PSD were increased. There was no significant difference in GWI, GCW, other echocardiography data or clinical parameters between the two groups. 2: GWE was negatively correlated with GLS, PSD and SBP, and the correlation coefficients were -0.624, -0.631 and -0.496, respectively. GWW was positively correlated with GLS, PSD and SBP, and the correlation coefficients were approximately 0.450, 0.532 and 0.532, respectively. 3. Receiver operating characteristic analysis demonstrated that GWE was the most powerful tool for detecting myocardial insufficiency early in SLE patients, and the area under the curve was 0.900. In the SLE group, GWE and GLS were lower in LN patients than in non-LN patients, while GWW, PSD and systolic blood pressure increased. GWE was superior to GLS for the detection of myocardial damage in LN patients. The area under the curve was 0.770, and the best cutoff point was 95.5% (sensitivity 89.5%, specificity 60%).
Conclusions GWE and GWW can detect impaired myocardial systolic function early in SLE patients and are strongly correlated with GLS, PSD and SBP. GWE has high sensitivity and specificity for detecting myocardial functional injury in LN patients and subclinical myocardial injury in SLE patients.

Accuracy of doppler tricuspid regurgitation in assessing pulmonary hypertension and addressing influencing factors of estimated pulmonary systolic artery pressure

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Research purpose This study aimed to compare the accuracy of different tricuspid regurgitation (TR) methods in evaluating pulmonary hypertension (PH), and to explore the factors that affect the accuracy of pulmonary artery systolic pressure estimated by echocardiography ($sPAP_{ECHO}$).
Materials and Methods A total of 218 highly suspected PH patients who underwent right heart catheterization (RHC) and transthoracic echocardiography (TTE) within 7 days were included. Patients' clinical data, TTE and RHC parameters were analyzed. The ratio of ($sPAP_{ECHO}$-$sPAP_{RHC}$)/$sPAP_{RHC}$ was calculated and divided into three groups, namely, the underestimation group, accurate group and overestimation group by ±10% as the boundary. The degree of TR was classified as mild, moderate and severe, and signal quality is divided into three categories: A, B and C. The ratio of tricuspid annular systolic displacement (TAPSE)/ $sPAP_{ECHO}$ was calculated. According to the tertiles of sPAP measured by RHC ($sPAP_{RHC}$), PH were classified into mild, moderate and severe level.The correlation and consistency between TR derived parameters and RHC results were tested by Pearson and Bland-Altaman methods. With mPAP≥25mmHg measured by RHC as the standard diagnostic criteria of PH, ROC curve was used to evaluate the diagnostic efficacy. The influencing factors of $sPAP_{ECHO}$ were analyzed by ordered regression analysis.
Results There were 197 PH patients and 21 non-PH patients. All the TR methods revealed good perfomence for predicting PH (AUCs $>$ 0.94 for all). $sPAP_{ECHO}$ had the greatest correlation coefficient (r=0.781, P < 0.001) and best diagnostic efficiency(AUC=0.98). The results of orderly regression analysis showed that $sPAP_{RHC}$ level, pulmonary artery wedge pressure (PAWP), tricuspid annular plane systolic excursion (TAPSE) / $sPAP_{ECHO}$ and TR signal quality affected the accuracy of $sPAP_{ECHO}$ (P < 0.05). The OR value of mild $sPAP_{RHC}$ level was 66.42 (95%CI: 22.67, 194.63) and 7.10 (95%CI: 3.41, 14.77) compared with that of severe $sPAP_{RHC}$ level. Relative to the signal quality of class A, the OR value of class B signal quality was 0.34 (95%CI: 0.18, 0.66). The OR value of PAWP was 0.95 (95%CI: 0.89, 0.99) and the OR value of TAPSE/ $sPAP_{ECHO}$ ratio was 0.004 (95%CI: 0.00, 0.07).
Conclusions Among all the TR-related methods , $sPAP_{ECHO}$ showed better sensitivity in predicting PH while maintaining similar specificity. In addition, high level of $sPAP_{RHC}$, worse TR signal quality, increased PAWP and TAPSE/ $sPAP_{ECHO}$ were associated with underestimation of $sPAP_{ECHO}$.

Evaluation of cardiac functions by speckle tracking echocardiography in type 2 diabetes mellitus with hyperlipidemia

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Background To investigate the value of two-dimensional speckle tracking echocardiography (2D-STE) in evaluating cardiac functions in type 2 diabetes mellitus (T2DM) with hyperlipidemia.
Methods Sixty T2DM patients with normal left ventricular ejection fraction (LVEF) and poorly-controlled blood glucosewere selected. Among these, thirty had hyperlipidemia. Thirty age- and gender-matched healthy individuals were recruited as the normal control group. Longitudinal strain of left ventricular segments, left ventricular global longitudinal strain (LV GLS), left atrial global

longitudinal strain (LA GLS), right ventricular global longitudinal strain (RV GLS) and right atrial global longitudinal strain (RA GLS) were measured by 2D-STE.
Results (1) Compared with the normal control group, LV GLS in T2DM group and T2DM with hyperlipidemia group decreased (P<0.05), but there was no significant difference of LV GLS between T2DM group and T2DM with hyperlipidemia group (P>0.05). Compared with the normal control group and T2DM group, longitudinal strain of middle segment of LV in T2DM with hyperlipidemia group decreased (P<0.05). (2) There was a significant difference in LA GLS among the three groups. LA GLS of T2DM with hyperlipidemia group was lower compared with the normal control and T2DM group (P<0.05). (3) Compared with the normal control group, RV GLS in T2DM group and T2DM with hyperlipidemia group was lower (P<0.05), but there was no significant difference of RV GLS between T2DM group and T2DM with hyperlipidemia group (P>0.05). RA GLS in T2DM with hyperlipidemia group decreased (P<0.05) compared to the normal control group and T2DM group.
Conclusion Speckle tracking echocardiography can effectively evaluate cardiac dysfunction in patients with T2DM. LA GLS and RA GLS can be used as potential markers of cardiac dysfunction in T2DM with hyperlipidemia, and provide the basis for early clinical diagnosis and treatment.

Effect of left ventricle morphology on right ventricle function in fetal hypoplastic left heart syndrome

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Aims Right ventricle (RV) function is the key to the prognosis of fetuses with hypoplastic left heart syndrome (HLHS), but left ventricular (LV) morphology is complex in HLHS, and the influence of left ventricle (LV) morphology on RV function is controversial. This study aimed to explore the impact of left ventricular morphology on fetal right ventricle geometry and function.
Materials and Methods We selected 37 cases diagnosed with HLHS by fetal echocardiography in our centre. They were divided into three subgroups according to the LV morphology: silt-like ventricle group, miniature ventricle group and dilation ventricle group. To calculate the global sphericity index (GSI), length and transverse diameters of left and right ventricles were measured on a four-chamber view. Z-score of each vessel and annulus were measured routinely, including Ascending Aorta artery (AA), main pulmonary artery (MPA), aortic valve, pulmonary valve, left pulmonary artery (LPA) and right pulmonary artery (RPA), ductus arteriosus (DA). Right ventricle longitude velocities (RVGLV), displacements (RVGLD), strain (RVGLS) and strain rate (RVGLSr) were evaluated by two-dimensional speckle tracking technology.
Results Fetal echocardiography showed RPA Z-scores were decreased in silt-like ventricle group (-0.91±0.61, p=0.004) and miniature ventricle group (-0.47±0.75, p=0.029), compared with control group but no significant difference in dilation group, LPA Z-scores were decreased in silt-like ventricle group (-0.65±0.82, p=0.036) and miniature ventricle group (-0.47±0.76, p=0.005). Conversely, AD Z-scores were increased in three groups. Meanwhile, RVGSI were decreased in slit-like ventricle group (0.76±0.16, p=0.017), miniature ventricle group (0.69±0.15, p=0.017). In addition to the morphological distortion, there were also changes in right ventricular function. RVGLS were decreased in all three groups, compared with the control group; the lowest strain was the dilation group (-12.66±1.7, p<0.001), followed by slit-like ventricle group. (-15.86±1.89, p<0.001) and miniature ventricle group (-17.08±3.07, p<0.001). In the diastolic period, RVGLD, RVGLSr and RVGLV also decreased in HLHS fetuses. Nevertheless, the decrease in RV function had no significant difference among the three groups.

Conclusion The RV geometry altered and correlated with the LV morphology. Although the RV function reduced in fetal HLHS, it is not affected by the LV morphology.

Quantification of left ventricular performance in different phenotypes of hypertrophic cardiomyopathy

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Objective To evaluate the characteristics of left ventricular structure, function, myocardial mechanics, hemodynamics and synchrony in different phenotypes of hypertrophic cardiomyopathy (HCM) using state-of-the-art echocardiography.
Methods The study population consisted of a consecutive series of 85 adult HCM patients who were admitted to the Xi Jing HCM center from January 2016 to November 2017. According to the peak left ventricular outflow tract pressure gradient in exercise stress echocardiography, these patients were divided into three groups: patients with non-obstructive HCM (n=28), those with labile-obstructive HCM (n=27), and those with obstructive HCM (n=30). In addition, 16 normal family members of HCM patients were included as a control group. Various ultrasonic techniques were used to evaluate the left ventricular function in resting and exercise state.
Results ① As compared to the control group, left ventricular end-diastolic diameter of HCM patients in each group decreased, left ventricular ejection fraction increased yet. Left ventricular maximum wall thickness and left ventricular mass index were the highest in obstructive HCM, followed by labile-obstructive and non-obstructive HCM, and the lowest in the control group (all $P<0.05$). ② At rest, the left ventricular global longitudinal, circumferential and radial strain (GLS, GCS and GRS), as well as the Twist of obstructive HCM were significantly lower than the other three groups. As compared to the control group, the labile-obstructive and non-obstructive HCM had decreased GLS and twist, but comparable GCS and GRS (all $P<0.05$). The obstructive HCM had the lowest Mitral Annular Plane Systolic Excursion (MAPSE) and s', and the longest systolic peaking time standard deviation (Ts-SD) and early diastolic peaking time standard deviation (Te-SD) (all $P<0.05$).The left ventricular diastolic function of obstructive HCM (e', the E/e' ratio and the left atrial volume index) was the worst, labile-obstruction and non-obstructive HCM were better, and the control group was the best (all $P<0.001$). ③ During exercise, the GLS, GCS, GRS, twist of the left ventricle and the MAPSE were the lowest in the obstructive HCM, which were increased in the labile-obstructive and non-obstructive HCM, and were best in the control group. The Ts-SD and Te-SD were the shortest in the control group, were prolonged in non-obstructive and labile-obstruction HCM, and were longest in obstructive HCM (all $P<0.05$). Additionally, The control group had the longest exercise time, followed by non-obstructive and labile-obstruction HCM, and the shortest in the obstructive HCM. The METs of obstructive HCM were significantly lower than the other three groups (all $P<0.05$).④During exercise, the increases of LVEF, LVCI, GLS, GCS, GRS, twist, HR, and SBP were the largest in the control group, which were decreased in non-obstructive and labile-obstructive HCM, and were smallest in obstructive HCM; in addition, the increase of mitral valve systolic displacement of HCM was lower than that of the control group (all $P <0.05$).
Conclusions In obstructive HCM, the left ventricular systolic strain and synchronization, as well as the MAPSE, were significantly impaired in patients both at rest and during exercise， and its reserves decreased significantly including in LVEF. The patients with labile-obstructive and non-obstructive HCM had reduced left ventricular GLS, twist, and e', and its reserves have been reduced.

Novel TrueVue plus light and/or Glass three-dimensional echocardiography for congenital heart diseases

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Background The diagnostic value of the innovative TrueVue, TrueVue Light, and TrueVue Glass series of advanced three-dimensional (3D) echocardiography technologies for various congenital heart diseases (CHDs) has not been confirmed. This study explored the advantages and limitations of these technologies and summarized their application methods and techniques.
Methods Two-dimensional (2D), traditional 3D echocardiography, and TrueVue plus light and/or Glass novel 3D technologies were performed on 62 patients with CHD, and a rating control trial was designed to judge whether the novel 3D images were more helpful for understanding the cardiac condition and guide treatment than traditional 3D images.
Results TrueVue increased the resolution and simulated the true texture of cardiac tissue, significantly improving the display ability of abnormal anatomical structures in CHD. TrueVue Glass automatically hid myocardial tissue and displayed the blood channel and the internal structure of cardiac cavity more intuitively, indicating a new observation aspect not shown by conventional echocardiography. The clinical rating trial results showed that the new 3D imaging methods effectively increased the diagnostic confidence of echocardiographers, enabled surgeons to better understand the details of lesions, promoted efficient communication, and improved the confidence of both doctors and patients in treatment.
Conclusion The combined application of TrueVue, TrueVue Light, and TrueVue Glass more closely simulated real anatomical features, showed more comprehensive and subtle blood flow in the lumen, and improved the accuracy of diagnosis and treatment of CHD when compared to traditional imaging techniques, indicating that this combined application has significant clinical value.

Machine learning with long short-term memory networks for predicting response to cardiac resynchronization therapy

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Purpose We tested the hypothesis that machine learning with long short-term memory (LSTM) scoring model to predict response to cardiac resynchronization therapy (CRT).
Materials and Methods We studied 131 CRT patients retrospectively. A machine learning with EL-LSTM was used to categorize subjects by baseline left ventricular strain traces into responders and non-responders. Patients were split into training (n=100) & testing (n=31) samples. We firstly tried to build up an LSTM scoring model by inputting the strain traces from the 4-chamber, 2-chamber, long-axis and the mix strain traces as the input variables, were trained independently and produced the confidence score finally. In order to achieve the best predicting ability, we combined the ensemble learning stacking strategy with LSTM (EL-LSTM) scoring models to improve the accuracy of the confidence score. The proposed EL-LSTM scoring model was compared with traditional machine learning methods to verify their predictive power for CRT response.
Results Using the 4CH-strain trace as the input features (variables), not only the six commonly used evaluation indexes but also the three special indexes for skewed datasets were all higher than using 2-chamber-strain trace or long-axis strain trace as the input features. In addition, compared with using mix strain trace as the input, all the nine evaluation indexes of the 4CH-strain trace LSTM scoring model only SP was slightly lower than the mix strain trace LSTM scoring

model.the EL-LSTM scoring model exhibited the winning a championship with a perfect record on the nine evaluation indexes compared with the five ML methods. Overall, the prediction performances of these ML methods were worse than the LATM scoring model that used mix strain trace as the input features (variables) but better than LATM scoring models that used 2CH- and APLAX-strain traces as the input features

Conclusions Machine learning with emzemble learning LSTM scoring model using longitudinal strain traces from apical 4-chamber allows for highly precise estimates of CRT response.

Oral-Maternal Ultrasound

Study on prediction birth weight of term pregnancy by ultrasonic measurement in mid-trimester

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Objectives To establish a birth weight prediction model based on maternal BMI and ultrasound parameters measurement in the second trimester.
Methods Two- and 3-dimensional ultrasound was prospectively performed in 1092 women with normal singleton pregnancies in 21-23 gestational weeks. The correlation between 2D and 3D ultrasound parameters and birth weight were calculated by Pearson correlation analysis. The inter and intra-class correlation coefficient were analyzed of 40 cases. The participants were divided into two groups, development group (n =700) and validation group (n=313). Single linear regression analysis and stepwise multiple linear regression analysis was used to develop a birth weight prediction model. The accuracy of the prediction model was tested by the validation group.
Results The inter and intra-class correlation coefficients of each parameter measurement are higher than 0.8. ROC analysis shows that in predicting macrosomia, the AUCs of Tvol, AC, Tmid, and Avol in the second trimester are 0.807, 0.793, 0.754, 0.742 respectively. As for predicting low birth weight infants, the AUCs of AC, Tvol, Avol, and Tmid in the second trimester are 0.682, 0.667, 0.646, 0.637 respectively. Single linear regression analysis shows maternal BMI before pregnancy, fractional thigh volume, abdominal circumference of the fetus and the gestational age of the mid-trimester ultrasound scan are related to birth weight ($p < 0.05$) .The equation was obtained by stepwise multiple linear regression analysis. This prediction model predicts 58.15% of the neonatal birth weight within the absolute error of ±250g and those which have a relative percentage error below 10% account for 70.29%, which is higher than that of using two-dimensional US parameters to predict alone.
Conclusion When we use US parameters in Mid-trimester to predict birth weight, combination of the fractional thigh volume by the three-dimensional US and maternal BMI, can result in a more accurate prediction model than traditional Hadlock model.

The ultrasound diagnosis of ovarian dysgerminoma

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Purpose In order to improve the diagnostic level of asexual cell tumor, the ultrasonographic features of asexual cell tumor were discussed in combination with pathological manifestations.
Methods The ultrasonic data of 7 patients with ovarian asexual cell tumor confirmed by surgery and pathology in our hospital from January 2013 to April 2021 were retrospectively analyzed, and the location, size, shape, margin, echo and blood flow signal of the tumor were observed.
Results In 7 cases, all cases were single. There were 6 cases on the right side and 1 case on the left side. 5 cases were simple type and 2 cases were mixed type. The mass presented as solid soft tissue mass in 6 cases and solid part mainly cystic solid mass in 1 case. Most tumors are well bounded. There were 3 cases with uterorectal fossa effusion and 2 cases with peritoneal effusion. 4 patients had abundant blood flow, 1 patient had sparse blood flow (with pedicle torsion), and 2 patients had no obvious blood flow signal (1 patient with pedicle torsion, and 1 patient with mixed teratoma component).
Conclusion Simple ovarian asexual cell tumor is usually presented as a large solid mass, which is heterogeneous or hypoechoic, and can be scattered in irregular liquid areas. The morphology is irregular and the boundary is clear. Color Doppler blood flow imaging: the blood flow in the mass

was abundant, and the blood flow signal was rare or no obvious in the patients with pedicle torsion. Mixed ultrasound findings lack specificity. Combined age, elevated CA125 and HCG are helpful for qualitative diagnosis.

Low intensity focused ultrasound targeted microbubble destruction recovered paclitaxel sensitivity by decreasing autophagy in paclitaxel-resistant ovarian cancer

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Objective Ultrasound targeted microbubble destruction (UTMD) was introduced as a promising method for improving the anti-tumor therapeutic efficacy, while minimizing side effects to healthy tissues. Nevertheless, the acoustical phenomenon behind the UTMD as well as the exact mechanisms of autophagy action involved in the increased anti-cancer response are still not fully understood.
Methods We investigated the drug resistance-reversing effects of low intensity focused ultrasound with microbubble (LIFU+MB) in paclitaxel-resistant ovarian cancer cells. Cell viability was evaluated using CCK8 (Cell Counting Kit-8)，apoptosis was detected by flow cytometry, quantitative real-time PCR and Western blot were used to detect the expression of the mRNAs and proteins, autophagy was observed by transmission electron microscopy (TEM).
Results We found that the level of autophagy was increased in PTX-resistant ovarian cancer cells, compared to the paclitaxel (PTX)-sensitive ovarian cells. Treatment of LIFU+MB combined with PTX can notably inhibit proliferation as well as increased apoptosis in drug-resistant cells. Furthermore, we revealed that the autophagy level of drug-resistant cells after the treatment of LIFU+MB was significantly inhibited.
Conclusion Our findings demonstrated that LIFU+MB could reverse paclitaxel-resistance in ovarian cancer via inhibiting autophagy, which provides a novel strategy to improve chemosensitivity in ovarian cancer.

Assessment of obstetric doppler ultrasound in high risk pregnancy and its perinatal outcome

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Introduction High-risk pregnancies is actually or potentially threaten either the health or life of the mother or her fetus during pregnancy, labor, or birth. It is associated with an increased risk of intrauterine demise, neonatal morbidity, and neonatal death. Serial ultrasonography for the evaluation of fetal growth and dopplerultrasound are used to guide pregnancy management decisions. By evaluating various waveforms of Middle cerebral artery, Uterine artery, Umbilical artery, Ductusvenosus, doppler ultrasound can be used as a screening tool in diagnosing adverse perinatal outcome
Research purpose To assess the utility of Doppler ultrasound in high risk pregnancy and its perinatal outcome.
Materials and Methods There will be two study groups of total 50 pregnant womens, 25 with non complicatedpregnancyand 25 with high risk pregnancy, 18 and above years of age, with or without risk factors coming for obstetric ultrasound, will have Doppler interrogation between 24-36 weeks

of gestation. Those who will have a abnormal pulsatility index (PI) will be considered to have an abnormal result, and will be evaluated and compared with those who are having normal results for adverse pregnancy outcomes, including small for gestational age and IUGR etc. 2D SWE images will be obtained with a general electric company LOGIQ E9 machine with the CL-6 MHz frequency probe

Results In our study, Doppler parameters like MCA in the presence of fetal hypoxemia, shows low resistance flow , increased diastolic velocities, reduced pulsatility index. Abnormal waveform in the Ductus Venosus like decreased, absent, or reversed flow has been documented in foetuses with IUGR and linked to an increased neonatal mortality rate. The persistence of aUterine Arterynotch in the late second and third trimesters showed abnormal uterine circulation in pregnancy compared to study group. Decrease in end-diastolic flow in the Umbilical Arterydoppler waveform until absent and then reversed flow during diastole were evident as compared to study group. Mean birth weight at different gestational period were significantly less compared to study group.

Conclusion Obstetric Doppler can be used as most effective for fetal surveillance in high-risk pregnancy cases. Most importantly it helps in guiding early intervention and assessing fetal outcome.

Poster-Young Investigator

Characterizing Intratumor vascular heterogeneity using contrast-enhanced ultrasound

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The Enhanced Permeability and Retention (EPR) effect is extensively used in drug delivery research. Taking into account that vascular heterogeneity somehow reflects vascular permeability, which reflects the endothelial gap. we have here set out to evaluate if contrast-enhanced functional ultrasound (CEUS) imaging can be employed to characterize Intratumor vascular heterogeneity. We chose Huh-7 and Bxpc-3 to established two different subcutaneous tumor models: hepatic carcinoma and pancreatic carcinoma , which represents the rich blood supply model and the poor blood supply model. Using Sono Vue (Bracco) to evaluate angiogenesis in Huh-7 and Bxpc-3 tumor bearing mice. In the same set of animals, remove the tumor, frozen slices were employed to assess tumor vascularization, and their blood vessel density was measured. Subsequently, the degree of tumor vascularization was correlated with the degree of CD31 immunofluorescence intensity. The degree of tumor vascularization, determined using CEUS, compared with pathological section , a good correlation between the degree of tumor vascularization and the degree of tumor accumulation was observed. These findings indicate that CEUS can be used to characterize intratumor vascular heterogeneity, and potentially also to help in patient selection.

Predicting chemotherapeutic response of colorectal liver metastasis using acoustic radiation force impulse elastography

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Purpose To predict chemotherapeutic response of colorectal liver metastasis (CRLM) using acoustic radiation force impulse (ARFI) elastography.
Materials and Methods In this single-institutional study, we prospectively enrolled 44 patients scheduled for chemotherapy for the treatment of colorectal cancer with liver metastasis. Before starting chemotherapy, all patients were subject to abdominal CT scan and ARFI elastography for baseline assessment. The stiffness was measured using ARFI elastography in the periphery, avoiding the necrotic area in one of the CRLMs. Within 48–96 hours of starting chemotherapy, a follow-up ARFI elastography was performed in the same point as the baseline examination. Follow-up CT examination was performed one month after chemotherapy in all patients. On CT, chemotherapeutic response of CRLM was divided into two categories according to the Response Evaluation Criteria In Solid Tumors: complete remission (CR)/partial remission (PR) and stable disease (SD)/progressive disease (PD). The change in CRLM stiffness as measured by baseline and follow-up ARFI elastography was calculated. Receiver operating characteristic (ROC) curve analysis was performed to evaluate the value of ARFI elastography in predicting the chemotherapeutic response of CRLM.
Results The median size of CRLM was 3.7 cm (range, 1–16.8 cm) and ARFI elastography was successfully performed in all CRLMs. Of the total patients, 52% (23/44) belonged to the CR/PR group, and the remaining 48% (21/44) belonged to the SD/PD group. The area under the ROC curve, sensitivity, and specificity of ARFI elastography in predicting chemotherapeutic response of

CRLM were 0.901 (95% confidence interval, 0.772–0.970), 100.0%, and 73.9%, respectively, with a cut-off value of >20% decrease of CRLM stiffness.
Conclusion ARFI elastography performed early in the course of chemotherapy has shown good results in predicting the treatment response of CRLM.

Contrast-enhanced ultrasound findings in a Balb/ C mouse model of breast cancer popliteal lymph node metastasis

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Objective To observe the popliteal lymph node enhancement of 4T1 breast cancer cells injected into the foot pad of Balb/c mice by contrast-enhanced ultrasound.
Methods Nineteen five-week-old female Balb/c mice were injected with 0.2 ml 4T1 cell suspension into the foot pad of the left hind leg. 0.2mlSonoVue ultrasound contrast agent was injected into the retroorbital venous plexus at the fourth week after inoculation. The ipsilateral popliteal lymph nodes were observed by conventional ultrasound and contrast-enhanced ultrasound. After examination, the mice were killed and dissected, and the primary tumor and enlarged popliteal lymph nodes were pathologically examined.
Results Four days after inoculation of 4T1 cell suspension, all 19 mice developed tumors at the foot pad inoculation site, and the tumor formation rate was 100% (19/19). One week after inoculation, all mice could touch the enlarged lymph nodes in the ipsilateral popliteal fossa, and contrast-enhanced ultrasonography of popliteal lymph nodes was performed after injection of ultrasound contrast agent through the retroorbital venous plexus. a total of 19 lymph nodes were detected and the detection rate was 100%(19/19). 12 metastatic lymph nodes were diagnosed by contrast-enhanced ultrasound, and the histopathological results of lymph nodes were compared as the gold standard of diagnosis. The accuracy of contrast-enhanced ultrasound in the diagnosis of lymph node metastasis was 78.9% (15/19), the sensitivity was 78.6% (11/14), and the false negative rate was 21.4% (3/14).
Conclusion Contrast-enhanced ultrasound has a certain application value in the model of popliteal lymph node metastasis of breast cancer in Balb/c mice.

Preparation of targeted nanobubbles mediated HMME and evaluation the therapeutic mechanism against hepatocellular carcinoma by SDT with RNA-seq

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Objective Hepatocellular carcinoma has a high incidence rate and low survival rate. Exploring effective and appropriate treatment methods has always been a hot topic. In recent years, sonodynamic therapy has been widely concerned and studied because of its advantages of non-invasive, high penetration and high selectivity of irradiation site. The main mechanism of sonodynamic therapy is the use of ultrasound with appropriate parameters to induce the production of reactive oxygen species, reduce the mitochondrial membrane potential, and then lead to tumor cell apoptosis. HMME (homopolypyrin monolither, HMME) has the advantages of single composition, stable performance and more than 8 times of singlet oxygen production compared with other similar drugs, so it can be used as a high-efficiency and low toxicity sound sensitive agent. The purpose of this study is to construct HMME loaded tumor targeted nanobubbles, and combine with low-frequency and low-intensity ultrasound irradiation to mediate the precise

sonodynamic therapy of liver cancer cells. Through high-throughput sequencing technology, the mechanism of action is explored at the genomic level.
Methods Nanobubbles mediated HMME were prepared by film hydration mechanical oscillation method, and their particle size and surface potential were characterized; Transmission electron microscope was used to observe the microstructure and overall distribution of the micro polymer; The results of UV spectrophotometer showed that HMME was successfully loaded. HepG2 cells were treated with low-frequency and low-intensity ultrasound in vitro. The survival rate of each group was determined by CCK-8 method. The production of reactive oxygen species and the change of mitochondrial membrane potential were observed by DCFH-DA method and JC-1 method. Full transcriptome sequencing was performed on the cell lines before and after treatment, and the differential genes were analyzed.
Results HMME loaded nano sound sensitive polymer was successfully prepared, which was pink transparent emulsion with an average particle size of 332 ± 7 nm, the surface charge is - 7. 78 ± 0.56mv。 Under the electron microscope, the micro polymer was spherical structure with uniform particle size. UV spectrophotometer showed that there were absorption peaks at 400 nm for both HMME loaded nanobubbles and pure HMME, which proved that the loading was successful. After low frequency and low intensity ultrasound irradiation, the IC50 of cytotoxicity test was 15ug / ml. Genomics results showed that 3375 and 2630 lncrnas were up-regulated and down regulated after SDT treatment in HepG2 cells.
Conclusion Oxygen loaded HMME nanobubbles were successfully prepared in this study. Under the guidance of low-frequency and low-intensity ultrasound, the cavitation effect and acoustic pore effect of microbubble blasting were used to further improve the local HMME concentration of tumor tissue and achieve efficient and accurate acoustic dynamic therapy. In addition, high-throughput sequencing, a cutting-edge molecular biology technology, was introduced to explore the mechanism of sonodynamic anti-tumor from the micro index of transcriptome, so as to provide new targets and prognostic indicators for gene therapy of liver cancer

The feasibility study of prenatal ultrasound in the evaluation of normal fetal sylvian fissure maturation by simplified two-dimensional transverse section grading

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Objetive To study the morphological changes of the Sylvian fissure on the transthalamic section of fetal brain at 20-32 weeks. To grade fetal Sylvian fissure development at 20-32 weeks by means of a simple scoring system and demonstrate its clinical feasibility.
Materials and methods From September 2018 to June 2020, 504 normal single fetuses of 20-32 weeks were examined in the Department of Ultrasound in Shenzhen Maternal & Child Health Hospital Affiliated to Southern Medical University. The Sylvian fissure maturation were analyzed on the transthalamic section of fetal brain and were graded from 0 to 5: un-visualized (Grade 0), shallow arc (Grade 1), obtuse-angled platform (Grade 2), right-angled platform (Grade 3), acute-angled platform (Grade 4), and closed operculum (Grade 5). Recording pregnancy outcomes, gestational age, etc. Statistical analysis was performed by SPSS 20.0 software using box plot, Mann-Whitney U Test, Weighted Kappa coefficient and so.
Results 280 fetuses obtained left Sylvian fissure grades and 247 fetuses had right Sylvian fissure grades. The fetal Sylvian fissure maturation at 20-32 weeks were graded from 0 to 5, which developed from low to high with the progress of pregnancy. Grade 0 only appeared in 3 fetuses at 20 weeks, and 99.4% fetuses at 20 weeks had Grade ≥ 1. Grade 1 in 20-22 weeks; Grade 2 in 20-25 weeks; Grade 3 in 22-26 weeks; Grade 4 in 25-32 weeks; Grade 5 in 27-32 weeks. Box-plot

and Mann-Whitney U test showed that gestational week distribution of Sylvian fissure at all Grades was symmetric on both sides (P > 0.05). The weighted kappa coefficients were 0.857 (95%CI, 0.750-0.957) and 0.939 (95%CI, 0.750-0.957), respectively, with strong consistency regarding inter- and Intra-observer agreement.
Conclution Fetal Sylvian fissure maturation at 20-32 weeks could be evaluated by means of a simple scoring system with symmetrical grading of on both sides.

Ultrasonographic assessment of knee cartilage thickness in indian paediatric population

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Research purpose This study was aimed to establish standard age and gender-related ultrasound reference values for knee joint cartilage thickness and to study variation in thickness between the right and left extremities in Indian children.
Materials and Methods This cross-sectional study was conducted in Indian children (5-12 years) in the Department of Radio-diagnosis, Mahatma Gandhi Memorial Medical College & M.Y. Hospital, Indore. Patients who were referred to the Department of Radio-diagnosis for ultrasound scans other than musculoskeletal, with no joint related complains. Joint cartilage thickness was measured using high frequency ultrasound probe at the knee joints of both lower extremities.
Results and Discussion A total of 200 healthy Indian children (including 89 girls and 111 boys) were investigated. Mean cartilage thickness at knee joint in Indian male children was more than that in females ($p<0.05$). Our study showed that mean cartilage thickness in paediatric population (5-12 years) decreases in size with increase in age. The finding is similar in both genders. Our study has provided data of normal cartilage thickness at knee joint in paediatric age group (5-12 years) which should serve as standard reference data for native Indian population.
Conclusion Ultrasound is an accessible modality for easy assessment of paediatric joint cartilage thickness which can be used to assess progression of certain joint diseases prevalent in paediatric population such as juvenile rheumatoid arthritis. In order to achieve it, we provided normal reference values for our native population of India.

High Resolution Ultrasonography (HRUS) in early diagnosis of acromioclavicular joint degeneration

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Research purpose This study was aimed to establish role of high resolution ultrasound in early detection of acromioclavicular joint degeneration in patient with anterior shoulder pain and correlating the finding with plain radiograph.
Materials and Methods The study was conducted in 50 subjects including male and female above 20 years age with complain of anterior shoulder pain, in the Department of Radio-diagnosis, MGM Medical College & associated Hospitals, Indore (India). Finding obtained on high resolution ultrasound and plain radiograph were graded on 1-3 scale and then compared and analyzed statistically.
Results and Discussion A total of 50 Indians with anterior shoulder pain were evaluated. We found slight male preponderance (54%) and predominantly affected age group was between 41 to 60 years (58%). Commonest finding observed on high resolution ultrasound was capsular distension (56%). In the study we also observe that high resolution US is superior to plain Radiograph for detecting non ossified osteophytes and tiny subchondral cysts around ACJ and also

for detection of grade-I degeneration. In advanced cases revealing grade-III degeneration, US and plain Radiograph showed similar diagnostic accuracy with a good correlation, but subchondral sclerosis was the finding detectable only on Plain Radiograph.
Conclusion Our study support the superiority of high resolution ultrasound as the modality for detecting early degenerative changes in acromioclavicular joint as ACJ is superficially located. US examination is dynamic, real time and can be applied to the contralateral side for comparison. US of ACJ should be used routinely in every examination of anterior shoulder pain

Utility of bedside point of care ultrasound (POCUS) in emergency department to differentiate abscess from lymphadenopathy in a 17-year-old male scratched by domestic cat

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Research propose Unilateral cervical swelling is a common compliant in emergency department. Physical examination sometimes is not accurate to differentiate abscess from lymphadenopathy, especially when history taking and initial diagnosis is suggestive of cervical lymphadenopathy.
Materials and method Beside side point of care ultrasound (POCUS) was introduced to clarify the nature of unilateral cervical mass developed after a 17-year-old male being scratched by a domestic cat.
Results An irregular subcutaneous hypoechoic mass measuring about 2.3x2x1.3cm is found in the right submandibular region. Some irregular blood flows can be detected in the adjacent region under color Doppler study. Multiple well-defined mass with central hilar regions are found around the above mass, the biggest one is about 1.2cm in greatest dimension, suggestive of reactive lymph nodes.
Conclusions Beside side point-of-care ultrasound (POCUS) can facilitate physician to clarify the nature of subcutaneous mass and had great impact on patient's disposition in emergency department.

Diagnostic point-of-care ultrasound (POCUS) for colitis in emergency department

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Research propose Colitis is commonly seen in the emergency department. Different etiologies of colitis, such as infectious colitis, ischemic colitis, pseudomembrane colitis, etc can be diagnosed. Abdominal computed tomography is usually the gold standard diagnosis method, but it is radiative and costly. Use the point of care ultrasound to assess the colitis is also helpful to diagnosis colitis.
Materials and Method A series of 3 patients who had findings different location colitis under POCUS. Subsequently, they have also confirmed the diagnosis with abdominal computed tomography.
Results Ultrasound shows colon wall thickening, pericolic fluid, increased mesenteric fat echogenicity, or peritoneal fluid to diagnose colitis. The different location inflammation of the colon may be related to different colitis. Ischemic colitis is usually in the left colon, infectious colitis is in the right colon, pseudomembranous colitis may present pancolitis .

Conclusions Point of care ultrasound (POCUS) is used widely in emergency departments for intestinal pathology. POCUS has been shown to help us to confirm the diagnosis early, and improve the overall outcomes of patient care in emergency departments.

Transperineal ultrasound – a valuable tool for perianal pathologies

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Aims and Objectives To assess the role of transperineal ultrasound (TPUS) in evaluation of perianal fistulas by comparing it with surgical findings.
Materials and Methods A retrospective study was carried out in our tertiary care hospital comprising of 51 patients who underwent surgical treatment for perianal pathologies. Transperineal ultrasound diagnosis of these patients were studied and compared with intra-operative findings.
Results and Discussion 44 out of 51 patients underwent surgery for perianal fistulas on the basis of TPUS report. Out of these, fistulas were found in 43 patients. One patient revealed only sinus tract intra-operatively. During surgery, sinus tracts were also found in remaining 7 patients, as labelled by ultrasound examination. Perianal collections were found in 4 patients with sinus tracts. This was in concordance with the preoperative ultrasound diagnosis.TPUS was also able to characterize fistulas as trans-sphincteric (24 patients), intra-sphincteric (18 patients) and extra-sphincteric (2 patients). Our study revealed high sensitivity (97.72%) and specificity (85.71%) of TPUS in detection of perianal fistulas.
Conclusion TPUS appropriately detected perianal fistulas with high sensitivity and can be considered as reliable tool for assessment of perianal pathologies. In experienced hands, TPUS can be considered as modality of choice in resource poor setup and may eliminate the need for pre-operative MR imaging.

COVID-19: usg at the front door & correlation with hrct

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Research purpose This study was aimed to evaluate the lung ultrasound findings in patients with COVID-19 & its correlation with the HRCT chest findings.
Materials and Methods This prospective study consists of 560 patients with positive COVID-19 status (proven with RT-PCR) admitted in MGM medical college, and associated hospitals, Indore (MP) between August 2020 to January 2021. All patients underwent bedside lung USG with convex (2-5–MHz) and linear (2-12–MHz) probes. Sonographic and HRCT chest findings were compared in all cases.
Results and Discussion The mean age of our study population was 52 ± 18.3 years; (age range, 21–92 years). All 560 patients (100.0%) had positive lung US findings. The most common findings were the following: B-lines (90.3%), consolidation (60.7%), and a thickened pleural line (53.6%). Pulmonary consolidations were more common in severe and critical cases (80%) than in moderate cases (38.4%) ($p<0.05$).USG findings of confluent B-lines, isolated B-lines and subpleural consolidation were correlated with HRCT chest findings of Ground-glass opacification, Septal thickening and Crazy paving respectively. The degree of agreement between lung USG and HRCT chest findings was good (82.14%).
Conclusion Being a rapid, portable and bed side test, USG particularly suitable in isolation wards and ICUs and helping to identify severe form of COVID-19. In addition, USG chest is highly recommended in extended clinical monitoring of the patient.

Clinical application for patients with thyroid examination from a rural island using a 5G-based telerobotic ultrasound system

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Purpose This study aimed to investigate the feasibility and clinical diagnosis evaluation of 5G-based tele-robotic ultrasound （US）system in thyroid examination.
Methods From September 2020 and March 2021,A total of 100 patients who underwent conventional US on Chongming Island were recruited and then reexamined by radiologist using 5G-based tele-robotic US at the Shanghai Tenth People's Hospital, 80Km away. Tele-robotic US and conventional US examination were independent of each other. We evaluated the feasibility and clinical application of tele-robotic US in thyroid examination from the aspects of thyroid measurement, diagnostic results, image quality, examination time, questionnaire survey and safety performance.
Results The 100 patients included 23 males and 77 females (average age was 57.7±11.8 years).Paired sample T test showed no significant difference in thyroid measurements (*P>0.05*).Both methods found 14 cases (14%) after post-thyroidectomy and 19 cases (19%) of heterogeneous echogenicity of thyroid gland, 69 (95.8%) thyroid nodules.Of these, 66 thyroid nodules (91.6%) were found to be the same nodule on both tele-robotic US and conventional US.The US features of the nodule, such as composition, chondrogenicity, aspect ratio, and calcification, show good interobserver agreement (all ICC > 0.75), while the margins show moderate agreement (ICC = 0.518). There was no significant difference in image quality scores(4.63±0.60 vs 4.52±0.56) between the two groups (*P*=0.139).The mean examination time of the tele-robotic US was longer than that of conventional US (5.34 min vs 5.34 min).None of the patients had examination-related complications.89% of patients agreed to the tele-robotic US, and 90% of patients expressed willingness to pay for the tele-robotic US.
Conclusion With high clinical diagnostic performance ,clear image quality and safety, 5G-based tele-robotic US can be used for thyroid examination in small rural islands, effectively solving the problem of insufficient medical resources.

A study of the Demetics ultrasound-assisted diagnostic system combined with ACR TI-RADS classification to guide thyroid nodule biopsy

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Purpose Aiming at the problem of overpuncture in clinical practice, to explore the value of the Demetics ultrasound-assisted diagnostic system combined with TI-RADS classification in guiding thyroid nodule biopsy.
Materials and Methods The clinical data of 153 nodules from 147 patients with thyroid nodules were retrospectively analysed. Conventional ultrasound indicated that the TI-RADS classification levels were 3, 4 and 5 and that puncture biopsy should be performed according to the guidelines. Thyroid nodules were reclassified using the Demetics ultrasound-assisted system combined with TI-RADS, and the pathological results were used as the gold standard to compare the differences between the two classification methods.

Results As the guidelines recommend that fine-needle aspiration (FNA) should be used to biopsy thyroid nodules, the biopsy rate for the 153 nodules was 100% (153/153). Moreover, the positive predictive value was 50.3% (77/153), the unnecessary biopsy rate was 49.7% (76/153), and the missed diagnosis rate was 0% (0/77). After combining TI-RAD with DEMETICS, the biopsy rate was 60.8% (93/153), the positive predictive value was 81.7% (76/93), the unnecessary biopsy rate was 18.3% (17/93), and the missed diagnosis rate was 1.3% (1/77). There were statistically significant differences between the two methods in the rate of biopsy, positive predictive value and the rate of unnecessary needle biopsy ($P < 0.05$), but no statistically significant differences were observed in the rate of missed diagnoses ($P > 0.05$).
Conclusion Demetics combined with the TI-RADS classification is convenient and easy for providing needle biopsy guidance for thyroid nodules, especially for TI-RADS class 3 nodules, which has obvious advantages. Thus, Demetics can significantly improve the positive predictive value, reduce the rate of unnecessary needle biopsy, and optimize medical resources.

A Review on Ultrasound-guided Ablation of Thyroid Nodules

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Thyroid nodules are commonly encountered in health care practice. They are usually benign in nature, with few cases being malignant, and their detection has increased in the adult population with the help of ultrasonography. Thyroidectomy or surgery is the first-line treatment and traditional method for thyroid nodules; however, thyroidectomy leaves permanent scars and requires long-term use of levothyroxine after surgery, which makes patients more reticent to accept this treatment. Thermal ablation and chemical ablation are non-invasive techniques that have been employed in the treatment of benign thyroid and malignant thyroid nodules, and have been shown to be effective and safe. Several studies, including long-term, retrospective, and prospective studies, have investigated the use of ablation to treat benign thyroid nodules and malignant thyroid nodules, including papillary thyroid carcinoma and papillary thyroid microcarcinoma. Here we review the recent progress in thermal ablation and chemical ablation techniques for treating benign and malignant nodules, including their technicalities, clinical applications, pitfalls and limitations, and factors that could affect treatment outcomes. Finally, we summarize the advantages and disadvantages of thyroid ablation treatment.

Framingham stroke risk score and carotid artery stenosis in type 2 diabetic patients without cerebrovascular disease

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Objective Diabetes greatly increases the risk of ischemic stroke. Carotid artery stenosis (CAS) have been reported to have associations with ischemic stroke and have been recognized as useful risk assessment tools for cerebrovascular diseases. Framingham stroke risk score (FSRS) is a widely used tool to identify asymptomatic individuals who are at risk to stroke. Therefore, identifying patients with diabetes with a high risk of developing ischemic stroke is of great clinical importance.
Methods This cross-sectional study enrolled 115 type 2 diabetes mellitus (T2DM) participants (59 men and 56 women, with age of 60.6±8 years (mean±SD)) without history of cerebrovascular disease, was analyzed. All participants underwent carotid artery duplex sonography to detect presence of CAS. The FSRS, clinical variables, basic laboratory data, plasma lipid

profile, coagulation, fibrinolytic, and inflammation parameters were measured for each participant. A modified version of the Framingham stroke Risk Profile (incorporating age, sex, systolic blood pressure (SBP), smoking status, hypertensive medication, DM, atrial fibrillation, left ventricular hypertrophy, and prior cardiovascular disease was used to assess 10-years risk of stroke. We used multiple logistic regression models to assess the relationship between cardiovascular (CV) risk factors and CAS.

Results Of the study subjects, the mean duration of diabetes was 11.6±6.6 years, and 11.3% (n=13) had CAS. A significant increase of age (66.9±4.6 years vs. 59.8±8 years; p=0.002), FSRS (22.7±11.7% vs. 10±6.7%; p<0.001), SBP (143±14 mmHg vs. 132±15 mmHg; p=0.011), pulse pressure (PP) (63±12 mmHg vs. 52±11 mmHg; p=0.001), mean arterial pressure (MAP) (110±13 mmHg vs. 100±12 mmHg; p=0.008), and uric acid (UA) (6.6±1.5 mg/dL vs. 5.8±1.3 mg/dL; p=0.047) was present in the T2DM with CAS, with the significant decrease of red blood cell (RBC) (4.1±0.4 106/μl vs. 4.6±0.5 106/μl; p<0.001), hemoglobin (Hb) (12.2±1.9 g/dL vs. 13.7±1.5 g/dL; p<0.001), Hematocrit (Hct) (36.2±4.4% vs. 41.0±3.9%; p<0.001), total cholesterol (TCHO) (132±23 mg/dL vs. 159±30 mg/dL; p=0.003), and low-density-lipoprotein cholesterol (LDL-C) (71±23 mg/dL vs. 89±25 mg/dL; p=0.014) levels compared to T2DM without CAS. Compared with the T2DM without CAS group, the T2DM with CAS group had significantly higher rate of use of anti-hypertensive drugs (92.3% vs. 63.7%; p=0.039), and regular exercise (84.6% vs. 52.9%; p=0.03). Results of multiple logistic regression analysis demonstrated that the FSRS (OR=1.164, 95% CI: 1.017-1.333, p=0.028) was independently associated with of CAS in T2DM after adjustment for other risk factors.

Conclusions These results suggest that higher FSRS is associated with CAS in T2DM patients without cerebrovascular disease.

Poster-Superficial tissue and vascular ultrasound

Deep learning radiomics of ultrasonography for preoperative evaluation of pathologic complete response to neoadjuvant chemotherapy in breast cancer: a prospective study

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Objective Breast cancer (BC) has become the most common cancer in women worldwide, and neoadjuvant chemotherapy (NAC) is considered the standard treatment for most BC patients. With the increasing incidence of pathologic complete response (PCR) after NAC, surgery is typically the gold standard for PCR detection. However, it caused unnecessary damage and psychological burden to patients who had already achieved PCR, increasing the urgent need for alternative diagnostic method. This study hypothesized that deep learning radiomics (DLR) might provide accurate PCR evaluation and combine DLR features with morphological and pathological characteristics might further improve the performance.
Methods A total of 231 patients with clinicopathologically confirmed breast cancer were enrolled in this prospective study from March 2016 to November 2020. All patients completed the entire course of NAC and underwent ultrasonography before and after NAC. We developed a deep learning radiomics (DLR) model (184 in the train cohort and 47 in the test cohort) and combined DLR features with morphological and pathological characteristics.
Result
Baseline characteristics From March 2016 to November 2020, a total of 327 patients were studied and finally 231 females with 231 breast lesions were enrolled in this study for further analysis. Fig. 1 was the flowchart of the patient recruitment and the baseline characteristics of these patients are summarized in table 2. The mean age of the patients was 49 years (range: 27-71 years) and the PCR rate was 34.63%. According to the classification of MP, the US images were divided into training, and test set based on lesions. The numbers of lesions in training set and test set are 184 and 47. There was no significant difference between the two sets in terms of age, maximum diameter of the initial lesion, the relative change of the maximum diameter of lesions (Δsize), the status of ER, PR, Her2 and Ki-67, tumor classification and pathology result of NAC curative effect (all $P > 0.05$, t-test or c^2 test).
Performance of DLR model in evaluating PCR of NAC treatment on test set
The proposed DLR model was able to evaluate PCR to NAC treatment with an AUC of 0.837 (95% CI: 0.858-0.929). However, only using the pre-NAC images (DLR_{bNAC}) cannot obtain a reliable evaluation result with an AUC of only 0.532 (95% CI: 0.473-0.590). Concurrently, it is difficult to obtain an acceptable PCR evaluation performance using only morphological and/or pathological characteristics with the best AUC of 0.698 (95% CI: 0.641-0.751) for $XGBoost_{M+P}$.
Experimental results show that combining DLR features with pathological characteristics and/or morphological characteristics can further improve the performance of PCR evaluation. The best model was $XGBoost_{D+M+P}$ which combined all available features and achieved an AUC of 0.895 (95% CI: 0.858-0.929). Furthermore, $XGBoost_{D+M+P}$ significantly outperformed the methods that does not apply the DLR features (Delong test: P=0.007 for $XGBoost_M$, P=0.014 for $XGBoost_P$, P=0.009 for $XGBoost_{M+P}$). Compared with DLR model, further combining pathological characteristics can obtain greater benefits than combining morphological characteristics on AUC (0.867 for $XGBoost_{D+M}$ vs. 0.891 for $XGBoost_{D+P}$). Using the classification threshold obtained from the operating characteristic curve by the Youden index on the training set, $XGBoost_{D+M+P}$ can achieve high specificity of 96.8% (95% CI: 94.6-98.5), positive predict value (PPV) of 92.3% (95% CI: 87.3-96.4) and negative predict value (NPV) of 88.2% (95% CI: 84.7-91.5) with an acceptable

sensitivity of 75% (95% CI: 68.0-81.6). In general, the $XGBoost_{D+M+P}$ was also the one with the strongest comprehensive evaluation ability among all models.

The operating characteristic curves of different methods on test set are shown in Fig. 3 and the performance of different methods on test set are shown in Table 3. The full results for training and test set are included in Supplementary Material.

Interpretability of DLR model

For exploring the interpretability of DLR model, we used the Gradient-weighted Class Activation Mapping (Grad-CAM) to visualize the DLR model. Grad-CAM can generate the activation maps to reflect the areas that the network pays attention to, which are valuable for network classification. The two activation maps of our DLR model are shown in Fig. 4. We found that in most cases, the DLR model pays more attention to the boundary of the tumor for the image before NAC treatment, and pays more attention to the tumor body for the image before surgery. To a certain extent, this can prove the effectiveness of our DLR model, which is consistent with the previous study.

We also plotted the feature importance (also the feature weights) extracted from $XGBoost_{M+P+D}$ model in Fig.5. For morphological characteristics, the initial maximum diameter before NAC treatment is more important than the change of maximum diameter. For pathological characteristics, the Ki67 is more important than others. For DLR features, the weight distribution is not uniform, but there are a few DLR features whose weights are significantly larger than those of morphological and pathological characteristics.

Conclusion The DLR model can be used as an effective means for PCR evaluation. When morphological and pathological characteristics are further combined, higher evaluation performance can be achieved.

The value of the characteristics of coronal image in ABVS and pathological indicators in predicting axillary lymph node metastasis in patients with breast cancer

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gzuangzhou

Objective To investigate the value of imaging features of coronal plane in automatic full volume breast imaging (ABVS) and pathological indicators in the evaluation of axillary lymph node metastasis of breast cancer.

Methods A total of 109 cases of breast cancer patients who were underwent axillary surgery or biopsy were included.The pathological diagnosis results as the gold standard, the patients were divided into the axillary lymph node metastasis group and the axillary lymph node without metastasis group. The ABVS coronal image characteristics and pathological results of all cases were statistically analyzed to find the related factors to predict the risk of axillary lymph node metastasis of breast cancer.

Results There were 64 cases in axillary lymph node metastasis group and 59 cases in axillary lymph node metastasis group. The "cloud sign", "converging sign", "lotus root sign" in coronal plane of ABVS and breast tumor treatment-related indicators Ki-67 and HER-2 were correlated with axillary lymph node metastasis ($P > 0.05$).There was no correlation among morphology, margin, calcification, ER, PR and axillary lymph node metastasis ($P < 0.05$).

Conclusion The image acquisition by ABVS robotic arm is convenient in operation, good in repeatability and standard in imaging. The unique coronal plane can accurately and intuitively locate the breast lesions. By analyzing the coronal plane signs of ABVS and combining with the relevant indicators of breast cancer treatment, it can have a certain predictive value for axillary lymph node metastasis of breast cancer.

Digital breast tomosynthesis plus synthesized two-dimensional images for breast cancer screening: a systematic review and meta-analysis

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To evaluated the benefit of digital breast tomosynthesis (DBT) plus synthesized two-dimensional images (s2D) for breast cancer screening compared to full-field digital mammography (FFDM) alone, with a focus on cancer characteristics.
Methods We searched electronic databases including PubMed, EMBASE, the Cochrane Library, Web of Science, and Chinese Biomedical Literature Database, from January 1950 to June 2019 and relevant references for published studies comparing DBT plus s2D versus FFDM alone for breast cancer screening. Pooled risk ratios (RRs) for various pathologic results were determined using random effects models.
Results Five eligible studies were included. Pooled RRs superior cancer detection for DBT plus s2D than FFDM alone for all cancer (1.35; 95% CI 1.13–1.62), and invasive cancer (1.74; 95% CI 1.23–2.47); however, DBT plus s2D did not increase detection of carcinoma in situ (1.14; 95% CI, 0.73–1.78). DBT plus s2D decreased recall compared to FFDM alone.
Conclusion DBT plus s2D increased detection rate of all cancer, and especially the early invasive breast cancer increased more obviously compared to FFDM alone, which can detect breast cancer that FFDM failed to detect. DBT plus s2D decreased the breast recall rate, and improve screening economics benefits.

Ultrasonographic and histopathologic correlation of primary breast angiosarcoma: a case report

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Breast angiosarcoma is a rare, aggressive malignancy with a high recurrence rate and poor overall survival. We report a case of primary breast angiosarcoma with contralateral breast metastasis. On sonography, based on their vascular channels or cellular components, angiosarcomas may appear as hypervascular lesions with hyperechogenicity. Through this case report, we believe the cause of hyperechogenicity is the reflection and scattering of sound waves by the small neoplastic cells and small capillaries infiltrating into breast parenchyma and fat tissue. We suggest that regarding a rapidly growing hyperechoic breast lesion, breast angiosarcoma should be considered as a tentative diagnosis.

A case report of secretory carcinoma of the breast

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VGHTPE

Secretory carcinoma, though a rare subtype of breast cancer, is the most common subtype of breast malignancy in the pediatric population with a good outcome. Most patients are under the age of 30. A 26-year-old woman visited our hospital with a complaint of painless palpable breast lump for one week. There is no family or medical history of breast cancer. A 1.5 cm mass noted at LIQ of right breast. Fibroadenoma was suspected clinically. Ultrasound revealed a hypoechoic mass with irregular margin. Color Doppler ultrasound shows increased vascularity. No axillary lymphadenopathy. Mammography and breast tomosynthesis showed an isodensity irregular mass

with obscured margin. The lesion was classified as BI-RADS 4B and percutaneous core needle biopsy confirmed secretory carcinoma.

To this date, there are only about 120 cases have been reported. It mimic common benign breast lesions such as fibroadenoma clinically. Ultrasound often reveals circumscribed, isoechoic or hypoechoic nodular lesion with sometimes heterogeneous internal echoes and lobulated margin. A core biopsy usually suffices pathologic diagnosis. Microscopic appearances including well-circumscribed borders, pushing borders with a variable combination of solid, tubular, microcystic patterns. The tumor cells contain eosinophilic granular to foamy or vacuolated cytoplasm with typical intracellular and extracellular secretory material. It commonly showed negative on estrogen receptor (ER), progesterone receptor (PR) and human epidermal growth factor receptor 2 (HER2). Some may show positive for ER and PR.

Due to small case number, no standard guideline for treatment was established. Complete surgical excision is mostly performed. If metastasis is found in axillary lymph node, an adjuvant chemotherapy is used. The overall survival is good but need long term follow up due to small proportion of cases had shown a late recurrent disease.

In conclusion, secretory carcinoma of the breast is a rare breast cancer without specific imaging feature. More clinical experience and data are needed.

The role of point of care ultrasound (POCUS) in patellar tendon rupture diagnostics

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Introduction A patellar tendon rupture is a common injury to the extensor mechanism of the knee. Clinical evaluation is comprised of history, physical examination, and plain radiography. However, painful swollen knee hides the classic findings of patellar tendon rupture and x-ray which is limited in ability to evaluate, especially in incomplete rupture. Magnetic resonance imaging (MRI) is alternative choice in which is an expensive and time consuming. Therefore, point of care ultrasound (POCUS) offers bedside static and dynamic imaging that is rapid method to diagnose patellar tendon rupture.

Case Report A 38 years-old male, healthy, presented to emergency department with anterior right knee pain after jumping down while he was playing badminton. Physical examination revealed infrapatellar region painful and swelling, impaired knee extension and difficult to weight bearing. Right knee x-ray revealed a high riding patella in the lateral view. Ultrasonography image showed discontinue fibrillar pattern within the patellar tendon. No further investigation by MRI because of clinically diagnosed as right knee patellar tendon tear. The patient was referred to orthopedics and had been done the operation of patellar tendon reattachment. The patellar tendon was found rupture in the operation.

Discussion In emergency point-of-care and clinical ultrasound guidelines of ACEP 2016 (American College of Emergency Physicians), recommendations bedside point of care ultrasound (POCUS) application in soft tissue injuries as well as tendon rupture. Moreover, some recent literature to suggest that ultrasonography is more accurate than MRI in confirming clinically diagnosed patellar tendinopathy. However, the accuracy of ultrasound is operator dependent. Technically, a linear probe is preferably given the superficial nature of the patellar tendon and compared with other alternatives, visualization in multiple planes is important for thorough assessment of injury. Overall, ultrasound is becoming increasingly prevalent in diagnostic aspect cause by rapid and cost-effective advantages.

Conclusion Point of care ultrasound (POCUS) is a cost-effective technique to evaluate patellar tendon; it is a dynamic imaging modality and represents the easiest and quickest method to diagnose a tear and determine its site clinically.

Pathological and ultrasonographic characteristics vulvovaginal nodule fasciitis and literature review

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Objective We aimed to investigate the ultrasonographic and clinical pathological characteristics of vulvovaginal nodule fasciitis.
Methods Retrospective analysis was conducted on 2 cases of vulvovaginal nodule fasciitis admitted to Henan Provincial People's Hospital from August 2020 to December 2020. Ultrasonographic and pathological morphological characteristics were discussed. Relevant literature review was carried out.
Results Two cases of vulvovaginal nodule fasciitis: case 1, female, 19 years-old, nidus located hypodermically at the right vulva; case 2, female, 31 years-old, nidus located hypodermically at the left vulva. Niduses of both cases presented similar ultrasonographic characteristics. In the 2-dimensional image of both cases, well-circumscribed subcutaneous nodules with low echo were observed. Increased echo at the rear area were also observed. In case 1, stripe-like high echo and small flaky-like non-echo areas were observed inside the low echo area. In case 2, several cystic non-echo areas were observed in the low echo area. Blood flow signals inside the nodules were observed in both cases by color doppler flow imaging. Adler grade for both cases were: case 1, I grade; case 2 III grade. In both cases, various degrees of fibroblast/myofibroblast hyperplasia and chronic inflammatory cell infiltration were observed inside the nidus. As revealed by immunohistological and molecular tests, SMA, CD34 and USP6 (FISH) were positively stained in the nidus, meanwhile ER, PR, S-100, SOX-10, CK (AE1/AE3), EMA and Desmin expression was not found in the nidus.
Conclusion Nodule fasciitis was a self-limited benign reactive pathological change mainly caused by fibroblast and myofibroblast hyperplasia with unknown etiology. Nodule fasciitis was most commonly found at forearms of the upper extremities, followed by the torso, head and neck. Vulvovaginal nodule fasciitis was relatively rare. The diagnosis of vulvovaginal nodule fasciitis relied on the pathological characteristics. Its ultrasonographic and clinical pathological characteristics were consistent with nodule fasciitis occurred at other locations. Ultrasound examination was simple and the resulting ultrasonographic characteristics were unique, and therefore can be used in the clinical diagnosis and treatments of vulvovaginal nodule fasciitis.

Evaluation of pathological changes of Achilles Tendon in Type 2 Diabetes patients by Shear Wave Elastography

Min Han
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Objective To evaluate the value of SWE in evaluating the onset time of Achilles tendon in normal and diabetic patients.
Methods Using high-frequency ultrasound and SWE technology,50 healthy volunteers(normal group),50 patients with simple type 2 diabetes mellitus were treaded for 0-10 years(group DM1), 50 patients with simple type 2 diabetes mellitus, 10-20 years (group DM2),50 patients with simple diabetes mellitus, and left Achilles tendon with disease duration >20years (group DM3).
Results Most of the parameters were statistically significant, indicating that the longer the duration of diabetes, the longer the continuity of Achilles tendon ,the uneven echo reduction ,the increase of elastic modulus and the increase of shear wave velocity.
Conclusion SWE can be used to evaluate the changes of Achilles tendon hardness in diabetic patients ,but there are still some limitations, such as the effect of age on Achilles tendon.

Deep learning for detecting supraspinatus calcific tendinopathy on ultrasound images

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Research purpose To evaluate the feasibility of convolutional neural network (CNN)-based deep learning (DL) algorithms to dichotomize shoulder ultrasound (US) images with or without supraspinatus calcific tendinopathy (SSCT).
Material and methods This was a retrospective study pertaining to US examinations that had been performed by 18 physiatrists with 3–20 years of experience. 133619 US images from 7836 consecutive patients who had undergone shoulder US examinations between January 2017 to June 2019 were collected. Only images with longitudinal or transverse views of supraspinatus tendons (SSTs) were included. During the labeling process, two physiatrists with 6- and 10-year experience in musculoskeletal US independently classified the images as with or without SSCT. DenseNet-121, a pre-trained model in CNN, was used to develop a computer-aided system to identify US images of SSTs with and without calcifications. Testing accuracy, sensitivity, and specificity calculated from the confusion matrix was used to evaluate the models.
Results A total of 2462 images was used for developing the DL algorithm. The longitudinal-transverse model developed with a CNN-based DL algorithm was better for the diagnosis of SSCT when compared with the longitudinal and transverse models (accuracy: 91.32%, sensitivity: 87.89% and specificity: 94.74%).
Conclusions The developed DL model as a computer-aided system can assist physicians in diagnosing SSCT during the US examination.

Utility of shoulder ultrasound in rotator cuff injury

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AIIMS BHOPAL

Research Purpose/Introduction

Ultrasound of shoulder joint can be effectively utilised in detecting rotator cuff tendon injuries and impingent. Shoulder ultrasound scan need expertise in understanding normal anatomy and picking the underlying injury. To simplify the shoulder ultrasound, indepth understanding of anatomy, tendon orientation, familiarity with imaging pitfalls and adhering to a scan protocol is important. This poster takes steps to simplify the shoulder ultrasound protocol and also illustrates few pathologies.

Procedure/ Material & Methods

Scan is done using linear high frequency ultrasound probe (GE LogiqS7) using the following protocol.

Tendon scanned	Axis	Position
Long head of biceps	Long & Short	Neutral position – Hand resting on thigh with elbow flexed 90 degree
Subscapularis tendon	Long & Short	Neutral position – Hand resting on thigh with elbow flexed 90 degree
	Dynamic	Patient externally rotates the arm with elbow flexed at 90 degree. The

		subscapularis tendon can be seen moving below the corocoid process and sub-corocoid impingement of subscapularis tendon can be tested.
Supraspinatus tendon	Long & Short	Modified CRASS position – The patient is asked to place the palm on the posterior aspect of ipsilateral iliac wing, projecting the flexed elbow joint posteriorly.
Infraspinatous & Teres Minor tendons	Long axis	Scanned from behind with hand in neutral position.
Acromio-clavicular joint	Dynamic & Coronal plane	Scanned in coronal plane with arm in neutral position. Patient is asked to abduct the shoulder to assess acromia-clavicular impingement.

Discussion

Biceps tendon

With arm in the neutral position, biceps tendon can be visualised in the intertubercular groove of humerus. The tendon is examined in both long and short axis. Anisotropy due to probe angulation must be considered which might mimic mild tendinopathy. Minimal fluid can be seen surrounding the tendon normally. However in cases of tenosynovitis, there will heteroechoic fluid with increased vascularity on color doppler. Biceps tendon tear can be diagnosed as non visualisation of tendon in groove with bulky contracted muscle proximal to it – popeyes sign.

Subscapularis tendon

With the arm is neutral position and passive external rotation, the subscapularis can be examined in long and short axis. Subscapularis tendon is usually heterogenous in echogenicity, however anechoic areas within the tendon suggests tear. Dynamic manoeuvre for diagnosing sub-coracoid impingement of subscapularis tendon is done by externally rotating the arm and asking the patient to slowly internally rotate the arm. Any impingement will be seen as a pop/cling during the manoeuvre.

Supraspinatus Tendon

To visualise supraspinatus tendon, the patient is asked to place their hand on their back pocket – modified CRASS position. In long axis, the tendon insertion at the superior facet of humerus is seen. The critical portion of tendon lies near the insertion site which is a common site for tear. Different patterns of supraspinatus tears occur.

Full-thickness tear

A full-thickness tear is involvement of entire tendon from bursal to articular surface. Tear occurs at the footprint of the greater tuberosity at tendon fibers insertion and extends proximally. Normal echogenicity of the tendon is replaced by a hypoechoic or anechoic areas with retraction of remaining tendon. Full-thickness tears are classified as small (<1 cm), medium (1-3 cm), large (3-5 cm) and massive (>5 cm) (DeOrio and Cofield classification).

Partial-thickness cuff tear

Partial-thickness tear is a focal discontinuity of tendon which can affect either articular or bursal surface. Partial-thickness tears have been classified by the depth of the tear, as Grade 1 (< 3 mm); grade 2 (3-6 mm); and grade 3 (>6 mm).

Infraspinatous and Teres minor tendons

Infraspinatous and teres minor tendons lies more posteriorly. Isolated tears are not common but encountered in association with internal impingement in athletes with over-arm throwing activities.

Conclusion Ultrasound gives the ability to provide direct correlation of the imaging findings with the symptoms of the patient, and helps with guided interventional procedures. MRI being the gold standard in shoulder injuries, however due to reduced availability and cost, USG can help in screening the patients with suspected rotator cuff injury. Impingement of tendons can be easily diagnosed using dynamic manoeuvres in ultrasound.

Role of ultrasonography in lymphedema: new multidisciplinary perspectives

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Lymphedema is a chronic debilitating condition where obstruction of lymphatic drainage leads to fatty hypertrophy and fibrosis in affected limbs and causing tremendous morbidity on the patients, mostly with cancer-related secondary lymphedema. Conventional treatment of lymphedema include rehabilitation with compressive garments and massage for decongestion. Recently, treatment for lymphedema has evolved toward microsurgical management, which involves anastomosing lymphatic ducts to venules or transferring vascularized lymph node flaps for physiologic drainage. A multidisciplinary team effort is required for presurgical planning and postoperative surveillance, with increasing importance of imaging. In this educational poster, the role of ultrasonography in the preoperative diagnosis, surgical planning and postoperative monitoring is introduced, with emphasis on B-mode ultrasonography, Doppler ultrasonography and acoustic radiation force impulse imaging. Ultrasonography has been used to map size, location and number of submental lymph nodes for presurgical planning of vascularized lymph node flap transfer. Concurrent venous comorbidity in lymphedematous limbs can be evaluated by Doppler ultrasonography. Acoustic radiation force impulse imaging can detect increased stiffness of cutaneous and subcutaneous tissue in lymphedematous limbs. Ultrasound Nakagami and entropy imaging techniques have been used to characterize limb lymphedema. Ultrasonography-guided technique is also used in drainage of chylous ascites in patients with concomitant retroperitoneal lymphangiomatosis. The various roles of ultrasonography in diagnosing and managing lymphedema are highlighted.

Clinical and ultrasonographic features of papillary thyroid carcinomalocated in the isthmus

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The aim of this research is to investigate the clinical and ultrasonographic features of papillary thyroid carcinoma (PTC) in the isthmus.A total of 823 patients with 823 PTCs including 133 in the isthmus and 690 in the lateral lobe were includedin our study. All patients were confirmed by post-operative pathology. The clinical and ultrasonographic characteristics were retrospectively analyzed and compared. Univariate analysis and multivariate logistic regression analysis were performed.Multi-factor analyses showed that PTC in the isthmus was significantly different from PTC originating from the lateral lobe inaspect ratio, microcalcification, extrathyroid extension, lymph node metastasis（LNM）,lymph node density（LND） ($P < 0.05$, for all). There were no significant differencesinage, gender, tumor size, margin, halo, echogenicityand homogeneity ($P > 0.05$, for all).The results indicates that the sonographic appearance of PTC in the isthmus was not typical, however, it had a higher incidence of extrathyroidal extension, central lymph node involvement and a tendency of higher lymph node density.Therefore, more careful ultrasound evaluation should be performed for these nodules.

The predictive value of the degree of capsule contact in thyroid cancer for lymph node metastasis

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Objective To investigate the value of thyroid nodule capsule exposure in predicting lymph node metastasis of thyroid papillary carcinoma.
Methods 324 cases of Non isthmic PTC were selected and confirmed in our hospital. The relationship between the indexes and lymph node metastasis was analyzed retrospectively. According to the different degrees of contacting capsule of Non isthmic thyroid nodule in conventional ultrasound, it was divided into three groups:1/4 group, 1/4-1/2 group, ≥1/2 group and ≥1/ 4 group (1/4-1/2 group combined with ≥ 1/2 group). The distribution differences of four groups in Non isthmic PTC lymph node metastasis were analyzed. the differences between groups were further compared.
Results 1. Univariate analysis showed that there were significant differences in PTC lymph node metastasis of Non isthmus ($P<0.05$). 2. Multivariate analysis showed that irregular shape, age≥45 years old and size≥11.55mm were the risk factors of Non isthmic PTC lymph node metastasis ($P<0.05$). 3. There were statistically significant differences in Non isthmic PTC lymph node metastasis between the groups with less than 1/4, 1/4～<1 /2 and ≥ 1/2 capsule contact ($P<0.05$).The specificity (94.6%) and accuracy (72.2%) were the highest when the lesions were in contact with the capsule≥1/2.
Conclusion Cervical lymph node metastasis is more likely to occur when the papillary thyroid carcinoma is in contact with the capsule more than 1/2, which can provide some reference value for ultrasound workers.

The clinical value of sonographic patterns of thyroid nodules in American Thyroid Association (ATA) guidelines

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Objective To discuss the clinical value of sonographic patterns of thyroid nodules in 2015 American Thyroid Association (ATA) management guidelines for adult patients with thyroid nodules and differentiated thyroid cancer.
Methods From January 2008 to December 2010, 483 thyroid nodules in 480 patients who underwent ultrasound-guided fine-needle aspiration biopsy (US-FNAB) in Peking Union Medical College Hospital were included in this study. Ultrasound images of the thyroid nodules were reviewed and their sonographic patterns were determined as high suspicion, intermediate suspicion, low suspicion and very low suspicion according to 2015 ATA guidelines. 112 nodules had surgical pathology. Diagnosis of other nodules depended on both US-FNAB pathology and follow-up of patients. Independent-sample *t* test was used to compare ages and sizes between benign and malignant nodules. Independent sample rank sum test was used to compare the malignancy risks between nodules of male and female patients, and between nodules that were solid, hypoechoic, with irregular margins, with microcalcifications and with taller than wide shape and each control group. Independent sample rank sum test was also used to compare malignancy risks of nodules with different sonographic patterns in 2015 ATA guidelines. Defining high-suspicion as positive, and intermediate to very low suspicion as negative, the diagnostic performance of sonographic patterns in 2015 ATA guidelines was calculated, including sensitivity, specificity, positive predictive value, negative predictive value, and accuracy.

Results Of the 483 thyroid nodules, 381 (78.9%) were benign and 102 (21.1%) were malignant proven by operation and follow-up. The malignancy rates were higher in nodules that were solid, hypoechoic, with irregular margins, with microcalcifications and with taller than wide shape than each control group, all of which had statistically significant differences (z=-6.255, -6.893, -13.000, -11.080, -6.718, $P < 0.001$). Actual malignancy rates of nodules determined as high, intermediate, low and very low suspicion according to the ATA guidelines were 53.3% (90/169), 5.5% (6/109), 3.9% (6/154), and 0 (0/51), respectively, with statistically significant differences between the four patterns ($\chi 2$=161.462, $P < 0.001$). When defining high suspicion as positive, and intermediate to very low suspicion as negative, the negative predictive value of sonographic patterns in ATA guidelines was relatively high (96.2%).
Conclusion Sonographic patterns in 2015 ATA guidelines provide effective malignancy risk stratification for thyroid nodules. High suspicion is a good indication of US-FNAB for thyroid nodules and has relatively high negative predictive value.

The value of contrast-enhanced ultrasound in differential diagnosis of benign and malignant thyroid nodules

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Objective As the most common malignant tumor of endocrine system , thyroid carcinoma(TC)has been rising worldwide in the last two years.Early detection of lesions and identifying benign and malignant lesions are related to the choice and prognosis, and we discuss the value of contrast-enhanced ultrasound(CEUS)for the differential diagnosis of benign and malignant thyroid nodules.
Methods 30 patients with thyroid nodules were treated by routine ultrasound and CEUS from September 2017 to November 2017Routine ultrasound observed the nodule location, size, aspect ratio, morphology, physical properties, echo, calcification, halo ring, nodules and thyroid membrane relationship and blood flow; CEUS observed the nodule contrast agent perfusion,.
Results 0f the 33 nodules, 23 were papillary thyroidcarcinoma, 6 were nodular goiter, 1 were thyroid adenoma, and 3 were Hashimoto's thyroiditis.Of 23 PTC, 15 showed typical centripetal and low enhancement patterns and 8 showed heterogeneous or high enhancement patterns. 6 nodular goiter also showed diversity.1 was never filled, considered the result of bleeding . There is only one case of thyroid adenma, manifested as ring and syn-enhancement patterns.Three of Hashimoto's thyroiditisshowed low enhancement mode.
Conclusion CEUS can better reveal the blood supply in thyroid nodules and is important to identify the benign and malignant thyroid nodules.The contrast pattern of thyroid carcinoma presents certain diversity, related to the angiogenesis characteristics in the tumor. The low enhancement pattern has a high identification significance, but other ultrasound identification characteristics can still not be ignored.

Doppler ultrasound analysis of parathyroid hyperplasia in hemodialysis patients

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Objective Doppler ultrasound (DUS) was used to study the morphology, location, number and blood flow characteristics of recurrence after parathyroid hyperplasia resection in hemodialysis patients, and to explore the feasibility of the causes of recurrence.
Methods From January 2017 to May 2021, 46 patients with hemodialysis who relapsed after resection of parathyroid hyperplasia were selected. All patients underwent Doppler ultrasound

examination before operation, combined with ECT examination results to analyze the location, number and blood flow characteristics of their recurrence. Sperman correlation analysis was used to explore the correlation between PTH changes and the location and number of recurrences before and after surgery.
Result 1. The PTH value of 46 patients with recurrence after parathyroid hyperplasia resection was 295.533 ± 226.074 pg/ml, and the PTH value of 24 hours before and after surgery was 1656.117 ± 886.374 pg/ml. The PTH of patients with recurrence was PTH 24 hours after surgery It will fall, will still be higher than normal, and then slowly rise, and PTH will rise to more than 1000 after six months to one year.**2.** There are more strips of colored blood flow in the hyperplastic parathyroid glands of relapsed patients, and they are more abundant, with clear mass boundaries, regular edges, and some calcifications, and the calcifications are mostly circular or flaky calcifications, and punctate calcifications less. **3.** There is a positive correlation between PTH changes and the location of recurrence ($r=0.413$, $P<0.01$), and a positive correlation with the number ($r=0.377$, $P<0.01$).
Conclusion Doppler ultrasound can be used to observe the recurrence location, number, and characteristics of blood flow in patients with recurrence after parathyroid hyperplasia resection. There is a positive correlation between the change of PTH value and the location and number of recurrence in patients with recurrence. The reasons for recurrence may include: ①The position of the parathyroid glands of patients is abnormal compared with non-recurring patients, and they are often located behind the sternum and around the carotid artery, rather than on the back of the thyroid gland. ②The number of parathyroid glands is more than four.

Ultrasonographic findings of superficial palpable masses in head and neck

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Objectives Small palpable masses are very common in face and scalp. High resolution ultrasound is very useful for the characterization of the masses and adjacent soft tissue evaluation. In addition, ultrasound is very helpful for the differential diagnosis. The purpose of the studyis to demonstrate many various diseases of superficial small palpable masses, and to learn the characteristic ultrasonic findings and disease spectrum of the superficial face and scalp masses with the review of literature
Methods Small palpable masses are very common in face and scalp. High resolution ultrasound is very useful for the characterization and the differential diagnosis of the masses and adjacent soft tissue evaluation Materials were retrograde collected in the university hospital for recent 5years using PACS sorting system, and final cases were chosen among the all pathologic proven cases.
Results Most cases were located face and scalp area. Categories of Cases are as follows ;Lipoma, dermoid, epidermoid, complicated or rupture of epidermoid, osteoma cutis, Pilometricoma, Trichilemmal cyst, Proliferating trichilemmal cyst, Sola elastosis, ;Osseous/calcified mass such as osteoma, calcified granuloma, Fibrovascular tissue with calcification(calcinosis cutis), Calcified foreign body;Vascular mass and malformation such as Hemangioma, lymphatic malformation, Venous lake (capillary aneurysm) with thrombosis), neurofibroma, schwannoma, Malignant mass such as melanoma, lymphoma, skin cancer ;Inflammatory mass such as Chronic inflammatory mass, Acute suppurative and granulomatous inflammatory mass, fat necrosis, Fibrofatty mass, Lipogranulomatous inflammatory mass, Chalazion, Scleroderma ;Cosmetic injection related : Foreign body granuloma(filler), cyst. Multiple injection droplet, Inflammatory mass, abscess.
Trauma related mass, Superficial lymph node, parotid mass, etc...
Conclusion superficial palpable masses are very common and the causes and pathologies are variable. Ultrasonography is very helpful for the evaluation of characteristic findings of superficial masses and for the differential diagnosis.

A preliminary discussion on a new index of brachial artery residual stress and its influencing factors of clinical application

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Objective A new index reflecting the circumferential residual stress of brachial artery was obtained by cuff oscillation wave and its influencing factors were preliminarily discussed.

Methods A total of 2581 volunteers without cardiovascular and cerebrovascular diseases were recruited and divided into groups Q1, Q2, Q3, Q4, and Q5 based on age in the highest to lowest quintile. Pressure volume index (API), which was a circumferential residual stress parameters of brachial arterial was obtained by cuff oscillation wave. 124 subjects were selected, and their left ventricular ejection fraction (EF) and fractional shortening rate (FS) were measured by echocardiography. The differences of API and general characteristics were compared between the 5 groups. The correlation between API and age, height, weight, body mass index, systolic blood pressure, diastolic blood pressure, pulse and EF were analyzed by Pearson correlation and multiple linear regression, respectively.

Results API value increased with age, and the difference between groups was statistically significant (all $P < 0.05$). In the overall sample, API was positively correlated with age, body mass, BMI and systolic blood pressure (r=0.471, 0.141, 0.260 and 0.671, all $P < 0.01$), and negatively correlated with height and pulse (r=-0.082 and -0.143, all $P < 0.01$). Multiple linear regression analysis showed that systolic blood pressure, diastolic blood pressure and pulse were independent influencing factors of API ($P < 0.01$).

Conclusion Arterial pressure volume index (API) is a new index reflecting arterial stiffness, which is related to age, body mass, body mass index, systolic blood pressure, height and pulse. It is expected to provide a new index for studying arterial stiffness

A study on correlation between overweight and high arterial stiffness in 2418 subjects

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Objective To explore the correlationbetween overweight and the incidence of high arterial stiffness.

Methods Among the natural population who participated in the physical examination, 2,418 persons without cardiovascular and cerebrovascular events were selected, and were divided into 5 groups according to age quintiles:≥69 years old, ≥61.9 years old, ≥51.6 years old, ≥38 years old and <38 years old.For everysubject, the general data of was collectedand the body mass index(BMI)was calculated. Arterial velocity-pulse index (AVI) based oncuff oscillation analysis was recorded. BMI≥24Kg/m2 was defined as overweight, and AVI≥33 was defined as the subgroup of high AVI subgroups..Among subjects, the difference in the incidence of AVI and high AVI was analyzedstratification.Pearson correlation and multivariate logistic regression models were used to analyze the risk factors of high AVI incidence.

Results ① In the overweight group, The AVIoffemale subjects was higher than that of males*(P*<0.01), and high AVI occurred in females than in males (*P*<0.05). Among females, AVI was higher in overweight than in normal weight (*P*<0.05). Among males, the incidence of high AVI was lower in overweight than in control subjects (*P*<0.05). ② Across age groups, AVI increased with age and decreased with increasing body mass index. For every age group,there was nosignificant intra-group difference in the incidence of high AVI, overweight and normal weight (all *P*>0.05). ③ After adjustingfor factors such as gender, height, age, systolic blood pressure, diastolic blood pressure and pulse rates, overweight was an independent risk factorofhigh AVI.High AVI in overweight individuals was 0.785 times that of normal weight individuals, OR (95% CI) = 0.456 (0.290, 0.716).

Conclusion The incidence of AVI and high arterial stiffness increased in women who were overweight, while the incidence of high arterial stiffness decreased in men who were overweight.

Poster-Abdominal ultrasound

Prediction value of CEUS versus MRI LI-RADS for prognosis of hepatocellular carcinoma after ablation: a multi-center study.

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Background MRI and CEUS LI-RADS was widely used in differential diagnosis for hepatocellular carcinoma (HCC), but few studies investigated the predictive value of them. If there are relationship between LI-RADS and prognosis of HCC, we could use it to strata patients before therapy.
Purpose We aimed to use head-to-head nodule comparing the prognostic value of LI-RADS in MRI (version-2018) versus CEUS (version-2017) for HCC treated by microwave ablation.
Materials and Methods In this retrospective study, 306 patients with a solitary HCC less than 5 cm who underwent thermal ablation between 2009 and 2019 at three institutions were included. Four independent readers assigned all nodules to LI-RADS category according to preoperative images. There were 247 men and 59 women. The mean age was 56.4±10.8 years. 220 patients were enrolled in training cohort and 86 patients in validation cohort. The intrahepatic metastasis (IM), distant metastasis (DM), disease-free survival (DFS), overall survival (OS) and their prognostic factors obtained by the Kaplan-Meier method and Cox proportional hazard model.
Results After the multivariable analysis, MRI LR-M was an independent risk factor for DFS both in training cohort ($P < 0.05$, HR = 3.74 [95% CI: 1.36,10.25]) and validation cohort ($P < 0.01$, HR = 7.66 [95% CI: 1.64,35.45]). MRI LR-M had a higher IM rate than LR-3/4 and LR-5 in both cohorts. However, there was no association between MRI LI-RADS categories and OS, and all the CEUS LI-RADS categories had no statistical significance for IM, DM, DFS or OS in either cohort.
Conclusion The MRI LR-M is valuable for predicting the recurrence of early stage HCC after ablation. Assigning categories by MRI LI-RADS can provide risk stratification of early-stage HCC. The value of CEUS LI-RADS for the ablation prognosis of hepatocellular carcinoma should be explored further.

Interpretation ultrasound elastography in chronic hepatitis b receiving anti-viral therapy

Dar-In Tai
Liver research

Research purpose Inflammation has significant impacts on liver fibrosis measurement by ultrasound elastography. Long term Nucleot (s)ide analogue (NA) therapy suppress hepatitis B virus replication and liver inflammation effectively. How to make interpretation of ultrasound elastography during the treatment course requires further optimization.
Materials and Methods We enrolled a consecutive series of patients with chronic hepatitis B who received acoustic radiation force impulse (ARFI) within I month of liver histology study. A total of 275 patients who underwent liver biopsy (61.5%) or tumor diagnosis/resection (38.5%) between 2011 and 2020 were enrolled. Among them, 49 patients (17.8%) had been receiving anti-viral therapy of various duration before liver histology study.

Results The areas under the receiver-operating characteristic (AUROC) for the diagnosis of Metavir F4 by ARFI was 0.827 in the nontreatment group and 0.771 in the treatment group. The ARFI values tended to be declining with increasing duration of therapy. The different between Metavir score and ARFI predicted fibrosis grade increased with longer treatment duration (Figure 1 p=0.004). The best match timing between histology and ARFI fibrosis prediction is between 12-26 months after anti-viral therapy. Form treatment baseline to 11 months, the prediction tended to be higher than histology grade because of inflammation activity; the ARFI fibrosis prediction was usually lower than the histology grading after 26 months of therapy.
Conclusions Improvement of liver fibrosis measurement by ARFI preceding the improvement of liver histology in chronic hepatitis B receiving anti-viral therapy.

Type ib choledochal cyst : a 5-years-old child with choledochal cyst stone

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Gallbladder cysts are a rare congenital disorder. Congenital cystic dilatation of any part of the gallbladder usually occurs in the main part of the gallbladder. It is considered a childhood and infantile disorder, but the age of reported cases varies from newborn to 80 years. In our country, there is no study on the prevalence of the disease, which is probably due to the low population density, incomplete coverage of preventive examinations in childhood, and the lack of information for radiologists.
Case report A 5-year-old child was admitted to our hospital with right upper quadrant pain experienced intermittently for the past year. He abdominal ultrasound evidenced according to the Todani classification a choledochal cyst type I with stone. His medical history and laboratory findings were normal (Alat-32 u/l, Asat-28 u/l, ALP-66 u/l, T/ Billirubin-20 u/l, GGT-18 u/l). Physical examination revealed tenderness in the right upper quadrant. US scan: Liver size is normal, ultrasound is smooth, the surface is smooth, the edges are sharp and there are no focal changes. The bile ducts in the liver are not dilated. There are no stones in the gallbladder, the wall is normal, the general bile duct is dilated and dilated in the middle (up to d-1.9 cm), and there are several stones up to d-0.8 cm. The pancreas has a smooth ultrasound reflection, no focal changes, and the dilatation is not dilated.
In our case, he was type 1, which occurs in 80-90% of the Todani cysts. Treatment involves removal of the enlarged portion of the bile duct and reconnection of the biliary system, requiring a hepatic anastomosis. He was advised to see a pediatric surgeon in the future. He underwent a medical examination and successfully underwent surgery at the National Center for Maternal and Child Health.

Ultrasonographic measurement of spleen – a review

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The spleen plays an important role in the immune system and regulation of the red blood cells. A number of disease may cause splenomegaly, these include hematological disease, hemodynamic disorder, infection, storage disease, metabolic / infiltrative disorder, neoplasm, trauma, and connective tissue disorder.

Assessment of spleen size is crucial in clinical practice. It can be assessed by ultrasonography (US), CT and MRI. However, CT is the gold standard due to its high reproducibility with multi-parametric reconstruction. On the other hand, US is a fast and portable modality that has no risk of ionizing radiation. The prolate ellipse formula [spleen volume = 0.52 x length x thickness (AP

dimension) x width] has been well accepted for calculation of the spleen volume by US. Another study proposed a similar formula substituting the length by an average length [(maximal length + craniocaudal length)/2].

US measurements of spleen is well correlated with that by CT. There are variable US techniques to evaluate the spleen. The linear measurement that correlated most closely with CT volume was the spleen width measured on a longitudinal section with the patient in the right lateral decubitus (RLD). There was also good correlation between splenic length measured in the RLD position and CT volume.

It has been reported that on CT, a splenic thickness (largest anteroposterior on axial images) of greater than 10.5 cm is the most accurate single measurement for mild to moderate splenomegaly in cirrhotic patients; while a craniocaudal measurement of greater than 14.6 cm is the most accurate single measurement for massive splenomegaly.

On US assessment, a length of 12 cm is generally considered the upper limit of normal. A recent German study on healthy volunteers, 26% men and 6% women exceeded the upper limit and they also found that height and sex affect the spleen length. The diagnosis of splenomegaly should always be correlated with clinical manifestations and laboratory data.

Sonographic appearances of normal endometrium and endometrial pathologies

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Radiological Sciences

Background The appearance of the endometrium can vary according to multiple factors, such as the patient's age, phase of the menstrual cycle, use of medications such as hormonal replacement/tamoxifen therapy, and pregnancy status. The associated pathology usually presents as either focal or diffuse endometrial thickening. Abnormal vaginal bleeding is a common symptom. When considered together with the patient's clinical history, the appearance of the endometrium may favour benign or malignant differential diagnoses. Transvaginal Ultrasound (TVUS) is a widely used first-line diagnostic imaging tool that provides dynamic, high resolution real-time imaging – making it an ideal imaging tool to evaluate the endometrium. Being familiar with the sonographic appearances of the normal endometrium will aid in the identification of pathological appearances, allowing more accurate diagnoses and swift management of the patient's condition.

Educational Goals This pictorial review aims to:**1.** To review the normal physiological appearances of the endometrium during different menstrual phases, in the post-menopausal patient as well as in patients undergoing hormonal therapy. **2.** Demonstrate the sonographic features of the endometrial pathologies and their correlation with the presenting clinical symptoms.

Imaging Findings The sonographic appearances of the normal endometrium and a spectrum of pathologies involving the endometrium will be presented. These cases include endometrial polyp, hyperplasia, carcinoma, submucosal fibroid, normal and abnormal positions of the intrauterine contraceptive device (IUCD), endometrial atrophy, and changes associated with hormone replacement therapy (HRT).

Conclusion The appearance of the endometrium changes throughout a patient's lifetime. Correlation between sonographic features, clinical presentation, and clinical history is essential to narrow down the differential diagnoses, which enhances the management of patients with endometrial pathologies.

Efficacy of IOTA simple rules, O-RADS，and CA125 to distinguish benign and malignant adnexal masses

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Objective Ovarian cancer is the most deadly gynecological tumors in the female reproductive system, worldwide. Therefore, the present study sought to determine the diagnostic performance of IOTA SR, O-RADS and the Cancer Antigen 125 (CA125) in discriminating benign from malignant ovarian tumors. The study also assessed whether a combination of the two ultrasound categories systems and CA125 can improve the diagnostic performance.
Methods 453 patients diagnosed with ovarian tumors were retrospectively enrolled from the Fujian Cancer Hospital, between January 2017 and September 2020.The study then recorded the age, max lesion diameter, location, histopathology, levels of CA125, and detailed ultrasound reports of the participants. Additionally, all the ultrasound images were independently assessed by two ultrasound physicians with more than 5 years of experience in the field, according to the IOTA simple rules and O-RADS guidelines. Moreover, the Area Under the Curve (AUC), sensitivity, and specificity of the above-mentioned predictors were calculated using the receiver operating characteristic curve.
Results Out of the 453 patients, 184 had benign lesions while 269 had malignant ovarian tumors. In addition, the AUCs and the sensitivity of IOTA SR, O-RADS, and CA125 in the overall population were 0.831, 0.804, 0.812, and 94.42%, 94.42%, 80.30%, respectively. On the other hand, the AUCs of IOTA SR combined with CA125, O-RADS combined with CA125,and IOTA SR plus O-RADS combined with CA125 were 0.900, 0.891, 0.909, respectively. The findings also showed that the AUCs of a combination of the three approaches was significantly higher than that of individual strategies($p<0.05$) but not significantly than the AUC of a combination of two methods ($p>0.05$).
Conclusion The findings showed that a combination of IOTA SR or O-RADS in combination with CA125 may improve the ability to distinguish benign from malignant ovarian tumors.

Preliminary study on the diagnostic value of real-time E imaging combined with serum anti-M type phospholipase antibody in membranous nephropathy

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Objective Different types of membranous nephropathy have significant differences in pathogenesis, clinical manifestations and medication regimens, etc. Traditionally, renal parenchymal puncture biopsy is needed clinically to identify the specific pathological types. In this study, the clinical value of real-time E imaging (SWE) and serum anti-M phospholipase antibody (PLA2R) detection in noninvasive diagnosis of membranous nephropathy with different pathological types was investigated.
Methods 78 patients with membranous nephropathy who underwent renal parenchymal puncture biopsy in the Department of Ultrasound of our hospital were measured by SWE technique to measure the YM value of the left lower pole renal parenchyma, and the fasting blood supernatant on the day of renal puncture was taken to detect the titer of PLA2R antibody. The results were analyzed statistically.
Results The patients were divided into idiopathic membranous nephropathy group (IMN), atypical membranous nephropathy group (AMN) and secondary membranous nephropathy group (SMN) according to the gold standard after operation. The YM values of the three groups were all higher than that of the healthy control group, and the YM values of the different groups were pair compared:

SMN >, AMN BBB>d IMN group. According to the ROC curve, when the maximum area under the curve is 0.646, the YM cut-off value is 26.0kPa, and the area under the ROC curve of the combined diagnosis of IMN by YM value and PLA2R is 0.928.
Conclusion The renal parenchymal elasticity of patients with membranous nephropathy is indeed different from that of healthy people, and the renal hardness is also different among different pathological types. SWE combined with PLA2R can provide certain clinical value for noninvasive diagnosis of membranous nephropathy.

Pitfalls of renal US: pseudolesions and pathologic conditions

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Ultrasound is commonly used in the primary investigation of problems associated with the kidney. Despite the accurate detection and characterization of renal masses using CT or MRI scan, ultrasound has its own advantages such as no radiation, vascular flow evaluation and possibility of portable examination. However, it is also well known that ultrasound may show many pseudolesions that confuse the radiologists. So the radiologists should know the findings of pitfalls and pseudolesions that can mimic true pathologic lesions in renal ultrasound. Doppler US and contrast-enhanced US are helpful in distinguishing variable pseudolesions from true lesions. In this article, we present a comprehensive pictorial review of the pitfalls and pseudolesions of renal ultrasound including pseudo-kidney, pseudo-hydronephrosis, pseudo-tumors vs. pathologic conditions, cyst mimickers, stone mimickers, and pseudo-tumors in bladder.

Usefulness of sonoelastography and contrast enhanced ultrasound for evaluation of vascular and parenchymal abnormalities of transplanted kidney with literature review

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The renal applications of sonoelastography and contrast-enhanced ultrasound (CEUS) have increased due to their versatility in problem-solving, without the risk of nephrotoxicity. We performed sonoelastography and CEUS in patients who had azotemia after kidney transplantation. The aim of this exhibition is to show image findings and the quantitative data of various pathologic conditions resulting in the functional decreases of the transplanted kidneys and to evaluate their diagnostic values with a literature review.
Contents Principles and Indications of CEUS Advantages of CEUS for evaluation of transplanted kidney CEUS findings of various biopsy-proven problems of the transplanted kidney and quantitative analytic data from time-intensity curve (TIC) with literature review Futures of CEUS for evaluation of transplanted kidney

Poster-Interventional ultrasound

Ultrasonograph and ultrasound-guided FNA-Tg 、FNA-TgAb in preoperative diagnosis of cervical lymph node metastasis of papillary thyroid carcinoma

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Objective To analyze the relationship between the levels of thyroglobulin washout of fine needle aspiration(FNA-Tg)and anti-thyroglobulin antibody washout of fine needle aspiration(FNA-TgAb) in lateral metastasis lymph node of thyroid papillary carcinoma through ultrasound-guided puncture.
Methods Retrospective analysis of our hospital from January 2020 to March 2021, 139 with ultrasonography suspicious bilateral cervical lymph node metastasis of thyroid papillary carcinoma , the patients were performed bilateral neck lymph ultrasound and ultrasound guided puncture FNA-Tg and FNA-TgAb, analyzing the PTC typical ultrasound metastatic signs of lymph node metastasis (US-M) and ultrasound-guided FNA-Tg and FNA-TgAb .
Result 71 with confirmed by pathology lateral lymph node metastasis, 68 were non-metastatic. FNA-Tg and FNA-TgAb levels in metastatic group 、 non-metastatic group descending, the difference in FNA-Tg was statistically significant ($P < 0.05$).The AUC of US-M, FNA-Tg and US-M+ FNA-Tg in the diagnosis of lateral lymph node metastasis of PTC were 0.854, 0.927 and 0.952, respectively. When the Cut-off value of FNA-Tg was 229.1 (ng/ml), the sensitivity and specificity of lateral lymph node metastasis were 84.5% and 89.5%, respectively.
Conclusion US-M and ultrasound-guided FNA-Tg detection in patients with papillary thyroid cancer, can be used to guide whether to dissection lateral lymph node during radical thyroid cancer.

Application of ultrasound-guided liquid isolation assisted fine needle aspiration biopsy in the qualitative diagnosis of region IV carotid intrathecal enlarged lymph nodes

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Objective To evaluate the clinical value of ultrasound-guided liquid isolation assisted fine needle aspiration biopsy in the qualitative diagnosis of region IV carotid intrathecal enlarged lymph nodes.
Methods From May 2017 to December 2020, 76 patients with malignant tumor with enlarged intracarotid lymph nodes in the First Affiliated Hospital of Zhengzhou University were retrospectively selected as the research subjects, including 35 males and 41 females. There were 83 enlarged lymph nodes in total. The average maximum diameter of the lesions was (0.64±0.13) cm, all of which were located in zone IV carotid sheath. There was no normal puncture path, and the fluid isolation was performed by local injection of normal saline + lidocaine (composed of normal saline 5ml+ lidocaine 5ml) under the guidance of ultrasound. A 22G fine-needle needle biopsy was performed. The cells were injected into the liquid-based flask, and the specimens were sent for cytopological examination. The pathological results were taken as the "gold standard", and the sampling volume was determined to meet the requirements of pathological diagnosis. The clinical data, sampling success rate, positive rate and the incidence of complications after puncture were recorded in detail.
Results After local injection of normal saline + lidocaine configuration solution in 100% (83/83) of 76 patients, effective separation of the lesion and adjacent large vessels was achieved, and fine needle needle biopsy was completed. The success rate and positive rate of sampling were 100%

and 98.8%, respectively. No complications such as blood vessel injury and massive bleeding occurred after surgery.
Conclusion Ultrasound-guided liquid isolation assisted fine needle aspiration biopsy is a safe and effective method for qualitative diagnosis of enlarged lymph nodes in the region IV carotid sheath.

New exploration on the application of percutaneous microwave ablation (PMWA) for focal adenomyosis in posterior wall of retroverted and/or retroflexed uterus：PMWA combined with yu's uteropexy

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Purpose Ultrasound (US) guided percutaneous microwave ablation (PMWA) has been developed as an effective minimal invasive treatment for symptomatic adenomyosis, while its role for lesions in posterior wall of retroverted and/or retroflexed uterus is limited. A new intra-procedural uterine transposition and temporary uteropexy technique named Yu's uteropexy was proposed to solve this problem. The aim of this study was to evaluate the feasibility, efficacy and safety of PMWA combined with intra-procedural Yu's uteropexy.
Methods Eighteen patients with symptomatic focal adenomyosis in posterior wall of retroverted uterus were subjected to Yu's uteropexy assisted trans-abdominal US (TAUS) guided PMWA and were enrolled in this study retrospectively. The technique success rate was evaluated immediately after ablation. Fifteen patients had been treated with hormonal medication for at least three months after PMWA was classified as group 1, the other three patients had no adjuvant therapy was classified as group 2. The clinical efficacy was evaluated separately based on intermediate clinical outcome, including hemoglobin (Hb) level, CA-125 level, uterine volume reduction rate (VRR), lesion VRR, pain score, menstrual pictorial blood loss score (PBAC), symptom severity scale (SSS) and health related quality of life scale score (HRQL). The post-ablation adverse events were recorded to assess the safety.
Results Yu's uteropexy assisted PMWA was performed successfully in all eighteen patients, and all of them completed the intermediate clinical outcome evaluation after ablation. The mean uterine VRR at 1 month, 3 months and 6 months postablation was 16.29 %, 36.37% and 42%; the mean value of lesion VRR was 43.59%, 65.22% and 79.86%. At 3 months after ablation, the Hb level increased to normal level in all patients with secondary anemia, the CA125 level was decreased significantly in all patients. For fifteen patients treated with PMWA combined with hormonal medication, the pain score, PBAC score, SSS, HRQL score were all improved significantly. For three patients had no adjuvant therapy, two had relatively unsatisfied outcome at 6 months after ablation. No major complication was observed in all patients.
Conclusion Yu's uteropexy combined with PMWA was a feasible, effective treatment for adenomyosis lesion in posterior wall of retroverted and/or retroflexed uterus, promising to be applied widely in patients with fertility reserve need.

The feasibility and safety of myocardial biopsy by liwen procedure

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Hypertrophic cardiomyopthy center

Background Liwen procedure refers to a new method of ultrasonic-guided percutaneous trans-septal puncture using a special diagnostic device to the heart target area for diagnosis or treatment

of heart diseases. At present, the technique has been successfully applied to the minimally invasive treatment of hypertrophic cardiomyopathy (HCM) and cardiac tumors, which preliminarily confirmed the feasibility, safety and effectiveness of the radiofrequency ablation technique for the treatment of heart diseases. In view of the importance of myocardial biopsy of HCM and the inherent defects of traditional myocardial biopsy, it is necessary to clarify the feasibility and safety of this new procedure in myocardial biopsy, so as to provide a novel biopsy procedure.
Objective The main purpose of this study was to evaluate the feasibility and safety of myocardial biopsy of Liwen procedure.
Method Sixty patients with HCM who received myocardial biopsy of Liwen procedure in the First Affiliated Hospital of Air Force Military Medical University from July 2019 to December 2020 were included. The biopsy method was evaluated by the success rate and the reaching standard rate of the biopsy and the incidence of complications one month after the operation.
Results We obtained 86 specimens from 60 patients and with success rate of sample acquisition 100.0%. The myocardial specimens were red filamentous. The number of myocardial samples taken per patient were 1.4±0.7, average length of all samples was 16.9±5.5mm and the diameter was 1mm which could be used for pathological diagnosis. The incidence rate of small specimen size (< 5mm) was 3.5% and the reaching standard rate was 96.5%. The complications included pericardial effusion with and without tamponade in one patient (1.7%), and no incidence of non-sustained and sustained ventricular tachycardia, conduction abnormity, perforation, stroke and pneumothorax. The in-hospital and 30-day mortality was 0%.
Conclusion This study has shown that myocardial biopsy of Liwen procedure is relatively safe and technically feasible with low complication rate, which could obtain adequate specimens for pathological diagnosis

Ultrasound guided hydrodilation for shoulder adhesive capsulitis

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Adhesive capsulitis also called frozen shoulder, painful stiff shoulder, or periarthritis. Its occurrence rate was around 2-5% in general population, more on female. It usually attacks adult patient with aged ranged from 35-65 years old. Adhesive capsulitis is considered to be a self-limiting disease, Unfortunately, symptoms may never fully subside in many patients. The common treatment included physical therapy, NSAID or steroid ingestion, but lots of patients could not resolve. The purpose of the study is to evaluate the effect of ultrasound guided hydrodilation for shoulder adhesive capsulitis.
Materials and Methods This is a retrospect study. There were 114 patients with chronic shoulder pain (VAS: 4-10) with limited ROM >3 months, failure after rehabilitation. They were 64 females and 50 males, ranging in age from 40-76 years old with average of 55.6. Every patient received ultrasonography and showed no rotator cuff tear. Patient received ultrasound guided hydrodilation. The regimens included mixed 1cc (10mg) triamcelone to 20cc normal saline under sono-guided injection anteriorly puncture. Patient as called back one month later after each treatment. The come-out evaluation was according to VAS and shoulder range of motion into 3 grades included cure (symptom free and full ROM), more than 50% improved and less than 50% improved.
Results There were 17 patients was cure after treatment, 85 patients had more than 50% improvement and 12 patients less than 50% improvement.
Conclusion Intra-articular injection of steroid could control the synovial inflammatory process. US guided hydroxylation is an effective treatment for adhesive capsulitis. However,post injection, full rehabilitation was recommended.

Ultrasound-guided dextrose solution perimysium dissection for posterior shoulder myofascial pain

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Background To assess the efficacy and safety of perimysium dissection for posterior shoulder myofascial pain.
Methods This retrospective single-arm study was performed at a medical center between April 2016 and August 2017. Fifty-seven participants with refractory chronic posterior shoulder pain of myofascial origin underwent ultrasound (US)-guided perimysium dissection with hypertonic dextrous solution. Visual analog scale (VAS) scores and complication rate were evaluated before treatment and 4 weeks after treatment.
Results US-guided perimysium dissection with dextrose solution resulted in excellent treatment efficacy and safety. Nineteen participatns (33.3%) were free of pain after treatment, and 32 (56.1%) had >50% improvement in pain score. Forty-nine participants had complete VAS records. Overall mean pre- and post-treatment VAS scores were 7.18+/-1.60 and 1.91+/-2.04 (mean difference -5.27, 95%CI -5.99 to -4.55, p<0.0001), respectively, including 7.26+/-1.44 and 1.84+/-1.98 (mean difference -5.43, 95%CI -6.33 to -4.52, p<0.0001) for those with infraspinatus myofascial pain, and 7.00+/-1.96 and 2.07+/-2.26 (mean difference -4.93, 95%CI -6.23 to -3.62, p<0.0001) for those in the teres minor subgroup. No complications were reported in any of the participants. One participants received retreatment for teres minor myofascial pain.
Conclusion US-guided perimysium dissection is an easy, safe and effective injection method to manage posterior shoulder pain.

Poster-Echocardiography

Behcet's syndrome

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Introduction Behcet diease is a chronic replasing inflammatory disease of unknown etiology and characterised by the clinical trial of oral ulcers, genital ulcers and uveitis. Symptoms can also include ophthalmologic, dermatologic, musculoskeletal, neurologic, vascular, intestinal, and pulmonary manifestations. Behcet sydrome is a clinical challenge to disgnose and treat, due to the non-specific serological and pathological changes of this disease. The diagnostic criteria are the following: recurrent oral ulceration plus 2 of the following: recurrent genital ulceration, uveitis-like skin lesion, and a positive pathergy test.
Case report A 48-year-old man suffered from oral and genital ulcers for 7 years, with a frequency of 12 events per year. In 2017, he underwent a congenital aneurysm of aortic sinus repair, mitral and tricuspid valvulopasty. The patient underwent reoperation of the ruptured aneurysm of aortic sinus repair, aortic valve replacement, and aortic sinus plasty on October 19, 2019. Laboratory tests including ANA, ENA, anti-ds DNA and anti-RA33 antibody didn't show positive results. Transthoracic echocaridography showed that the aorta was dilated, and the inner diameter of the aortic sinus was about 40mm. The sinus tract with a inner diameter of about 21mm could be seen in the 10 to 4o'clock direction of the short-axis view of the aorta, outside the aortic prosthetic valve annulus. The direction of the sinus tract from 10 to 11 o'clock which was connected to the left ventricle through torn basal segment of ventricular septum. In addition, the 4 o'clock direction of the sinus tract communicates with the aorta through a gap which was about 4mm wide. The blood flow signal that shuttle back and forth between the aorta and the left ventricle could be seen in the sinus tract.

Another patient, a 42-year-old man with a significant history of myocardial infarctions and implanted two stents in 2019, had recurrent oral ulcers for 3 years and rashes on the head and neck for 3 months. Laboratory tests including nRNP, ds-DNA antibodies were positive. Peripheral vascular ultrasound examination revealed that the patient had bilateral anterior tibial artery stenosis. Transthoracic echocaridography showed that a sac-like lesion protruding toward the left ventricular outflow tract could be seen at the root of the non-coronary cusp, the size of this structure is about 20×16mm, and its size changes with the change of the cardiac cycle. It increased during the period of diastole and decreased during the period of systole. The remainder of his heart valves were in good shape and function. Color Doppler revealed turbulent blood flow between the left ventricle and aorta. During the period of diastole, a blood flow signal with a width of 3.9mm could be seen directly flow into the left ventricle. Another blood flow signal firstly flowed into the sac-like lesion, then through the breach of the lesion flowed into the left ventricle, with the peak velocity is 3.99m/s.
Discussion Cardiac manifestations of Behcet disease had been reported are very rare, such as aneurysm of the sinus of Valsalva, aortic or mitral valve involvement, proximal aortic dilatation, thrombus on right atrium, etc. The involvement of cardiovascular system has not been paid attention to because of the lack of awareness of it. Behcet disease follows a chronic course of unpredictable relapses and remissions, which occasionally induce acute life-threatening aggravations of clinical symptom in cases with cardiovascular involvement. Now, how to raise awareness of the damage of cardiovascular system is significant. It can be clearly know from the previous two typical cases, Behcet disease is chararcterized by mainly involving the aorta and aortic valve. Combine the patient's clinical manifestation and imaging study can help to diagnosis the Behcet disease.

The research on the changes of right ventricular diastolic function of the young male strength athletes by echocardiography

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Objective To analyse and compare the changes of right ventricular diastolic function between young male strength athletes and normal control group .
Methods To collect routine echocardiography of 72 young male strength athletes and 75 normal control group by GE Vivid 95 instrument. Obtain the Peak velocity of E in early diastole, the peak velocity of A in late diastole, E', A', E/A,E'/ A', E/ E',the Isovolumic relaxation time (IVRT), deceleration time (ms), right atrial transverse and axial diameters .In order to exclude the influence of individual differences on right atrial diameter, right atrial transverse and axial diameters were corrected by BSA. To Analyse Whether the difference between the results of the athlete group and the control group was statistically significant .
Results Compared with the control group, the peak E of the athletes' group was increased, the IVRT was decreased and the peak deceleration time of the athletes' group was increased, right atrial transverse and axial diameters were larger .
Conclutions The early diastolic function of right ventricle was enhanced in the athletes group compared with the control group.

Evaluate the use of diastolic function parameters in adverse cardiovascular events in patients with right ventricular cardiomyopathy

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Objective Arrhythmic right ventricular cardiomyopathy/dysplasia (ARVC) is a cardiac disease characterized clinically by life-threatening ventricular arrhythmias. Its prevalence is estimated to range from 1:25,500 to 1:5,000. ARVC is the leading cause of sudden death in adolescents and athletes. The pathological manifestations were hereditary right ventricular myocardial dystrophy with fibre-fat replacement, resulting in enlargement of the right ventricle. The clinical manifestations include: the asymptomatic subclinical phase, with ventricular fibrillation or ventricular tachycardia as the first presentation; An electrophysiological disorder with palpitations and syncope caused by tachyarrhythmia of right ventricle origin; Eventually, right ventricular or bicentricular pump failure is severe enough to require a transplant. There is limited data on diastolic function parameters in patients with arrhythmic right ventricular cardiomyopathy (ARVC). We sought to evaluate the prediction of right ventricular diastolic parameters for right ventricular adverse cardiovascular events (MACE).
Methods Two patients diagnosed with ARVC/D were selected and followed up for 6 ~ 18 months. Two-dimensional transthoracic echocardiography (2D) was used to accurately evaluate the systolic and diastolic indexes of bilateral ventricles. RV equal-volume dilation time (IVRT), RV myocardial performance index (MPI) and RV volume (RA) were evaluated.
Results Two patients (mean age = 38.5±14 years; Males). one had grade I, annother one had grade II, right ventricular diastolic dysfunction. At 12 months of follow-up, 2 patients (50%, mean RV3DEF = 24.8±9%) developed MACE and required hospitalization: ventricular tachycardia, RV thrombosis, and right side failure. In logistic regression analysis, the Doppler velocity of tricuspid annular tissue (E TV)(P =.02 points or = 0.581,CI = 0.368 - -0.917), E-peak mitral valve (P =.043

or = 0.95,CI = 0.913 - -0.999), tissue Doppler velocity interval E "(P =.052 or = 0.733,CI = 0.536 - -1.003), and MPI (P =.009 or = 95,CI = 3.083-2942) was a strong predictor.
Conclusions In our study, right ventricular diastolic function parameters including E 'TV and E 'mV, RA volume and area, and right ventricular MPI were strong predictors of MACE and could be considered during follow-up in patients with ARVC.

Evaluation of fetal cardiac conduction time from simultaneous recording of doppler blood flow spectrum of fetal pulmonary artery and vein

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Objective To investigate the value of synchronous recording of Doppler blood flow spectrum of fetal pulmonary artery and vein in quantitative measurement of fetal heart conduction time.
Methods A total of 221 fetuses aged 16-41 weeks were enrolled in this study. Each fetus was measured by pulsed Doppler (PD), tissue Doppler (DTI) and pulmonary arteriovenous synchrony (PA-PV).Atrioventricular conduction time (AV) and ventricular contraction began to shrink to the next cardiac atrial contractions of the time period (VA), comparing the consistency of three measure methods.
Results AV and VA values obtained by three different measurement methods had no statistical significance after comparing with each other. AV and VA were measured by PA-PV method by linear correlation and regression analysis. AV was positively correlated with gestational age (r = 0.825), The larger the gestational age, the greater the AV value, with a significant statistical significance (P=0.000). Meanwhile, the larger the biparietal diameter, the greater the AV value, the difference was statistically significant (P=0.004).There was no significant difference among the VA value of every group (P=0.829). There was a negative correlation between AV and heart rate. The higher the heart rate was, the lower the AV value was (r=-0.236, P=0.000) The faster the heart rate, the smaller the VA value. The correlation coefficient r = -0.860 (P = 0.000).
Conclusion It is consistent by PA-PV method, PD method, DTI method to determine fetal heart conduction time. AV value and fetal heart rate are negatively correlated. AV value and gestational age,biparietal diameter are positively correlated.Fetal ventricular conduction time reference value for the quantitative analysis of fetal arrhythmia has important clinical potential application value.

"Seagull sign" on echocardiography to identify the anomalous origin of left main coronary artery from the right sinus of valsalva: a case report

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Introduction Anomalous origin of left main coronary artery from the right sinus of Valsalva (ALCA) is rarevariation in congenital heart disease with an estimated incidence of 0.03%[1]. ALCA is more common disease associated with sudden death after vigorous physical activity[2]. To delineate the origin and course of the coronary arteries, trans-esophageal echocardiography is usually not the best modality, the gold standard is coronary angiogram. Coronary CTA may be used to differentiate an intramural course of the artery from interarterial one[3]. However, coronary angiography and CTA are not considered as routine screening items

forpeople. Patients with contraindications to contrast agents should not undergo CTA and coronary angiography examination. In this case, ultrasound diagnosis of ALCA is particularly important. However, there are few reports on the diagnosis of ALCA by echocardiography. Indeed, coronary anomalies are a great challenge in echocardiography to identify and determine their clinical relevance so that proper treatment can be instituted. We describe a case of anomalous origin of left main coronary artery from the right sinus of Valsalva, which was evaluated by transthoracic echocardiography. This case was a uremia patient, echocardiography was the only option, not available for coronary angiography. From this case, we would discuss the ultrasonographic specificity sign of ALCA to improve the detection rate.

Case report We present the case of a 26 years old male referred to our hospital for evaluation of nausea and vomiting symptoms occurring in the past three days. He reported a history of chronic renal failure for the last 6 years under hematodialysis. He had been evaluated with 2D-echocardiography as a routine examination to exclude uremia cardiomyopathy. He recounted a previous episode of syncope post-exertion. There was no history of family heart disease, sudden cardiac death or other cardiovascular risk factors. The patient did not report any symptoms of dizziness and palpitation. On physical examination, his blood pressure was 147/80 mmHg and both S1 and S2 heart sounds were finely audible. Peripheral pulses were well palpated with no carotid or femoral auscultated murmur.

On the surface 12 lead ECG, sinus rhythm was confirmed with normal QRS axis, normal P and QRS duration and unaltered T waves in the precordial leads V3 to V6. No ECG signs of left ventricular hypertrophy were observed. An echocardiography examination revealed an enlarged left atrium and moderate regurgitation because of mitral insufficiency, along with a globally well preserved systolic function and minor regurgitation of aortic and tricuspid valves. The parasternal short-axis view showed two vessels, a right coronary artery (RCA) and an ectopic left main coronary artery, arising from the right coronary sinus. The ostium of the ALCA was widely patent but associated with an acute angle take-off of the vessel (Figs a). ALCA was seen between the aorta and the pulmonary artery, and apparent directed blood flow was shown in color-flow Doppler mode. ALCA presented a bright red flow along the interventricular septum in a nonstandard five-chamber view of the apical heart (Figs e). Indeed, the ALCA was appeared as closely apposing the aortic wall. The ALCA traveled between the aorta and pulmonary artery roots and extended to the left anterior descending branch (Figs b and c). The left circumflex branch arised from the left coronary sinus (Figs d). All of these vessels were patent along their entire length, with no areas of stenosis and no intravascular thrombi. RCA showed normal origin from the right sinus of Valsalva. The RCA followed a normal course and was the dominant vessel forming the posterior descending branch. The RCA showed no areas of narrowing and no thrombi. No any additional congenital anomalies were shown in the remainder of the heart.

Discussion ALCA is an exceptionally rare congenital coronary artery anomaly. The condition can be asymptomatic. However, a course of the ALCA inside the aortic tunica media can cause chest pain, syncope, and ventricular arrhythmias, myocardial infarction and sudden cardiac death, and with a poor prognosis. The prevalence of the ALCA and the RCA arising from the left coronary sinus (anomalous right coronary artery [ARCA]) is 0.03% and 0.23% respectively. Although the prevalence of the ARCA is seven times as of the ALCA, ALCA is more common disease associated with sudden death during exercise. ALCA is considered more serious than ARCA because of larger amount of left ventricular myocardium at ischemic risk[4,5]. There are four types of ALCA defined by the path of the left coronary artery, after arising from the right coronary sinus. The path of the first type is anterior to right ventricular outflow tract before reaching the anterior sulcus, the usual area of bifurcation. The second type courses behind the right ventricular outflow. The third one courses dorsal to the ascending aorta. These three types in absence of atherosclerotic plaque obstruction are benign. The fourth type arises from the right sinus of Valsalva and travels obliquely between the aorta and pulmonary trunk. This latter type is the only one predisposing to sudden death[6]. An interarterial course of an anomalous left coronary artery is thought to carry the highest risk of sudden cardiac death, comparing with an interarterial course of an anomalous right coronary artery. Episodic myocardial ischemia resulting in fatal arrhythmias is the main proposed mechanism leading to sudden cardiac death[7], and the course of the artery is considered to be a major determinant of outcome.

After hypertrophic cardiomyopathy, coronary artery anomalies of origin from the wrong sinus of Valsalva are the second most common cause of death in the young(<35 years)[8]. Sudden death during or immediately after athletic or vigorous physical activity can occur at any age. However, since most competitive athletes are under age 35, sudden death secondary to a cardiac anomalous artery occurs more frequently in the younger age group[9]. Dynamic or isometric exercise involves the use of large muscle masses that increase venous return, increase left ventricular enddiastolic volume and together with adrenergic stimulation increase heart rate, blood pressure, cardiac output and myocardial contractility. These responses increase myocardial oxygen demand and this is met by increased myocardial blood flow. In the presence of coronary artery obstructive disease, sudden death is related to either sudden marked myocardial ischemia or myocardial scarring resulting in malignant ventricular arrhythmia.

There are several possible mechanisms for ischemiain fourth type. Normally, the coronary ostia are round to oval in shape, but in this anomaly, the artery has an acute angulation at the origin that could make aslit-like ostium. With increased cardiac output, the aorta dilates with stretching of the wall making the ostium severely narrowed[10]. The most frequently mentioned mechanism is a pressure increase and expansion in the aorta and the pulmonary artery during exercise, causing a compression of the coronary having an aberrant course between these two vessels with myocardial ischemia[11].

The diagnosis of coronary anomalies can be made through different imaging modalities. The standard diagnostic imaging tool for coronary artery anomalies is coronary angiography. Other imaging methods including MDCT or computed tomographic angiography (CTA), magnetic resonance angiography, echocardiography, and intravascular ultrasound (IVUS) are considered to have complementary roles. Transthoracic echocardiography is often a physical examination item.

“Seagull sign” is a direct sign of ALCA seen on the short axis section of the artery with two vessels coming from the right coronary sinus. The parasternal short-axis view showed two vessels, a RCA and an ectopic left main coronary artery from the right coronary sinus like the seagull. Two vessels make up the two wings of “the seagull”, one of which is the right coronary artery and the other wing is the ectopic left coronary artery. ALCA should be on the alert if you see a red stream of blood along the interventricular septum in a nonstandard five-chamber view at the apex and carefully look for ALCA to raise awareness of the disease. Rarely, IVUS may be needed in patients with potentially serious coronary artery anomalies and has unique advantages and limitations[12]. Non-contrast free-breathing self-navigated 3D magnetic resonance angiography (SN3D-MRA) studies provide considerable diagnostic accuracy regarding the detection of anomalies, and inter-arterial course of the coronary arteries. In children with suspected coronary artery malformations, this may enable a reduction in ionizing radiation and contrast media volume. Contrast enhanced CTA remains the superior imaging technique currently in terms of diagnostic confidence and visualization of more distal coronary artery branches and characterization of subtle anatomical detail such as intramural coronary course[13].

In our case, he recounted a previous episode of syncope post-exertion. He previous syncope event post-exertion may have been a critical warning of the coronary abnormalities. Surgery is indicated in symptomatic ALCA (or ARCA) patients with non-lethal episodes of syncope, angina, arrhythmias, or resuscitation after cardiac[14]. Surgical intervention usually involves the direct repair of the anomalous origination in the aortic root or coronary artery bypass grafting. The management of asymptomatic patients remains controversial. This case illustrates that anomalous origin of the left coronary artery from the opposite sinus of Valsalva (inter-arterial type) is a rare congenital cardiac anomaly, and may present at young age with catastrophic life threatening myocardial infarction. We discussed the ultrasonographic specificity sign of ALCA to improve the detection rate of ultrasound.

Conflict of interest The authors of this manuscript declare no relationships with any companies, whose products or services may be related to the subject matter of the article.

Poster-Maternal Ultrasound

Effects of different delivery modes on levator hiatus of postpartum women evaluated by real-time three-dimensional pelvic floor ultrasound

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Objective To investigate the effects of different delivery modes on the area of levator hiatus of po stpartum women by transperineal 3D pelvic floor ultrasound.
Methods 80 postpartum women, 6 weeks after delivery (case group) and 40 nulliparous women (control group) are included in this study. The areas of levator hiatus in both rest and Valsalva phr ases in transvaginal delivery, selective cesarean and control groups are compared to evaluate th e effects of different delivery modes on levator hiatus of postpartum women. Besides, the relativit y between the area of levator hiatus and the neonatal weight in the transvaginal delivery group in different phrases is analyzed.
Results The areas of levator hiatus in the control group are(11.98±1.33)cm^2 (15.13±1.34)cm^2 in t he rest and Valsalva phrases, while the areas in the transvaginal delivery group and the selective cesarean group are respectively {(16.14±2.68)cm^2,
(16.14±2.68)cm^2},{(14.90±2.04)cm^2 ,(23.14±2.17)cm^2} in both phrases. Tested by *t*, the difference s between the case group and the control group in different phrases are statistically significant (*P* <0.05), the differences between the transvaginal group and the selective cesarean group in Valsa lva phrase are statistically significant(*P*<0.05), but not in the rest phras (*P*>0.05). There is a positi ve correlation between the area of the levator hiatus and the neonatal weight in the transvaginal g roup in both rest and Valsalva phrases(*R* equals to 0.856 and 0.857 respectively).
Conclusion Transperineal real-time 3D ultrasou, which is noninvasive, convenient and repetitive, can evaluate the structure of the pelvic floor of postpartum women by measuring the area of the levator hiatus. It can be employed as a routine screening method to assess the function of female pelvic floor clinically and provide basis for clinic diagnosis and therapeutic evaluation.

First trimester diagnosis of anal atresia in VACTERL association

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Objective Anal atresia, the most common deformity in VACTERL association, occurs in approximately 1 in every 1,500 to 5,000 live births, but prenatal diagnosis rates are extremely low. Although surgical treatment is available after delivery, the prognosis of Vacterl syndrome is generally poor. In prenatal examination, most of the VACTERL association is detected and diagnosed by ultrasonographic manifestations of prominent fetal limb abnormalities, and rarely by anal atresia. However, approximately 90% of Vacterl syndromes are associated with anal atresia, and limb abnormalities occur only in approximately 50% of Vacterl syndromes. We describe the ultrasonographic findings of anal atresia in the first trimester, with the aim of helping to detect anal atresia in the first trimester and further improving the diagnostic rate of VACTERL association.
Method A 29-year-old woman (gravida 1, para 0) with no relevant personal or family medical history was referred to our department for a nuchal translucency scan at 12 weeks' gestation. The scan showed a cystic mass in the fetal abdomen with normal nuchal translucency of 1.9 mm. First-

trimester fetal systemic ultrasonography was performed at 12^{+2} weeks' gestation and showed a cystic mass in the middle lower abdominal cavity. No peripheral or internal blood flow signals of the cystic mass were observed; the stomach and bladder were normal in appearance. In the transperineal axial plane at the level of the fetal anogenital region showed only echogenic stripe of perineum without the dot-like echogenic anus. The fetal left kidney was hyperechogenic and enlarged (10 × 14 × 9 mm) with a cystic occupying lesion. Only a single umbilical artery (left) was visible. The coronal scan of the fetal spine showed hemivertebra, which was causing an abnormal spinal curvature. All of these findings led to a diagnosis of VACTERL association. The parents opted for termination of the pregnancy after prenatal consultation. Fetal autopsy confirmed the final diagnosis of VACTERL association. And there was no anal opening; dilation of the intestinal canal was found in the abdominal cavity, which was confirmed to be the dilated ascending colon and transverse colon by microscopic anatomy examination. Whole-exome sequencing showed 46,XY with a normal copy number variation.

Result This case presents a new clue for the ultrasound diagnosis of anal atresia at 11-13^{+6} weeks of pregnancy: the linear hypergenicity of the perineal suture and dot-like echogenic anal mucosa in normal fetus constitute a "!" sign; anal atresia makes the "point-like" focus disappeared, and the original "!" sign leaving only the perineal suture-like hypergenicity "|". This sign, combined with the cystic space-occupying lesions formed by the dilated colon of the fetus, provides a strong basis for the early diagnosis of fetal anal atresia.

Conclusion Here we present a case where the fetal anal atresia was found by ultrasound to further diagnose the VACTERL syndrome. The ultrasound signs of fetal anal atresia at 12 weeks are described for the first time: the disappearance of the original "!" sign combined with cystic space-occupying lesions in the fetal abdominal cavity, which provides a strong basis for the early diagnosis of fetal anal atresia and helps to shorten the diagnostic time window of VACTERL association.

Study on the value of prenatal ultrasound in the differentiation of mature & immature fetal sacrococcygeal teratoma

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Objective The purpose of this study was to evaluate the clinical and ultrasonic features in fetal sacrococcygeal teratoma (SCT) with different histological type of the tumor.

Methods A retrospective analysis of a total of 34 cases of SCT who underwent the diagnosis from January 2015 to December 2016 in Beijing Obstetrics and Gynecology Hospital, Capital Medical University. These cases were divided into 2 groups (mature group: n=23, immature group: n=11). Data (maternal age, gestational week and tumorous sonographic features) was analyzed by t-test/Chi-square/ Mann-Whitney *U* test using SPSS.

Results Between the mature group and the immature group, no statistical differences were observed in terms of maternal age (29.83±4.55 vs. 31.09±5.63 years old, t=-0.702, *P*=0.488), gestational week (25.94±4.62 vs. 25.68±3.27 weeks, t=0.165, *P*=0.870), fetal sex (6:17 vs. 2:9, c^2=0.194, *P*=1.000) and Altman's classification (c^2=4.179, *P*=0.228). Among all the ultrasonic features, mass volume of the immature group is significantly bigger than the mature group (88.65±282.25 vs. 308.87±349.71cm^3, Z=-3.332, *P*=0.001). The main performance of the mature group was cystic echo (56.5%, 13/23) when the immature group was cystic-solid echo (100%, 11/11), presenting a statistically significant difference (c^2=6.911, *P*=0.011). The color doppler ultrasound showing that 3 cases of the mature group and 10 cases in the immature group were detected with blood flow signal, the differences were statistically significant (c^2=19.10, *P*=0.000). Scanning of the tissues surrounding the mass and other fetal systems showed there are 5 cases

in the mature group and 7 cases in the immature group were suffered from complications, it represented a statistically significant difference between the two groups (c^2=5.72, *P*=0.026).
Conclusions The prognosis of fetal sacrococcygeal teratoma was vary with different pathological types. Cystic-solid echogenic masses, bigger mass volume, rich blood flow signals and suffered from complications were important signs for the diagnosis of immature fetal sacrococcygeal teratoma. Early diagnosis by using prenatal ultrasound can provide good results of the perinatal management.

Value of ultrasound screening for congenital malformations of fetal central nervous system in 11-13+6 gestational weeks

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Objective To investigate the ultrasound screening system in early pregnancy diagnosis of central nervous system abnormalities, and for clinical early detection and intervention of fetal malformation of the central nervous system to provide imaging basis, helps to improve the quality of eugenics.
Methods 1. From March 2014 to April 2017, 2084 cases of pregnant women with NT (translucency) in the early stage of pregnancy were enrolled in our hospital, and 2135 fetuses were examined by Nuchal. The pregnant women were 20~43 years old, average age (29.87 + 5.87), gestational age 11~14 weeks, mean gestational age (12.70 + 0.58) weeks.We use ultrasound measurement of the crown rump length (Croen rump length, CRL) after estimation of fetal gestational age, and the results were statistically analyzed. Check before the ultrasound workstation established each pregnant woman data files, including name, age, last menstrual period, parity, fetal number, contact.**2.** GE-V730 type real-time color Doppler ultrasonic diagnostic apparatus was used to investigate the frequency of 2 to 5.0MHz. All pregnant women were subjected to standardized early fetal ultrasound examinations in strict accordance with the guidelines for prenatal ultrasound examination and the British fetal medicine foundation. In the case of fetal survival, clear fetal number and chorionicity, pregnant women for ductus venosus and conventional ultrasound and fetal size, NT value measurement, through the head sagittal section, lateral ventricle, cross-sectional level of cerebellum and posterior cranial fossa, spine section 4 ultrasound images of long axis section the standard section of fetal central nervous system anatomy system inspection, but also to the fetal facial structure, structure, limbs, chest and abdomen umbilical cord and placenta were examined, and detailed records of measurement data of the fetus and the evaluation content.**3.** According to the ultrasonic measurement of CRL value evaluation of gestational age patients were divided into 3 groups: group A: 11~11^{+6} weeks in 175 cases; group B: 12~12^{+6} weeks in 1204 cases; group C: 13~13^{+6} weeks in 756 cases, statistical display and NT value in the 4 standard ultrasonic section examination at the same time, the analysis of NT value, standard section display rate and the relationship between gestational age and early pregnancy by ultrasound examination of the standard section of central nervous system abnormalities detection rate, sensitivity, specificity, positive predictive value and negative predictive value of statistical analysis.
Results 1. This study from the start to the end of pregnancy of pregnant women in early pregnancy, diagnosis of central nervous system malformation in 11 cases, a total of 17 malformations, which early pregnancy diagnosed 10 cases of malformation of the central nervous system, are serious central nervous system malformation, pregnancy diagnosis of fetal central nervous system malformation in 1 cases, central nervous system malformations the incidence rate of 5.15 per thousand (11/2135).11 cases of central nervous system malformation fetus, 8 cases only one fetal malformation of the central nervous system, including 1 cases of anencephaly, exencephaly in 2 cases, 1 cases of holoprosencephaly, 2 cases of scoliosis, 1 cases of bilateral choroid cyst and 1 cases of Blake cyst Porch.3 cases of fetus with 2 or 2 above the central nervous system

abnormalities, including 1 cases of anencephaly semi open spina bifida, 1 cases of anencephaly with open spina bifida and kyphoscoliosis malformation, 1 cases of exencephaly with open spina bifida. The study of early pregnancy diagnosed 10 cases of central nervous system malformation, pregnancy diagnosis of fetal central nervous system malformation in 1 cases, fetal central nervous system malformations in early pregnancy, the detection rate was 90.91% (10/11); early pregnancy sensitive malformation by ultrasound diagnosis of fetal central nervous system standard cross-section sensitivity was 90.91%, specificity was 100%, positive the predictive value of 100%, negative predictive value of 99.48%.**2.** This study detected 11 cases of fetal malformation of the central nervous system in 6 cases (6/11, 54.55%) with other system abnormalities, including 4 patients with 3 and more than 3 fetal malformation (4/11, 36.36%), respectively, 3 cases of fetal malformation accompanied by limb, facial, cardiac ultrasound and abnormal index, 1 cases of fetal malformation is considered as pentalogy of Cantrell with central nervous system malformation; 2 cases with 2 and more than 2 fetal malformation (2/11, 18.18%), 1 cases were right heart, left ventricular diaphragmatic hernia; 1 cases of double strephenopodia, acromphalus. In addition, there are 4 cases of fetal NT value more than 3.0mm in the fetal malformation, with limbs, facial and heart malformation in 2 cases, pentalogy of Cantrell with central nervous system malformation in 1 cases, with 1 cases of abnormal structure of other systems.**3.** First trimester fetal head chest median sagittal section of ultrasound imaging, the level of the lateral ventricles transverse, cerebellum and posterior cranial fossa, spine section long axis cross study shows that rates were 98.17%, 99.44%, 98.78% and 98.97%, which showed a higher rate, but the ultrasound standard section index is not the same gestational age groups display rate comparison analysis, the difference was not statistically significant (P>0.05).**4.** In this study, 2135 fetuses were followed up for 2094 normal pregnancies. The Spearman correlation analysis was used to investigate the relationship between the NT value of normal fetuses and the gestational age. The results showed that the NT value of normal fetuses was positively correlated with gestational age (r=0.153, P<0.05), suggesting that fetal NT thickness increased with gestational age and gestational age.
Conclusions 1. The ultrasonic screening system can effectively diagnose early pregnancy severe central nervous system malformation fetus by using ultrasonic imaging standard cross section, and the detection rate of central nervous system malformation in early pregnancy is 90.91%.**2.** In the early stage of pregnancy (11~13^{+6}weeks), the ultrasound examination of the fetus showed a higher display rate of the central nervous system structure, and the ultrasonographic diagnosis was not affected by the gestational age.

Variable fetal neoplasms and mimickers, A to Z

Hyo Jeong Lee Jeong Yeon Cho Sang Youn Kim Taek Min Kim
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Variable fetal neoplams can develop in any organ system. Knowing the presence of fetal neoplasms and suggesting differential diagnosis may alter the prenatal management and enables immediate postnatal treatment. In this exhibit, we presented fetal neoplams arised from a variety of organs with US findings. The list of cases includes:

- Glioblastoma vs. Intracranial Hematoma
- Intracranial Teratoma vs. Hematoma
- Teratoma vs. Hematoma in the Posterior Fossa
- Subependymal Hamartoma vs. Germinal Matrix Hemorrhage
- Teratoma vs. Conjoined Twin
- Cervical Lymphangioma vs. Mimicking Lesions
- Retroperitoneal Lymphangioma vs. Mimicking Lesions
- Mesenteric Cyst vs. Other Abdominal Cystic Lesions
- Hepatocellular Adenoma vs. Abnormal Focal Echo of the Liver
- Abdominal Teratoma (Fetus in Fetu) vs. Meconium Peritonitis
- Mesoblastic Nephroma vs. Autosomal Recessive Polycystic Kidney

- Adrenal Neuroblastoma vs. Mimicking Lesions
- Cystic Sacrococcygeal Teratoma vs. Myelomeningocele
- Solid Sacrococcygeal Teratoma vs. Cloacal Exstrophy

Causes of intrauterine fetal and neonatal death after implementation of a standardized protocol of frequent ultrasound monitoring of twin pregnancies

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Objective To determine the causes of intrauterine fetal death (IUFD) and neonatal death (NND) in monochorionic (MC) and dichorionic (DC) twin pregnancies after 24 weeks' gestation.
Methods This was a secondary analysis of our retrospective cohort study (J Obstet Gynaecol Res, in press) on twin pregnancies who had antenatal care and delivery in a public hospital from 2011 to 2018. Monoamnionicity, one/both twin miscarriage, twin-twin transfusion syndrome and lethal congenital abnormalities were excluded. All MC and DC twins were managed in a multiple pregnancy clinic (MPC) with standardized protocols on fetal monitoring and timely delivery according to international guidelines. All fetal or neonatal demise was investigated with standard protocols including postmortem examination.
Results Of 1282 DC twin fetuses, the number (rate) of IUFD, and NND was 6 (0.5%), and 3 (0.2%), respectively. Of the six cases of IUFD, three were due to selective fetal growth restriction (sFGR) at 25, 26 and 33 weeks' gestation, the other three were due to placental abruption (1), unexplained hydrops (1), and unexplained cause (1). The cause of all three NNDs was extreme prematurity <=26 weeks.Of 378 MC twins, the number (rate) of IUFD, and NND was 5 (1.3%), and 2 (0.5%), respectively. The cause of all the five IUFDs was unexplained, involving two pair of MC twins (at 27 weeks and at 32 weeks), and one single IUFD at 35 weeks. One NND was due to multiple congenital abnormalities at 29 weeks, and the other was due to extreme prematurity at 28 weeks.
Conclusions With frequent fetal monitoring by standardized protocol and timely delivery, the IUFD of both MC and DC twins were low. The cause of IUFD differed between MC and DC twins while the major cause of NND was extreme prematurity for both.

Can intense fetal monitoring improve the outcomes of twin pregnancies?

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Objective The aim of the study was to investigate whether the implementation of intense clinical and sonographic fetal monitoring reduced the rate of intrauterine fetal death, neonatal death and perinatal death in twin pregnancies.
Methods This is a restrospective cohort study on twin pregnancies who had delivery in a public hospital before (from 2007 to 2009) and after (from 2011 to 2018) the establishment of a specialist clinic for multiple pregnancies. After the establishment of multiple pregnancy clinic, all the monochorionic and diamniotic twin pregnancies were managed with standardized protocols on fetal monitoring and timely delivery according to the international guidelines by maternal-fetal medicine specialists. The intrauterine fetal death (IUFD), neonatal death (NND) and perinatal death (PND) rates, and the outcome of the twin pregnancies before and after the implementation of intense fetal monitoring were compared.
Results Among the 590 and 1660 fetuses delivered before and after implementation of intense fetal monitoring, the IUFD, NND and PND rates were 0.3 and 0.6% (p=0.37), 0.9% and 0.3%

(p=0.65), and 1.2 and 1.0% (p=0.63) respectively. The rate of delivery was significantly lower before 34 weeks after implementation of intense fetal monitoring (13.0% versus 18.3% before the implementation, p<0.01). The rate of Cesarean delivery in twin pregnancies was lower after the implementation of intense fetal monitoring (8.6% versus 5.9%, p=0.04).
Conclusions The implementation of intense fetal monitoring improves the perinatal outcome of twin pregnancies by lowering the rates of preterm deliveries without increasing the rates of Caesarean deliveries.

Pre-and post-natal US and MRI findings of fetal brain lesions

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KSUM

Objective The purpose of this exhibition is to demonstrate and compare pre- and post-natal US and MRI findings of various anomalies involving fetal brain.
Methods The contents of this exhibition will be variable neural tube defects, midline anomalies including agenesis of corpus callosum and Dandy-Walker continuum, lissencephaly, intracranial hemorrhage, dural arterior venous fistula, dural sinus thrombosis, variable intracranial cystic lesions and brain tumors.
Results Various anomalies may occur in the fetal brain. US is not only the first line but also a confirmative study in many cases of fetal brain anomalies. MRI is increasingly being used to evaluate the fetal brain, and is a valuable complement to prenatal US.
Conclusions Almost fetal brain anomalies show specific imaging features and can be diagnosed on the prenatal US and MRI. The exact prenatal diagnosis and thorough postnatal work-up of fetal brain anomalies are important for the prenatal and postnatal managements.

Publish-Young Investigator

Experience of ultrasound-guided percutaneous hepatobiliary puncture and drainage in difficult obstructive jaundice cases

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Objective Obstructive jaundice can be manifested as different complex images on ultrasound according to different causes, which brings great difficulty to ultrasound-guided percutaneous hepatic biliary puncture and drainage.This study retrospectively summarized three common clinically difficult cases of obstructive jaundice， then share the experience of ultrasound-guided percutaneous transhepatic cholangiocentesis (PTCD).
Methods A total of 117 cases of ultrasound-guided percutaneous hepatobiliary puncture and drainage (without puncture support) were collected from January 2020 to April 2021 in Fudan Zhongshan Xuhui Hospital.And 25 cases of complicated and difficult cases were screened out, which were divided into 3 categories based on the etiology and ultrasound findings, including slightly dilated (<3mm) intrahepatic bile ducts in 15 cases, full-filled intrahepatic bile duct stones in 6 cases, and intrahepatic bile duct gas accumulation in 4 cases. The surgical success rate and surgical complications of the above 25 complicated cases were analyzed, and compared with 92 non-difficult PTCDs in the same period, and some cases are supplemented by contrast-enhanced ultrasound. The experience were summarized by combining with the operator's operating experience and lessons.
Results The surgical success rate and complication rate of 25 cases of complex PTCD cases were 73.3% (11/15) and 33.3% (5/15) of mild bile duct dilation, and 83.3% (5/6) and 16.7% (1/6) for bile duct stones, 66.7% (3/4) and 50.0% (2/4) for bile duct gas accumulation, 100% (92/92) and 13.0% (12/92) for non-difficult cases during the same period. Intraoperative contrast-enhanced ultrasound in the bile duct was used in 6 cases. In order to prompt the success rate of surgery and reduce the incidence of complications, the key surgical experience includes: 1) Reducing the angle between the puncture needle and the bile duct can increase the success rate of puncture in cases of mild bile duct dilation; 2) Guide the needle through the cross section of the bile duct can reduce the incidence of accidental injury to the accompanying blood vessels; 3) Make full use of the guide wire to help improve the success rate of puncture in cases of bile duct stones; 4) The key to successful puncture in cases of bile duct pneumocystis is to judge that the needle tip breaks through the bile duct wall by keen touch and withdraws the gas. 5) The application of contrast-enhanced ultrasound can determine the position of the puncture needle tip and the drainage tube, which helps to improve the success rate of the operation and reduce the occurrence of bleeding complications.
Conclusion Ultrasound-guided percutaneous biliary puncture and drainage is more difficult and the incidence of complications is higher in complex obstruction cases. It has strong operator dependence. Contrast-enhanced ultrasound has certain application value in operation.

Brain hemodynamic change in hypoplastic left heart syndrome

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Objectives The study investigated the cerebral vascular hemodynamic changes under different oxygen saturation in Hypoplastic Left Heart Syndrome (HLHS), combined with cerebral placenta ratio, anatomical anomaly and other vascular parameters, Which provided valuable information for neurodevelopmental adverse outcome for HLHS fetus.
Methods HLHS cases(n=110)、Aneurysm of the atrial septum（AAS）(n=20) cases and normal control cases (n=30) were retrospectively analyzed. All cases were referred to fetal echocardiography, hemodynamic parameters of middle cerebral artery and other important vessels were compared and analyzed before and after MH.
Results Neurodevelopmental abnormalities in children with HLHS originated from fetus stage. In HLHS, The resistance of fetal middle cerebral artery(MCA) and cerebral-placental ratio(CPR) decreased, compared with the normal control group（P<0.05）.The flow in aortic arch increased. HLHS showed an obvious “brain-sparing” effect.After maternal hyperoxygenation, The PI of intraparenchymal pulmonary artery decreased significantly in both HLHS and AAS（P >0.05）. The CPR didn’t show statistical difference between HLHS and AAS after maternal hyperoxygenation（P >0.05）.The resistance of fetal MCA increased and flow velocity of MCA decresed. At the same time , the resistance of umbilical artery and uterine artery didn’t significantly change.
Conclusions Fetal HLHS showed obvious“brain-sparing” effect, due to self autoregulation to the damage of hyperoxic blood flow in the brain. In HLHS, The resistance of fetal MCA increased slightly after maternal hyperoxygenation, which limited the blood flow to the brain and adaptated to its own state. The hypoxic level of fetal brain in HLHS was alleviated by maternal hyperoxygenation.Maternal hyperoxygenation intervention provided valuable hemodynamics information to improve neurological development in fetuses with HLHS. Maternal hyperoxygenation intervention is relatively safe for the fetus and the mother.

Publish-Superficial tissue and vascular ultrasound

The quantitative parameters of contrast-enhanced ultrasound for the diagnosis of benign and malignant soft tissue tumors

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Objective To evaluate the value of quantitative parameters of contrast-enhanced ultrasound (CEUS) in the diagnosis of benign and malignant soft tissue tumors (STTs).
Methods The characteristics of the conventional ultrasound and CEUS time-intensity curves of 122 cases of STTs were retrospectively analyzed. The difference of quantitative parameters in the CEUS time-intensity curves between benign and malignant STTs was evaluated. The ability of conventional ultrasound and quantitative CEUS for the differential diagnosis of STTs was determined.
Results Among the 122 cases of STTs, 59 were benign and 63 were malignant. In the time-intensity curve of CEUS, there was significant difference of AT-Intensity (P = 0.029), Peak Intensity (P = 0.000), 50% Wash Out-Intensity (P = 0.000), 50% Wash Out-Time (P = 0.001) and Rising Slope (P = 0.001) between benign and malignant STTs. The sensitivity, specificity and accuracy of conventional ultrasound combined with quantitative CEUS in the differential diagnosis of benign and malignant STTs was 93.7%, 72.9% and 83.6%, respectively. Area under curve (AUC) was 0.909.
Conclusions The quantitative CEUS can provide valuable information for the evaluation of benign and malignant STTs. Higher RS is an independent risk factor for malignant STTs. The combination of conventional ultrasound and CEUS can improve the ability in differential diagnosis of STTs.

Small saphenous vein thrombosis identified by real-time three-dimensional vascular ultrasound:Case report

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This case report describes a case of diagnosis of small saphenous vein thrombosis using real-time three-dimensional ultrasound technology. This technology has multiple display modes, each of which has its own unique advantages. It allows the observer to observe the thrombosis structure in the venous lumen stereoscopic through new vision, and this technology reduces the rate of missed diagnosis of the disease. In the diagnosis of venous thrombosis disease, it has the unique advantages of stereoscopic intuitionism and high accuracy, and can be used as a powerful supplement to conventional ultrasound. It has important clinical value in making clear diagnosis, guiding treatment and evaluating curative effect.

Preliminary discussionthe clinical value and influencing factors of the new index of arterial stiffness, a studybased on 2677 subjects

Wenzhe Xu
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Abstract Objective To explore the clinical value and influencing factors of arterial velocity index (AVI) and arterial pressure-volume index (API), a new index of arterial stiffness.
Methods 2677 volunteers were recruited from the hospital and divided into 929 patients ≥64.2 years old (Q1 group), 890 patients ≥47.8 years old (Q2 group), and 858 patients younger than 47.8 years old (Q3 group) according to the age tertiles. The AVI and API of the subjects were monitored by the cuff oscillatory wave analysis method. 124 subjects were randomly selected to obtain their left ventricular ejection fraction (EF). One-way analysis of variance was used to compare the differences in AVI and API between the three groups. Pearson correlation and multiple linear regression analysis were used to obtain independent influencing factors of AVI and API.
Results ①The differences between AVI and API in the three groups had statistical significance (all P<0.05), and the values of AVI and API increased with age (all P<0.05). ②Elevated AVI was positively correlated with age, body mass index, systolic blood pressure and diastolic blood pressure (r=0.536, 0.055, 0.486 and 0.189, all P<0.01), and was negatively correlated with height, body mass, ejection fraction and shortening fraction(r=-0.123, -0.049, -0.268 and -0.259, all P<0.05). Multiple linear regression analysis indicated that age and systolic blood pressure were independent influencing factors of AVI (P<0.05). ③Elevated API was positively correlated with age, body mass, body mass index, and systolic blood pressure (r=0.475, 0.108, 0.230, and 0.690, all P<0.01), and negatively correlated with height (r=-0.107, P<0.01)). Multiple linear regression analysis indicated that diastolic blood pressure and systolic blood pressure were independent factors affecting API (P<0.01).
Conclusion AVI and API are new indicators reflecting arterial stiffness, which are related to age, height, body mass index and blood pressure,providing new substitute indicator for arterial stiffness screening.

Study about Contrast-enhanced ultrasonography in evaluation on lower extremity artery disease in patients with Diabetic Foot

Jinhui Wang
Taiyuan Second People's Hospital

Objective To investigate the role of Contrast-enhanced ultrasonographyin evaluation on lower extremity artery disease in patients with Diabetic Foot.
Methods A total of 426 lower limbs in 213 patients with diabetic foot underwent color doppler ultrasonography. The related indicators were observed including vascular diameter, arterial intima-media thickness, plaques, arterial stenoses or occlusios and hemodynamics parameters. The lesion characteristics of common Íemoral arteries, popliteal artcries, anterior tibial arteries, posterior tibial arteries, peroneal arteries and dorsalis pedis arteries were analyzed. Among 46 patients , a total of 88 arterial segments with severe stenoses or occlusios accepted the examination of CEUS, Digital subtraction angiography was the reference standard.
Results Lower extremity arterial disease in patients with diabetic foot are widespread,ranging from femoral artery to the dorsal pedal artery， multiple segments of arteries are involved, severe stenoses and occlusions are more common in anterior and posterial tibial arterior. There was significant difference in the incidence rate of arterial stenoses or occlusios of anterior and posterial

tibial arterior from that of femoral artery, popliteal artery, peroneal artery and dorsalartery. Totally88 arterial segments were checked in 46 patients .There were 50 arterial segments with severe stenosis , 38 arterial segments with occlusion by Contrast-enhanced ultrasonography. The sensitivity, specificity, positive predictive value and negative predictive value of Contrast-enhanced ultrasonography for evaluation of arterial occlusion was 100%（31/31），87.72%（50/57），81.58%（31/38）、100%（50/50）respectively, and the positive likelihood ratio was 8.13, the negative likelihood ratio was 0.0. Agreement between CEUS and DSA were good, Kappa value was 0.834. The specificity and accuracy of CEUS were higher than that of CD-US.
Conclusion There were good Agreement between CEUS and DSA. CEUS can enhance blood flow signal and color Doppler signals intensity in lower extremity arterial and improve the diagnostic ability of CD-US when scanning difficult arterial segments in patients suffering from DF.

Ultrasound elasticity imaging contrast benign breast disease and breast cancer

Xiuhong Jin
Shanghai Fengxian District Central Hospital

Objective To compare patients with benign breast disease and breast ultrasound elastography, clear ultrasound elastography value.
Methods Selected May 2014 - Patients in January 2016 in our hospital 146 cases of Breast Surgery, according to pathological findings into benign breast disease and breast cancer compared with pathological results of ultrasound imaging flexibility.
Results 128 patients with a total mass of 146 patients with 99 cases of benign tumor nodules, 32 cases of breast fibroadenoma, 29 cases of nodular hyperplasia, 20 cases of breast lipoma, 6 cases of breast Angiolipoma, 4 cases as ductal adenoma, 8 cases of intraductal papilloma; 47 cases of malignant tumors, including 37 cases of invasive ductal carcinoma tumor, 9 cases of mucinous adenocarcinoma tumor, one case of hard lumps of cancer. Benign breast lesions in 99 patients, 1 minute 43 cases (43.43%), 2 minutes and 34 cases (34.34%), 3 minutes and 18 cases (18.18%), 4 points in 4 cases (4.04%); 47 cases of breast cancer patients , 3 minutes and 9 cases (19.15%), 4 minutes and 20 cases (42.55%), 5 minutes and 18 cases (38.30%). Ultrasound elastography application in differentiating benign breast disease and breast cancer sensitivity of 95.96% and a specificity of 80.85% and an accuracy of 91.10% and a negative predictive value of 90.48%, a positive predictive value of 91.35%.
Conclusions Ultrasound elastography discriminating benign breast disease and breast cancer sensitivity as high as 95.96 percent, with higher accuracy, can assist in the diagnosis of breast disease.

Value of S-Detect technique for diagnosing breast tumors by well-experienced and less-experienced ultrasound physicians

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Objective To compare the diagnostic efficiencies of S-Detect technique for diagnosing breast tumors using by a well-experienced ultrasound physician and a less-experienced one and to explore the value of S-Detect technique for clinical application.

Methods 100 patients (with 144 breast masses) who underwent breast tumor surgery in our hospital were included in this study and were examined by a well-experienced ultrasound physician and a less-experienced one using conventional ultrasound with BI-RADS classification (BI-RADS > 4a was considered as malignant) and S-Detect technique ('possibly malignant' in longitudinal and/ or transverse sections was considered as malignant) respectively. With pathological results as golden standards, the diagnostic efficiencies and consistency of BI-RADS classification and S-Detect technique were analyzed and compared.
Results Among 144 breast tumors, 124 were benign and 20 were malignant. AUCs of BI-RADS classification of the well-experienced ultrasound physician and the less-experienced one were 0.868 and 0.690 respectively; AUCs of S-Detect technique of those physicians were 0.877 and 0.893 respectively. AUC of BI-RADS classification of the less-experienced ultrasound physician was significantly lower than the other three (P<0.01). The diagnostic results of two ultrasound physicians using BI-RADS were moderately consistent with ICC as 0.736; and the diagnostic results of two ultrasound physicians using S-Detect were highly consistent with ICC as 0.928.
Conclusions The application of S-Detect technique could greatly improve the diagnostic accuracy and confidence of less-experienced ultrasound physicians. S-Detect technique is easy to master and operate, especially suitable for ultrasound physicians with less experience or in primary hospitals and should be popularized.

Virtual touch tissue imaging and quantification (VTIQ) in the evaluation of thyroid nodules: the associated factors leading to misdiagnosis

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Objective To evaluate the associated factors leading to misdiagnosis with VTIQ for differentiation between benign from malignant thyroid nodules (TNs).
Methods The study included 238 benign TNs and 150 malignant TNs. Retrospective analysis was performed to evaluate conventional ultrasound (US) features and VTIQ parameters which compared with the reference standard of histopathological and/or cytological results. Binary logistic regression analysis was performed to select independent variables leading to misdiagnosis.
Results The maximum shear wave speed (SWS) (SWS-max), mean SWS (SWS-mean), standard deviation of SWS (SWS-SD) and SWS-ratio were significantly higher for malignant TNs compared with benign TNs (all P < 0.001). For differentiating benign TNs from malignant TNs, the areas under the receiver operating characteristic (ROC) curve for the quantitative VTIQ parameters (including SWS-max, SWS-mean, SWS-SD and SWS-ratio) was 0.814((95%CI:0.722-0.852) , 0.827(95%CI:0.785-0.863), 0.682((95%CI:0.633-0.728), 0.774((95%CI:0.729-0.815), respectively, (P < 0.001) , the cut-off value was 3.61m/s、3.15 m/s、0.34 m/s、1.12, respectively. SWS-mean (had the highest areas under the curve) achieved the highest diagnostic performance with a cut-off value of 3.15m/s, with a sensitivity of 64.7% (97/150), specificity of 86.6% (206/238), accuracy of 78.1% (303/388), PPV of 75.2% (97/129), and NPV of 79.5% (206/259). The false negative rate 35.3% (53/150) was significantly higher than the false positive rate 13.4% (32/238) (P< 0.001). Binary logistic regression analysis showed that Intranodular calcification (OR: 1.715, 95%CI:1.046-2.811) was significantly associated with false positive VTIQ findings, while nodule size (OR: 0.936, 95%CI: 0.881-0.994) and echotexture of the thyroid gland (OR: 0.033, 95%CI: 1.217-5.617) were negatively associated with them. Nodule depth (OR: 0.881, 95%CI: 0.800-0.970) and TI-RADS category (OR: 0.563, 95%CI: 0.339-0.933)VTIQ has improved specificity for diagnosing malignant TNs and also improved the confidence for diagnosis. These US characteristic of TNs should be taken into consideration when interpreting the results of VTIQ examinations.

The application value of ultrasonic grading assessment of anterior talofibular ligament injury and preoperative positioning

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Purpose The value of ultrasound in diagnosing anterior talofibular ligament injury has been clinically recognized. The degree of damage to the anterior talofibular ligament is very important for the selection of treatment options and prognosis. This study explored the value of ultrasound grading assessment of anterior talofibular ligament injury and the application value of preoperative ultrasound in locating the location of the injury and the vascular and nerve course.

Materials and Methods From September 2019 to May 2021, 485 patients with lateral malleolus varus or plantar flexion sprain were admitted. All patients underwent ankle ultrasound examination and graded ATFL injury degree. There were 365 males and 122 females, age 4- 79 years old, average (28.9±12.9) years old. The time from injury to consultation is 2 hours to 1.5 years. Inclusion criteria: ①Acute ankle sprain, ②Patients with a history of ankle sprain and chronic ankle pain. Exclusion criteria: ①Suffering from gouty arthritis, rheumatoid arthritis, diabetes, immunodeficiency diseases, ②History of ankle surgery.

Use Hitachi HITACHI Avius color Doppler ultrasound diagnostic apparatus, 14MHZ high-frequency linear array probe to perform ultrasound scanning under the preset conditions of musculoskeletal examination. The patient sits on the examination table with the knee joint flexed and the ankle joint in a neutral position. Scan the anterior, outer, and medial ankle joints, observe the tendons, joint cavity, anterior tibiofibular ligament, calcaneofibular ligament, cortical bone and subcutaneous soft tissue; scan longitudinally and transversely along the ATFL direction, and observe the echo of the ligaments bilaterally , Shape, thickness, length, continuity, tension, continuity of soft tissue around ligaments and cortical bone. The thickness and length of the ATFL are measured 3 times, and the average value is taken. The location of ATFL damage, blood vessels, sural nerve or superficial peroneal nerve, or mesothelial nerve of superficial peroneal nerve were randomly performed on the surgical patients. The course of ATFL damage and the damage location were marked with a black marker, and the course of blood vessels and nerves was marked with a purple marker. One month after surgery, follow-up ultrasound was used to measure the length of the wounded scar on the body surface and ask the patient's physical signs. All examinations were performed by physicians with more than 3 years of experience in musculoskeletal ultrasound diagnosis.

A normal ATFL ultrasound image shows a continuous strip of medium echo, smooth and smooth, with a fine linear hyperechoic fiber structure within, the thickness of not more than 2.4 mm or the thickening of not more than 20% of the contralateral side. According to the thickness of the injured ligament, the level of echo, the continuity, the location of the injury, the remaining ligament, the greater strong echo and the unevenness of the cortical bone, the injury is divided into five types: (1) Type I: contusion, ultrasound image It is characterized by continuous ligament swelling and thickening, thickness> 2.4 mm or thickening more than 20% of the healthy side, reduced echo and unclear fiber structure; (2) Type Ⅱ: fibula side injury, ⅡA partial tear, ultrasound image characteristics The fibular lateral ligament fiber continuity is partially interrupted, the ligament is swollen and thickened, and the gap at the tear site is formed, and no echo or hypoechoic is seen in the periphery; ⅡB complete tear, the ultrasonic image is characterized by complete rupture of the fibular lateral ligament, and ligament echo on the talar , The contracture ligament is thickened, and the tension at the broken end of the probe is lost; IIC avulsion fracture, the ultrasonic image is characterized by a strip or arc with a long diameter> 5mm at the fibula end, and the local cortical surface is not smooth; (3) Type Ⅲ: side injury of the talus, ⅢA partial tear, ⅢB complete tear; (4) Type Ⅳ: mid-section ligament injury, ⅣA partial tear, ⅣB complete tear; (5) Type Ⅴ: old ligament

Injuries are classified into ligament laxity, loose bodies in ligaments, sesamoid or calcification foci, and ligament resorption based on the characteristics of ultrasound images.

According to the ultrasound classification of ATFL injuries, conservative treatment with plaster or brace is recommended for type I, IIA, IIIA, and IVA injuries; the location of the fracture and the vascular nerves are located under ultrasound for type IIB, IIC, IIIB, and IVB injuries. And mark, open or arthroscopic surgery; ATFL reconstruction for ligament absorption in type V injury.

Results (1) Among the 485 patients, 34 showed normal ATFL sonographic features, accompanied by different degrees of joint cavity effusion and soft tissue swelling. Among the 451 cases of ATFL injury, type I injury accounted for the highest proportion. It was 55.2%, followed by type Ⅱ and type Ⅴ injuries, which accounted for 17.5% and 12.9% respectively. Among other abnormal signs, joint cavity effusion was the most common, with an incidence of 43.0%. (2) For 42 patients undergoing surgical treatment, preoperative ATFL ultrasound grading assessment, clarifying the injury location, and comparing the analysis with the surgical results, the accuracy was 97.6%; among them, the preoperative ultrasound was used to locate the ATFL injury location, blood vessels, and nerve surface in 22 cases. Twenty patients underwent body surface localization. The two methods were followed up one month after surgery. The length of the surgical incision and nerve injury were compared, and the difference was statistically significant ($p<0.05$).

Conclusions Ultrasound is a reliable imaging method for assessing ATFL damage. It provides an accurate objective basis for clinical judgment of ATFL damage and selection of appropriate treatment options. Preoperative ultrasound positioning makes the surgical incision more precise, avoids vascular and nerve damage, and is beneficial to postoperative Rehabilitation of ankle joint function.

A case of perivascular epithelioid tumor (PEComa) of vocal cord diagnosed by ultrasound

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The 27-year-old female patient was admitted to hospital for hoarseness for more than two months.In December 2020, the patient developed hoarseness without obvious inducement, accompanied by dryness of the throat and foreign body sensation, accompanied by cough and sputum, with a small amount of yellow purulent sputum, without water choking, dyspnea or dysphagia.The MRI of the throat in the local hospital showed that the left vocal cord was occupied with a size of about 1.6×1.2×2.3cm.Laryngoscopy showed neoplasm in the left larynx.Later, a biopsy was taken at the local hospital and the results showed that :(left larynx) was considered to be a benign soft tissue tumor.After admission, ultrasound exploration in the anterior cervical region showed that the anterior thyroid cartilage combined with the lower anterior cervical median left vocal cord muscle region showed a 2.4×1.6cm low-echo shadow with clear boundary, irregular shape and shallow lobulated shape.CDFI showed abundant blood flow signal, and PW could detect the blood flow of low-speed and low-resistance arteries.The operation showed that the tumor involved the muscular layer and the intima of thyroid cartilage was invaded and removed.Postoperative pathology showed that under microscope, the tumor was infiltrative around the tumor, the tumor cells were epithelioid cells, the cytoplasm was transparent to eosinophilic, and there were obvious nucleoli with a nest-like or alveolar distribution, and the morphology was similar to perivascular epithelioid cell tumor (PEComa). Combined with immunohistochemistry, the tumor was considered to be perivascular epithelioid tumor of vocal cord (PEComa).

Combined carotid artery color doppler ultrasonography and transcranial color-code sonography diagnosed Bilateral congenital absence of internal carotid artery case report and review of the literatures

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Bilateral congenital absence of internal carotid artery is a rare congenital vascular abnormality with less than 1 / 10,000. A 76-year-old male patient was hospitalized for 15 hours due to unclear speech and angular deviation. Carotid artery color doppler ultrasonography combined with transcranial color-code sonography examination diagnosed Bilateral congenital absence of internal carotid artery, bilateral posterior communicating artery was opened: posterior blood supply forward. Head magnetic resonance angiography examination indicated that no intracranial segment of bilateral internal carotid artery: severe stenosis or occlusion, and large bilateral posterior communicating artery. Digital subtraction angiography examination indicated bilateral internal carotid arteries were not developed, considering as occlusion; bilateral posterior communicating artery was opened: posterior blood supply forward. Cranial computer tomography bone window indicated bilateral absence of the carotid canals. Through multidisciplinary consultation and discussion, support ultrasound diagnosis: bilateral congenital absence of internal carotid artery. Due to the establishment of good intracranial and external communicating artery circulation, Bilateral congenital absence of internal carotid artery did not have relevant clinical symptoms, but was accidentally found in the relevant examination after cerebrovascular events.

Analysis on sonographic features of adult temporomandibular disorders

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Objective To retrospectively analyze the sonographic techniques and imaging features of adult temporomandibular disorders (TMD).
Materials and Methods Sixty eight patients with 97 temporomandibular joints with clinical diagnosis of TMD in our hospital were enrolled in this study, including 29 males and 39 females, with age of 32.6±15.4 years old. The main symptoms were pain, snapping, limited or deviant jaw opening, and chewing difficulties. Sonographic techniques: Patients with supine position were examined by a sonography clinician with Siemens S2000 ultrasound instrument with 9L4 probe; All the temporomandibular joints were scanned in longitudinal and short axis under the conditions of mouth closed and opened, respectively. Evaluation indices: thickness of articular capsule; thickness of articular capsule-disc (measuring the distance of the movement of articular disk according to Friedma's way); echogenicity of adjacent tissues; blood flow distribution of synovium and surrounding soft tissues; and relative positions and bone cortex contour of condyle process and mandibular fossa.
Results Sonographic abnormalities were detected in all 97 joints, including thickening of articular capsule in 82 cases, enhanced vasculature of capsule in 11 cases, anterior dislocation of articular disk in 41 cases (reducible in 25 cases and unreducible in 16 cases); change of bone cortex contour in 53 cases; change of the relative position of condyle process and mandibular fossa in 3 cases; swelling of surrounding soft tissues with increased blood signals in 2 cases.
Conclusion Sonography can show the degeneration, synovitis, inflammation of surrounding soft tissues and inflammation activities in TMD, and this technology can play a guiding role in the diagnosis and treatment of TMD.

The value of two - dimensional ultrasound combined with blood flow doppler and elastic imaging in identifying small breast cancer

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Abstract Objective To value the performance of sonoelastography (USE) and color Doppler ultrasonography (USD) in distinguishing small breast cancer.
Materials and Methods 131 patients were enrolled in this study from January 2014 to December 2016, 131 biopsy-proven breast masses were included. Three blinded readers assessed the images of US, USE and USD according to the Breast Imaging Reporting and Data System (BI-RADS) lexicon independently. Sensitivity, specificity, accuracy and area under the receiver operating characteristic (ROC) curve (Az) values of each data sets were compared. Pathologic results were reference standards.
Results (1) A total of 131 breast masses were included in this study, including 68 cases (51.9%) of benign masses and 63 cases (48.1%) of malignant masses. Patient age and postmenopausal statement in benign masses group were smaller than these in malignant masses group (P<0.001). (2) The diagnostic specificity of the three groups of ultrasound physicians in group B and D was higher than that in group A (P <0.001), while the sensitivity of diagnosis was lower than that of group A (P> 0.05). The sensitivity, specificity and accuracy of group A were significantly higher than those of group C (P <0.001). (3) The area under the ROC curve in group B and D was significantly higher than that in group A (P <0.001); and the Az of group A have different degrees of reduction compared to the three ultrasound physician in the group C, the difference was not statistically significant (P> 0.05).
Conclusion USE is more useful than USD in distinguishing small breast malign masses from begin masses.

Publish-Abdominal ultrasound.

Is the transperineal ultrasonography approach effective for the diagnosis of rectocele?

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Background Transperineal ultrasonography has been used as a diagnostic imaging modality for rectocele for many years. However, the consistency of ultrasonography and defecography in evaluating the severity of rectocele was not satisfactory. This study aimed to evaluate the agreement in the measurement of rectocele parameters between the two methods in different positions and provide clinical implications for the diagnosis of rectocele.
Methods In this pilot study, participants were recruited in an outpatient clinic of a tertiary hospital between December 2017 and December 2019. All participants separately underwent defecation proctography at sitting and squatting positions, and undertook transperineal ultrasonography at left lateral, sitting, and squatting positions. The consistency of ultrasonography and defecography was evaluated.
Results Thirty female volunteers with rectocele were included in this study. The degree of anorectal angle was signifificantly larger at rest and during contraction, maximal Valsalva, and evacuation; the depth of the rectocele was signifificantly deeper during maximal Valsalva and evacuation; and the length of the perineum descending was signifificantly longer during contraction and maximal Valsalva in using squatting position compared to the sitting position when performing the defecation proctography. The degree of anorectal angle, the depth of rectocele, the area of levator hiatus, and the volume of the rectocele were signifificantly different in using squatting, sitting, and left lateral positions when performing the transperineal ultrasonography. Bland-Altman semi-quantitative plots showed good consistency in the measurement of the anorectal angle and the depth of the rectocele between proctography and ultrasonography in both sitting and squatting positions.
Conclusions The fifindings of our study may be considered as the preliminary evidence to support the use of transperineal ultrasonography with sitting and squatting positions as the imaging test of choice for evaluating patients with rectocele.

Contrastive analysis of imaging features of tuberculous granulomas in retroperitoneal lymph nodes

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Objective to investigate the imaging features of retroperitoneal tuberculous granulation and provide the imaging basis for clinical diagnosis and treatment.
Methods the imaging data of one patient with retroperitoneal lymphatic tuberculosis granuloma admitted to our hospital were retrospectively analyzed, and the domestic and foreign imaging medical documents closely related to retroperitoneal tuberculosis were reviewed and analyzed in Wan fang and Pubmed medical network.
Results This case went to the hospital for 1 month because of dull pain and discomfort in the upper abdomen.Color ultrasound suggested: **1.** Upper retroperitoneal cystic solid mass with calcification; **2.** Retroperitoneal solid nodules;3. Enhanced CT examination of the upper abdomen is recommended.CT findings: solid lesions in the upper abdomen with calcification, adjacent to multiple larger lymph nodes with calcification, considering solid granulomatous lesions, tuberculosis possibility.Patient OT test (-), blood sedimentation rate did not rise, after consultation

of a number of clinical experts was recommended follow-up observation, after half a year, no obvious changes in the mass, continue to follow up observation. Ultrasound examination 1 year later showed that the size of the cystic solid mass in the upper retroperitoneum was significantly reduced, and the solid nodules in the upper retroperitoneum disappeared.
Conclusion Retroperitoneal tuberculous granuloma is extremely rare, with characteristic imaging features, providing clear imaging basis for clinical diagnosis and treatment, greatly reducing the incidence of misdiagnosis and misdiagnosis, reducing unnecessary surgical treatment, and effectively reducing the physical and mental pain and economic burden of patients.

The initial study of enhance form and quantitative parameters of contrast enhanced ultrasound characteristics of intestinal malignant tumor

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Objectives To analysis the characteristics of enhance form and time-intensity curve of contrast-enhanced ultrasound (CEUS) of intestinal malignant tumor and to evaluate the diagnosis of intestinal malignant tumor by CEUS.
Methods 26 patients of intestinal malignant tumor were undertook CEUS examination. The enhance forms were observed. The quantitative parameters of tumor tissue and intestinal wall besides were acquired by time-intensity curve.
Results CEUS showed that all the 26 patients of intestinal malignant tumor had heterogeneous enhance modes including 7 patients had empty contrast areas in the lesion. The lesions showed high enhance form mainly, including 23 patients (88.5%) showed high enhance form and 17 patients (65.4%) showed the enhance form that washed in from peripheral area to the center. The lesions also showed fast wash out that 22 patients (84.6%) showed the high enhancement maintained only a short period of time and washed out quite early. There's significant difference between the absolute enhance intensity and the arrival to peak time of both tumor tissue and intestinal wall besides ($p<0.05$).
Conclusions The intestinal malignant tumors have characteristic CEUS appearance. The blood flow wash in situation of colic malignant tumors can be dynamical observed by time-intensity curve. CEUS has clinical application value to the diagnosis of intestinal malignant tumor.

The value of combined application of abdominal and perineal ultrasound in vaginal birth of postcesarean repregnancy

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Objective To discuss the value of examination of the lower uterine muscular layer thickness by abdominal and perineal ultrasound in vaginal birth after postcesarean repregnancy.
Methods Abdominal and perineal ultrasound were performed on 95 cases of pregnant again women with a history of cesarean section(observation group) and 102 cases of pregnant women without cesarean section(control group) in the late trimester of pregnancy. The measurements were taken to test and comparatively analyze the thickness and structure of the lower uterine muscular layer and the final Vaginal birth results. Results The successful showing rate of the thickness and structure of the lower uterine segment of the pregnant women by the abdominal and perineal ultrasound was higher than that by abdominal ultrasound alone（$P < 0.01$）through the ultrasound

check of the 202 cases. The thickness of lower uterine muscular layer of observation group in late trimester of pregnancy was significantly thinner than that of the control group(P < 0.01). There was no statistically significant difference（P > 0.05） in the successful rate of vaginal delivery between the observation group76.8%(73/95) and the control group 86.9%(93/107). Because of poor cervical conditions, the cesarean section rate in the observation group 16.8%(16/95) was significantly higher than that in the control group 4.6%(5/107)（P < 0.01）.
Conclusions The thickness of lower uterine muscular layer of repregnancy tends to thinner after cesarean section. Measureing the thickness of lower uterine muscular layer（>2mm） by abdominal and perineal ultrasound contributes to the choice of vaginal birth after cesarean (VBAC）.

Assessment of intestinal stiffness in in patients with crohn's disease by real-time shear wave elastography

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Aim The aim of this study was to evaluate the diagnostic performance of real-time shear wave elastography (SWE) for assessment of the predominant types of intestinal stenosis in patients with Crohn's disease (CD).
Material and Methods Suspicious intestinal stenoses in 31 patients with Crohn's disease were enrolled in this study，gray scale ultrasonography and real-time SWE methods were performed, and all patients underwent endoscopy within 24 hours with pathologic biopsy. The Young's modulus of stenotic intestinal wall was compared between the two groups.The sensitivity, specificity, accuracy, positive predictive value (PPV), negative predictive value (NPV), and area under the receiver operating characteristic curve (AUROC) were calculated.
Results The Young's modulus of the inflammatory stenosis of intestinal wall was significantly lower than that of the fibrous stenosis of intestinal wall (P<0.05). The optimal cut-off value of the Young's modulus for fibrostenotic bowel was a score of 6.3kpa or greater (sensitivity, 72%; specificity, 87%; accuracy, 76%; PPV, 33.7%; NPV, 88.4%; AUROC, 0.859; P < .05).
Conclusion Real-time SWE had the good performance for evaluating and differentiating intestinal stenosis in Crohn disease. It could provide a quantitative, objective measurement for predicting the stiffness of bowel, and can distinguish between inflammatory and fibrostenotic bowel.

Simple renal cyst and myocardial remodeling in hypertension

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Objective To investigate the incidence of simple renal cyst in patients with hypertension, especially its relationship with hypertensive myocardial remodeling.
Methods 92 patients with hypertension were examined by B ultrasonography.Results: The incidence of renal cyst increased with age. Multivariate logistic regression analysis showed that age, sex, renal calculus and renal insufficiency were significantly related to the incidence of renal cyst.However, the incidence of ventricular septal thickening in hypertension with simple renal cyst was significantly higher than that in hypertension without simple renal cyst (P > 0.01). The increase of blood pressure in hypertension with simple renal cyst was mainly caused by systolic pressure,

and antihypertensive drug therapy was effective.Conclusion: The incidence of simple renal cyst in patients with hypertension is related to age, sex, renal stones, renal insufficiency, systolic blood pressure, and myocardial remodeling in hypertension, but may not be related to diastolic blood pressure, cardiac systolic and diastolic function.

A hybrid machine learning model based on semantic information can optimize treatment decision for naïve single 3-5cm HCC patients

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Background Tumor recurrence is an abomination for hepatocellular carcinoma (HCC) patients receiving local treatment.
Purpose: To build a hybrid machine learning model to recommend optimized first treatment (Laparoscopic hepatectomy (LH) or Microwave ablation (MWA)) for naïve single 3-5cm HCC patients based on early recurrence (ER, ≤2 years) probability.
Methods This retrospective study collected 20 semantic variables of 582 patients (LH:300, MWA:282) from 13 hospitals with at least 24 months follow-up. Both groups were divided into training, validation and test set, respectively. Five algorithms (Logistics Regression, Random Forest, Neural Network, Stochastic Gradient Boosting (SGB) and eXtreme Gradient Boosting (XGB)) were used for model building. Model with highest AUC in validation set of LH and MWA was selected to connect as a hybrid model which made decision based on ER probability. Model testing was performed in a comprehensive set composing of LH and MWA test set.
Results Four variables in each group were selected to build LH and MWA model, respectively. LH-XGB model (AUC=0.744) and MWA-SGM (AUC=0.750) model were selected for model building. In comprehensive set, a treatment confusion matrix was established based on recommended and actual treatment. The predicted ER probabilities were comparable with the actual ER rates for various types of patients in matrix ($p>0.05$). ER rate of patients whose actual treatment consistent with recommendation was lower than that of inconsistent patients (LH:21.2%vs46.2%, $p=0.042$; MWA:26.3%vs54.1%, $p=0.048$). By recommending optimal treatment, hybrid model can significantly reduce ER probability from 38.2% to 25.6% for overall patients ($p<0.001$).
Conclusions The hybrid model can accurately predict ER probability of different treatments, and thereby provide a reliable evidence to make optimal treatment decision for patients with single 3-5cm HCC.

Spatial and temporal relationship between local tumor progression and safety marge of ablation zone after thermal ablation for ≤5cm HCC hepatocellular carcinoma

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Background Local tumor progression (LTP) is a recurrence type occurred near ablation zone (AZ) after thermal ablation for hepatocellular carcinoma.
Aim: To explore spatial and temporal relationship between LTP and AZ.
Methods This study included 93 cases of tumor recurrence within 1 cm of AZ after clinical curative thermal ablation for ≤5cm HCC between 2009 and 2020. AZ was divided into 8 quadrants spatially through 3D-visualization image fusion and tumor map. We identify the quadrant which was the

shortest safety marge (SM) of AZ, and evaluate whether this quadrant was consistent with the quadrant that LTP occurred. LTPs were classified into contacted-type and non-contacted-type LTP based on whether recurrence tumor margin was contact with AZ margin. Subgroup analysis was performed for different types and different recurrence time of LTPs.
Results Among all 93 LTPs, 48 LTPs (51.6%) occurred in shortest SM quadrants, which showed a significant centrality compared with average (1/8) level ($p<0.001$). However, only 5 of 25 non-contacted LTPs (20.0%) and 3 of 19 over-2-years LTPs (15.8%) occurred in shortest SM quadrant, which showed that non-contacted-type LTP ($p=0.195$) and over-2-years LTP ($p=0.43$) was not correlated with shortest SM. In 40 contacted-type LTPs which occurred in shortest SM quadrant within 2 years,7 LTPs, 1 LTP and 0 LTP occurred when the 3mm, 5mm and 10mm shortest SM was completely reached, respectively.
Conclusion Although LTP was more likely occurred in the shortest SM of AZ, the non-contact type and over-2-years LTP did not show significant centrality. Compared with 3mm, 5mm SM can effectively prevent the occurrence of LTP.

Publish-Interventional ultrasound

The value of TI-RADS, BRAFV600E mutation analysis and BSRTC in the differential diagnosis of thyroid nodules

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Objective To explore the value of the thyroid imaging reporting and data system (TIRADS), Bethesda system for reporting thyroid cytopathology (BSRTC) and BRAFV600E mutation analysis in the differential diagnosis of thyroid nodules.
Methods We retrospectively analysed 1093 thyroid nodules which were underwent surgery resection at our hospital. These nodules were analyzed preoperatively with ultrasonography, ultrasound-guided fine-needle aspiration, and BRAFV600E mutation analysis. These nodules were classified according to the TI-RADS classification criteria, and BSRTC was applied for cytological diagnosis of the nodules. The sensitivity, specificity and diagnostic accuracy of the three methods are calculated separately.
Results The sensitivity,specificity,accuracy and AUC of TI-RADS were 99.21%,53.85%, 95.97% and 0.826, respectively. The sensitivity of BSRTC and BRAFV600E mutation analysis was 87.49% and 80.10%, respectively, and the specificity was 91.03% for both. BSRTC also has the highest Youden index. When combined BSRTC with TI-RADS or (and) BRAFV600E mutation analysis, it could significantly improve the sensitivity and correct diagnosis rate ($p < 0.01$). When BSRTC was combined with BRAFV600E mutation analysis, the diagnostic specificity and Jorden index were 84.62% and 79.60%, respectively. Sensitivity and accuracy are highest when all three methods were combined (99.61%, 96.25%). In addition, BSRTC class I-III nodules combined with TIRADS or (and) BRAFV600E mutation analysis could reduce misdiagnosis and improve diagnostic accuracy.
Conclusion TI-RADS, BRAFV600E mutation analysis and BSRTC have high value in the diagnosis of thyroid nodules. When combine BSRTC with TI-RADS and BRAFV600E mutation analysis, we can reach best diagnostic efficiency and reduce erroneous judgement.

Dual-sonosensitizer loaded phase-transition nanoparticles with tumor-targeting for synergistically enhanced sonodynamic therapy

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Purpose Sonodynamic therapy (SDT) is fast-growing activated therapy by using ultrasound to initiate catalytic reaction of sensitizing agents and kill tumor cells through producing reactive oxygen species (ROS). Both sinoporphyrin sodium (DVDMS) and IR780 are preeminent sonosensitizers and have been used in SDT. In this study, tumor targeting multifunctional composite nanoparticles (DVDMS@IR780@PFP@PLGA, DIPP-NPs) by encapsulating DVDMS, IR780 and perfluoropentane (PFP) were synthesized to evaluate the ability of dual-mode imaging and explore the synergistic enhancement of SDT between DVDMS and IR780 in tumors.
Materials and Methods DIPP-NPs were synthesized via the double emulsion method. The in vitro cellular uptake, the generation levels of reactive oxygen species (ROS) and the anti-tumor efficacy of SDT with DIPP-NPs were examined by different ways. The in vivo anti-tumor efficacy was evaluated by tumor weight and tumor size, and it was further confirmed by H&E, TUNEL and PCNA

staining. In addition, the photoacoustic (PA) and ultrasound (US) imaging systems were used to assess the abilities of DIPP-NPs as dual modal contrast agent in vitro and in vivo.
Results DIPP-NPs was successfully synthesized. The SOSG and DCFH-DA detection results showed that DIPP-NPS could produce a large amount of ROS under ultrasonic irradiation. Based on the results of CCK8, FCM, CLSM and 4T1 or CT26 animal models, SDT mediated by DVDMS or IR780 alone both inhibited tumor growth, while the therapeutic effect was enhanced when they acted together both in vitro and in vivo, whether the tumor is superficial or deep. Furthermore, this synergistic therapy also prevented lung metastasis by observing the lung tissues of mice in each group. Last but not least, the imaging-guided precision therapy was realized by dual-mode imaging (US/PA imaging).
Conclusion DIPP-NPs not only achieved dual-mode imaging, but also had obvious anti-tumor effect both in vitro and in vivo via synergistic effect. Generally, this study represents a proof-of-concept and paves a promising way for tumor therapy.

Publish-Echocardiography

The study of left atrial function in patients with Type 2 Diabetes Mellitus by four-dimensional automatic left atrial quantification

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Objective To evaluate left atrial function in patients with Type 2 Diabetes Mellitus (T2DM) by four-dimensional automatic left atrial quantitation (4D-LAQ) and to explore the independent correlative factors affecting left atrial function.
Methods Forty-six patients with T2DM were selected as the case group and forty-eight healthy volunteers were selected as the control group, all subjects were analyzed by conventional two-dimensional echocardiography, left atrial diameter (LAD), inter-ventricular septal thickness (IVST), left ventricular end diastolic diameter (LVDd), left ventricular ejection fraction (LVEF), early diastolic peak velocity of mitral inflow (E), late diastolic peak velocity of mitral inflow (A), E wave deceleration time (EDT), early diastolic peak velocity of the mitral annulus (E') and isovolumetric relaxation time (IVRT) were measured. Left atrial maximum volume index (LAVImax), left atrial pre-systolic volume index (LAVIpreA), left atrial minimum volume index (LAVImin), left atrial total emptying fraction (LAEF), left atrial expansion index (LAEI), left atrial passive emptying fraction (LAPEF), left atrial active emptying fraction (LAAEF), left atrial reservoir longitudinal strain (LASr), left atrial conduit longitudinal strain (LAScd) and left atrial contraction longitudinal strain (LASct) were measured by 4D-LAQ. The differences of these parameters between the two groups were compared. ROC curves were used to find the most sensitive parameter for evaluating left atrial function and the independent correlation factors were investigated by univariate and multivariate linear regression analyses.
Results Compared with control group, LAD, LAVIpreA and LAVImin in T2DM group were increased, while LAEF, LAEI, LAPEF, LASr and the absolute value of LAScd were decreased, all the differences were statistically significant ($P < 0.05$). ROC curve analysis showed that the absolute value of LAScd had the best performance in evaluating left atrial function (AUC: 0.882). Age and E/E' were independently negatively correlated with the absolute value of LAScd (β=-0.282, P=0.024; β=-0.389, P=0.003), E was independently positively correlated with the absolute value of LAScd (β=0.533, P=0.000).
Conclusions 4D-LAQ can quantitatively evaluate left atrial function in T2DM patients. The absolute value of LAScd has the highest evaluation efficiency in the left atrial function parameters. Age, E and E/E' are independently correlated with the absolute value of LAScd respectively.

Impact of metabolic syndrome on LV longitudinal stratified strain in an unstable angina population

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Objective To investigate the impact of metabolic syndrome (MS) on LV longitudinal myocardial systolic function in unstable angina (UA) population.
Methods A total of 126 patients who underwent coronary angiography with Gensini score were collected. They were divided into UA group, MS group, UA + MS group, and control group.Two dimensional speckle tracking imaging (2D-STI) was used to analyze global longitudinal strain in the subendocardial, Midmyocardial, and subepicardial myocardium of the LV(GLSendo, GLSmid and GLSepi).

Results (1) Gensini scores were significantly higher in the UA group and UA + MS group versus control group and MS group(P<0.05).(2) GLSendo, GLSmidand GLSepi were significantly reduced in the UA group and MS group compared with the control group (P<0.05), whereas ΔGLS was only significantly reduced in the UA group compared with the control group (P<0.05). GLSendo, GLSmid and Δ GLS were significantly decreased in the UA + MS group compared with the other 3 groups (P<0.05), whereas GLSepi was significantly decreased (P<0.05) compared with the control group. (3) Rank correlation analysis showed that GLSendo was correlated with Gensini score, R values were 0.474 (overall, n=126) and 0.703 (in MS population, n=59) (P<0.05). (4)Analysis of factorial design for GLS and ΔGLS: There was an interactive effect of UA and MS on the decrease in LV GLSendo and ΔGLS (P<0.05). The factorial analysis of UA and MS components on GLSendo showed that UA interacted with abnormal blood pressure and obesity on the reduction of GLSendo (P<0.05).
Conclusions 2D-STI can be used to evaluate left ventricular systolic function in patients with UA and MS. GLSendo is associated with the severity of coronary artery disease, such as MS, especially in the presence of obesity and hypertension, which will further aggravate the damage of left ventricular systolic function.

Ascending aortic strain evaluated by speckle-tracking Speckle technique and its association with coronary heart disease

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Objectives To evaluate the ascending aortic strain by speckle-tracking technique (2D-STI), and explore the clinical value of ascending aortic stiffness in coronary heart disease (CHD).
Methods A total of 108 patients with suspected CHD due to chest tightness or chest pain were enrolled in the Cardiology Department of Yichang Central People's Hospital from January 2020 to January 2021. Echocardiography was performed 24 hours before coronary angiography. The systolic and diastolic internal diametres of the ascending aortic were measured 3cm above the aortic valve on the long axis section of the parastermal left ventricle, then the conventional parameters of ascending aortic stiffness, such as ascending aortic dilatancy (AODIS), ascending aortic stiffness index (AOSI) and ascending aortic strain were calculated. The dynamic images of the parasternal short-axis view in 3cm above the aortic valve were obtained for 5 consecutive cardiac cycles.The peak strain images of each segment of the ascending aortic were obtained by using the 2D-STI, and the global circumferential ascending aortic strain (CAAS) and global circumferential ascending aortic strain rate (CAASR) were measured. The average of the three measurements was taken for each parameter. According to the results of coronary angiography, they were divided into CHD group and control group. Then, the severity of coronary artery lesions were evaluated according to Gensini score (GS), and the CHD group was further divided into three subgroups: low GS group, medium GS group and high GS group.The above parameters were statistically analyzed.
Results Excluding patients with poor image quality, 97 subjects (age 60.37±7.31 years; 53 males and 44 females), including 66 patients in the CHD group and 31 patients in the control group. Compared with the control group, the proportion of male, the prevalence of diabetes and hypertension in the CHD group were significantly higher, and the differences were statistically significant (P < 0.05). AODI, ascending aortic strain, CAAS and CAASR in the CHD group were lower than those in the control group, and the differences were statistically significant (P < 0.05). Compared with CHD group, AOSI was higher than the control group (P < 0.05). In the CHD group, CAAS and CAASR decreased with the increase of the severity of Gensini socre, with statistically significant differences (P = 0.004, P = 0.011). Compared with the low GS group, CAAS and CAASR were significantly lower in the high GS group, and the differences were statistically significant (P =

0.001, P = 0.016). There were no significant changes in CAAS and CAASR between the low GS group and the moderate GS group,the moderate GS group and the high GS group, and the differences were not statistically significant (P = 0.251, P = 0.329). Univariate logistic regression analysis showed that gender, diabetes, hypertension, AODIS, CAAS and CAASR were all risk factors for CHD (all P < 0.05). After multivariate analysis, CAAS was still an independent risk factor for CHD (P < 0.001). Multiple linear regression analysis showed that CAAS, CAASR were independent risk factors for the severity of CHD (B= -8.15, P＜0.001;B=-22.46, P=0.032).
Conclusions Compared with conventional parameters of ascending aortic stiffness, CAAS assessed by 2D-STI has higher clinical value for CAD, and CAAS and CAASR are independent risk factors for the severity of coronary artery lesions.

Study on the relationship between left atrial stiffness, interatrial septal thickness and left atrial function in type 2 diabetic patients with Normotensive patients without symptomatic cardiovascular disease

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Introduction The prevalence of type 2 diabetes mellitus (DM2) increases with age, obesity epidemic and sedentary lifestyle changes.The risk of cardiovascular disease increases,resulting in significant cardiac morbidity and mortality. In DM2, these patients may have related changes in cardiac function before the onset of clinical symptoms. The early changes of left ventricular function in patients with DM2 have been widely studied, and the evaluation of left atrial (LA) function has attracted more and more attention.

Left atrial stiffness (LASt) is a new index proposed in recent years, which is calculated by two-dimensional speckle tracking imaging (2D-STI), provides an alternative method to explore the function of LA and detect the early changes of myocardial performance in LA.Some studies have shown that LASt increases with atrial remodeling, reflecting the deterioration of reserve function .
The change of myocardial wall thickness of interatrial septum is the same as that of left ventricle during the cardiac cycle.Related studies have shown that the increase of atrial septum thickness may be related to fat deposition and structural tissue hyperplasia in atrial septum. The measurement of the thickness of atrial septum in different periods provides a new way for the study of left atrial hemodynamics. In the course of our study, we found that with the increase of LASt, IAST will also change accordingly. To the best of our knowledge, no one has studied the mechanical relationship between LASt and IAST in DM2 patients. Therefore, the purpose of this study was to evaluate the relationship between LASt, IAST and left atrial function in patients with type 2 diabetes, and to analyze the correlation between LASt index and IAST.
Materials and Methods
Selection of the Patients

Thirty-nine patients with DM2 with normal blood pressure in the outpatient or inpatient department of our hospital from October 2020 to October 2021 were selected, including 19 males and 20 females. Inclusion criteria for DM2: Nüchternglukose (venöses Plasma)≥7.0mmol/L, 2-h-Glukose nach 75g OGTT (venöses Plasma) ≥11.1mmol/L, HbA1c ≥6.5% or Nicht-Nüchtern („Random-Glucose“,venös oder kapillär) ≥11.1mmol/L. All patients with DM2 had normal blood pressure and no related clinical complications. Another 41 healthy subjects matched with the above-mentioned age and sex were selected as the control group, including 18 males and 23 females.

This study was approved by the Medical Ethics Committee of our hospital, and all the participants signed the informed consent form before participating in the study.
Echocardiographic measurements

All patients were examined by the same researcher using PhilipsEPIQ7C (S5-1 probe, frequency 1-5MHz) color Doppler echocardiography. Connect the single-lead ECG during the examination. All patients were in sinus rhythm at the time of examination.

The left ventricular end-diastolic diameter (LVEDd), left atrial anterior-posterior diameter(LAAD), interventricular septum thickness(IVSd) and left ventricular posterior wall thickness(LVPWd) were routinely measured on the long-axis view of the left ventricle. Mitral flow patterns were recorded in apical four-chamber view. Peak early diastolic filling velocity(E), peak late diastolic filling velocity (A) and E/A ratio were measured by Pulsed Doppler blood flow spectrum. The early and late diastolic velocities (e'and a') were measured by tissue Doppler in lateral and septal boeder of the mitral annulus. Lateral and septal myocardial velocities were averaged. E/A and E/e' ratios were computed. The left ventricular ejection fraction (LVEF) was measured by Simpson method in apical four-chamber and two-chamber view. The maximum, minimum and before atrial contraction volumes of left atrium were measured at the end of T wave, the peak of R wave and the beginning of P wave. Each parameter shoule be measured at least three times continuously, and then the average value was be calculated. Left atrial maximum volume index (LAVImax), before atrial contraction volume index (LAVIpre) and left atrial minimum volume index (LAVImin) were obtained by body surface area (BSA) to exclude individual differences. Total left atrial emptying fraction (LAVtEF),left atrial passive emptying fraction (LAVpEF) and left atrial active emptying fraction (LAVaEF) were calculated.

Measurement of left atrial stiffness index (LASt index)

The two-chamber and four-chamber dynamic two-dimensional cardiac cycle data were collected and analyzed by Qlab10.5 workstation software,and PALS was measured by 2D-STI,E/e' ratio to LA global PALS was obtained to calculate LASt index.

Measurement of interatrial septal thickness(IAST)

Lying flat under the xiphoid process in the biatrial section, using anatomical M ultrasound, the sampling line is perpendicular to the atrial septum, at the place of the oval fossa and the outermost thickness (the thickness between the two is constant, which is usually used as the position for measuring the thickness of the atrial septum), ZOOM magnification measurement is used to obtain the maximum values of end-systolic and end-diastolic phase.

All above measurements were calculated from three consecutive cycles at least. Average of the three measurements was recorded.

Statistical Methods SPSS22.0 software was used for statistical analysis.All the parameters are tested by normal test, and the continuous variables in accordance with the normal distribution are expressed in the form of mean ±standard deviation. The independent samples' t-test was used to compare the differences between the two groups,and the chi-squared test was used to classify variables. The correlation was evaluated by Pearson correlation coefficient, and the diagnostic efficiency was analyzed by ROC curve. The difference was statistically significant ($P < 0.05$).

Results In the evaluation of basic clinical characteristics, there was no significant difference in age, sex, BMI and blood pressure between the two groups. HbAlc and blood lipids in the diabetic group were significantly higher than those in the control group. (all $P<0.05$).

There was no significant difference in LAAD, LVEDd, IVSd, LVPWd and LVEF between the two groups. E, E/A ratio and e' in DM2 group were lower than those in normal control group, but A was higher than that in normal control group, and the difference was statistically significant (all $P < 0.05$). Compared with the normal control group, E/e' of DM2 patients was higher, and the difference was statistically significant ($P < 0.05$).

The levels of LAVImax(26.76±5.44vs.23.23±5.01ml/㎡), LAVImin(12.26±2.22vs.9.10±2.28 ml/㎡) and LAVIpre(19.58±2.89vs.16.86±2.87 ml/㎡) in DM2 group were significantly higher than those in normal control group($P < 0.05$ for all). Compared with the normal control group, PALS(30.19±4.96vs.38.00±4.23%) decreased, LASt index(0.33±0.08vs.0.21±0.05ml/㎡),end-systolic IAST(8.97±1.43vs.6.14±0.93mm) and end-diastolic IAST(6.65±1.16vs.3.97±0.64mm) increased in DM2 patients, and the difference was statistically significant($P < 0.05$ for all).

There was a significant positive correlation between LASI and LAVImax($r=0.610$，$P<0.001$), LAVImin($r=0.651$，$P<0.001$), LAVIpre($r=0.613$，$P<0.001$) and E/e' ($r=0.804$，$P<0.001$) in the whole study population.

In the whole study population, end-systolic IAST was positively correlated with the LAVImax(r =0.433, P<0.001), LAVImin(r =0.602, P<0.001) and LAVIpre(r =0.514, P<0.001). It was negatively correlated with LAVaEF and LAVtEF (r=-0.373, P=0.001;r =-0.301,P=0.007,respectively). In addition, we also found that end-systolic IAST was significantly positively correlated with LASt index (r=0.694,P<0.001). There was a similar statistically significant difference in end-diastolic IAST.

We conducted a subgroup analysis to evaluate the effects of HbAlc on left atrial volume index, PALS , LASt and IAST. The results showed that there was no significant difference of HbAlc on left atrial volume index, PALS , LASt and IAST between normal control group and DM2 group(P>0.05). The areas under the ROC curve of LAVImax, LAVImin, LAVIpre, PALS, LASt, end-systolic IAST and end-diastolic IAST were 0.694,0.836,0.746,0.892,0.904,0.946 and 0.984,respectively,and the sensitivities were 69.20%,92.30%,79.50%,89.70%,74.40%,76.90%, 94.90%, respectively.The specificity was 70.70%,63.40%,63.40%,78%, 90.20%,100% and 95.10%,respectively.

Discussion Our study mainly found that LASt index and IAST increased and PALS decreased in patients with DM2 compared with normal controls. LASt and IAST were significantly correlated with left atrial volume index, while IAST was negatively correlated with LAVaEF and LAVtEF, indicating that IAST was related to the degree of structural and functional remodeling of left atrium. We also found that there was a significant correlation between IAST and LASt. LASt and IAST are superior to PALS and left atrial volume index in diagnosing left atrial function parameters in patients with diabetes.

Previous studies have shown that impaired left atrial mechanical function is associated with atrial fibrillation. LASt and IAST are significantly increased in patients with atrial fibrillation, and positively correlated with left atrial volume index. Similarly, in our study, we found that PALS decreased and LASt and IAST increased in patients with DM2. These findings indicate an increase in interatrial septal thickness (which may be caused by increased blood lipids in patients with diabetes leading to atrial and septal fat deposition and connective tissue hyperplasia), leading to an increase in LASt. Left atrial stiffness is the result of left atrial fibrosis and left atrial deformation damage, which is usually related to oxidative stress, inflammation and pro-inflammatory changes. These changes in the left atrium are considered to be an important basis for causing later atrial arrhythmias and strokes to be more common in these patients. It is well known that patients with type DM2 have a higher risk of atrial fibrillation, and a significant correlation between higher HbAlc and the future development of atrial fibrillation has been confirmed.

There was no significant correlation between HbAlc and left atrial volume index,PALS,LASt and IAST, suggesting that the changes of left atrial volume and functional parameters were not affected by blood glucose control in the near future. Previous studies have confirmed that LA function is impaired and left atrial volume is increased in DM2 patients with normal blood pressure and asymptomatic cardiovascular disease. Although the mechanism of this damage is unclear, atrial myocardial damage caused by persistent hyperglycemia and LA fibrosis has been considered to be a pathogenic factor. Compared with the control group, the left atrial volume index of DM2 patients increased, the difference was statistically significant, while the LAAD value of the two groups changed little, the difference was not statistically significant. This may be due to the fact that the left atrium is a three-dimensional structure, and when the left and right diameters increase at the same time, there will be a significant difference in volume. In addition, we also found that in patients with DM2, the ratio of E/A and the early diastolic filling velocity of mitral annulus by tissue Doppler decreased, while the ratio of E/e' increased, suggesting that the left ventricular diastolic function was impaired to some extent.

In our study, we compared the diagnostic efficacy of left atrial volume index, PALS, LASt and IAST in predicting changes in left atrial function parameters in DM2 patients with normal blood pressure and asymptomatic cardiovascular disease. Our data showed that LASt, end-systolic IAST and end-diastolic IAST had higher positive predictive values, showing high sensitivity (74.4%, 76.90%, 94.90%) and specificity (90.2%, 100%, 91.1%) when the cutoff values were 0.28,7.95,4.95, respectively. Diastolic IAST AUC was the largest and had the highest diagnostic efficacy. Although the area under the curve of LASI and PALS ROC is similar, the difference between the enlarged sample size of LASt is higher than that of PALS, may be more obvious.

This study has some limitations:1.the sample size is small, so we can only do a preliminary study, and we still need to expand the sample size to further verify different taxonomic groups;2.the

independent predictors of LA function changes in DM2 patients cannot be determined;3.our study is not prospective and there is no follow-up of arrhythmias in patients. 4.At present, there is no 2D-STI analysis software for left atrial strain, but the accuracy of PALS, results calculated by left ventricular analysis software is affected to some extent;5. this is a cross section, so it is difficult to determine whether these associations are causal. However, there may be a logical mechanical connection in clinic.

Conclusion To sum up, LASt index and IAST can accurately reflect the early changes of left atrial structure and function in DM2 patients with normal blood pressure and asymptomatic cardiovascular disease, which provides a reliable basis for early clinical intervention.

Value of TDI-Tei index in evaluating fetal cardiac function in late pregnancy with intrauterine distress

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Objective To investigate the value of Tei index of right and left ventricles measured by tissue Doppler imaging (TDI) in evaluating fetal cardiac function in late pregnancy with intrauterine distress.

Methods Retrospective analysis of prenatal diagnosis and pregnancy results in obstetric ward of our hospital from March 2016 to June 2018 confirmed 30 cases of fetal distress as observation group, and 30 cases of normal late pregnancy as control group. Obtained and analyzed hemodynamic indexes of fetal umbilical artery (UA) and middle cerebral artery (MCA). And right and left ventricular Tei index. Result: Tei index of right and left ventricles of fetus with intrauterine distress in late pregnancy was significantly higher than that of control group ($t = 9.01$, $P < 0.01$; $t = 10.67$, $P < 0.01$); 2) Tei index of right and left ventricles of fetus in late pregnancy was significantly correlated with fetal umbilical artery S/D, RI, middle cerebral artery S/D and RI ($r = 0.767$, $P < 0.01$, $r = 0.6$). 83, $P < 0.01$; $r = 0.701$, $P < 0.01$, $r = 0.634$, $P < 0.01$; $r = - 0.386$, $P < 0.01$, $r = - 0.347$, $P < 0.01$; $r = - 0.614$, $P < 0.01$, $r = - 0.576$, $P < 0.01$); 3) Tei index of left and right ventricles of 30 fetuses with intrauterine distress was significantly correlated ($r = 0.718$, $P < 0.01$).

Application value of echocardiography in mitral valve prolapse

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Objective Mitral valvuloplasty is one of the main methods for the treatment of mitral valve prolapse. The correct evaluation of the regional positioning of mitral valve prolapse and the degree of regurgitation before surgery can provide reliable information for the formulation of surgical plans. This study Through preoperative echocardiography to compare the location of mitral valve prolapse and the results of surgery, to explore the application value of echocardiography in the location of mitral valve prolapse.

Methods A total of 42 patients with mitral valve prolapse were collected. All patients underwent preoperative echocardiography. Observation was performed on each zone of the mitral valve through standard cut planes. The prolapsed parts were located in zones. All patients underwent surgical treatment. And compare and analyze with the operation result.

Results There were a total of 336 mitral valve leaflet divisions in 42 patients with mitral valve prolapse. Among them, there were 89 leaflet divisions diagnosed as prolapsed by echocardiography before operation, and 84 leaflet divisions diagnosed as prolapsed by surgery.

There was no statistically significant difference between the preoperative echocardiographic location of mitral valve prolapse and the surgical results (p=0.125).
Conclusion Echocardiography can use standardized cut planes to accurately regionalize the location of the leaflet prolapse of patients with mitral valve prolapse before surgery, and provide accurate and reliable information for the clinical development of individualized surgical plans for patients with mitral valve prolapse. The examination is simple, easy to perform, inexpensive, and patient can tolerate it. It is a better choice for patients with mitral valve prolapse to locate the prolapsed part before surgery.

Publish-Maternal Ultrasound

Diagnostic value of four types of risk of malignancy index in distinguishing benign and malignant ovarian tumors

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Objective To assess the value of four kinds of risk of malignancy index (RMI) in the differential diagnosis of benign and malignant ovarian tumors.
Methods We retrospectively analyzed the preoperative CA125 levels, menopausal status, ultrasound score, tumor size, and postoperative pathological data of 200 patients with ovarian tumors who were treated at Changzhou Second People's Hospital from October 2017 to October 2018. We used different calculation methods (RMI1, RMI2, RMI3, and RMI4) to calculate the RMI for distinguishing benign and malignant ovarian tumors, and the results were compared with pathology to evaluate their diagnostic value among different pathological tissue types and clinical stages. ROC curve analysis was performed to compare their diagnostic power with individual indicators and calculate their positive predictive value, negative predictive value, specificity, and sensitivity. The Cochran's Q test was used to compare the similarities and differences of the four methods (RMI1, RMI2, RMI3, and RMI4), and the Dunn's test (corrected by Bonferroni method) was used for pairwise comparison of the four methods.
Results The areas under the ROC curves of RMI1, RMI2, RMI3, and RMI4 were 0.859, 0.872, 0.866, 0.878, respectively. According to the ROC curve analysis, when the cutoff values of RMI1, RMI2, and RMI3 were all 100, and that of RMI4 was 200, the sensitivities were 77.5%, 82.6%, 80.0%, and 82.5%, and the specificities were 94.4%, 91.9%, 93.1%, and 93.1%, respectively. The positive predictive values were 77.5%, 71.7%, 74.4%, and 75.0%, respectively, which were higher than those of the original threshold. There were significant differences among the four RMI methods ($\chi 2=8.333$, $P=0.04$). After pairwise comparison, it was found that only RMI1 and RMI2 had a significant difference ($P=0.028$). RMI had a higher diagnostic rate for malignant epithelial ovarian tumors (71%, 77%, 71%, and 74%), RMI2 had a higher diagnostic rate than the other three RMIs. However, RMI had a lower diagnostic rate for non-epithelial ovarian tumors (40% each). Among ovarian malignant tumors, the diagnosis rate for stage I lesions and borderline tumors was low.
Conclusion The four RMIs have high specificity and positive predictive value for the diagnosis of benign and malignant ovarian tumors, but the sensitivity to non-epithelial tumors, borderline tumors, and early-stage ovarian tumors is low, and further improvement is needed.

Study on the value of cervical length and fetal membrane thickness in predicting preterm delivery in pregnant women with twin pregnancy

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Objective To evaluate the value of Cervical Length (CL) by transvaginal ultrasound, fetal membrane thickness by transabdominal ultrasound and their combination in predicting preterm delivery of pregnant women with twin pregnancy.
Methods A total of 177 pregnant women with twin pregnancy of 20-24 weeks in the Second Affiliated Hospital of Zhengzhou University from September 2019 to January 2021 were selected. The pregnancy ending was tracked and the 177 pregnant women were divided into premature

delivery group and term delivery group according to their gestational weeks of delivery. The differences of CL, fetal membrane thickness, dvp, cervical orifice opening rate and uterine anomaly rate between premature delivery group and term delivery group were compared and their efficacy in predicting preterm delivery was analyzed.
Results (1) There was no significant difference in clinical baseline data between the premature delivery group and the term delivery group (P > 0.05). (2) Compared with the term delivery group, the CL was shorter (32.9±4.8mm VS 24.9±3.1mm) and the fetal membrane thickness was larger (1.19±0.11mm VS 1.37±0.22mm) in the premature delivery group, but there was no significant difference in other indexes (dvp, cervical orifice opening rate and uterine anomaly rate). (3) The logistic regression model of CL and fetal membrane thickness was established to predict preterm delivery of pregnant women with twin pregnancy. CL and fetal membrane thickness were quantitatively related to preterm delivery in twin pregnancy (P < 0.05). (4) The AUC values of CL, fetal membrane thickness and their combination in predicting preterm delivery were 0.914, 0.789 and 0.946 respectively. The predictive efficiency of CL was higher than that of fetal membrane thickness (P < 0.05), and the predictive efficiency of the combination of them was further improved, and the difference was statistically significant (P < 0.05).
Conclusion It is confirmed that CL measured by transvaginal ultrasound and fetal membrane thickness measured by transabdominal ultrasound can effectively predict preterm delivery of pregnant women with twin pregnancy, and the combination of the two indexes can improve the predictive efficiency.

Comparison on different sonographic fetal weight estimate formulas for predicting fetal macrosomia

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Objective To compare the accuracy of different sonographic fetal weight estimate (SFEW) formulas in predicting fetal macrosomia's mass, and to analyze the impact factors.
Methods Data of 629 cases of macrosomia were retrospectively analyzed. The macrosomia were divided into group A and group B according to actual masses after delivery. The biparietal diameter (BPD), head circumference (HC), abdominal circumference (AC) and femur length (FL) were substituted into different formulas to compare the predicting values of fetal macrosomia and the actually measured values.
Results SFEW calculated with different formulas were significantly lower than the measured values (all *P*<0.001). The difference of predicted value and the measured value of Hadlock formula taken BPD, AC and Fl as parameters were smallest. There were low correlation between the biological values of ultrasound of fetal macorsomia and the measured mass and length (*r*, <0.50). Body length, body mass index (BMI) and all biological values of group B were higher than those of group A (all *P*<0.05). Error of different formulas in group B were higher than those in group A (all *P*<0.05).
Conclusion SFEW were effective and feasible to predict fetal macrosomia, but tended to underestimate fetal mass. Parameters used in formulas which could not fully reflect the impact of fat distribution outside body trunk of fetal macrosomia might be one of the causes.

Crystal Vue technology in the evaluation of fetal congenital high airway obstruction syndrome

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Great progress has been made in three-dimensional imaging of the fetus. Compared with the classical two-dimensional ultrasound, three-dimensional ultrasound can process multiplane and volume images, and can provide more detail information and the global view of the region of interest1. Crystal Vue is a novel three-dimensional ultrasound imaging technology2. The technology has many advantages3-6, can be widely used in many systems of obstetrics and gynecology.

Congenital high airway obstruction syndrome (CHAOS) is a rare fetal life-threatening congenital malformation with true incidence being unknown. The main cause of this disease may be laryngeal atresia, tracheal atresia, congenital trachea or laryngeal web, subglottic stenosis, obstructive laryngeal cyst, tracheal or laryngeal hypoplasia7. Due to obstruction, the amniotic fluid produced by the fetal lung cannot be absorbed, resulting in increased pressure in the trachea and alveoli, secondary proliferative lung growth, increased intrapleural pressure, less venous reflux, fetal heart failure, heart compressed at the midline, and fetal edema8, 9.

The fetal was performed examination using ultrasound at 19 weeks gestational age. Showing that lung of fetal was hyperechoic and volume increase. Expanded trachea and bronchus and compressed heart were observed. Fetal cardiothoracic ratio was 1.99/19.09=0.10. Inversion of diaphragmatic and ascites of fetal were observed. Volumetric image has been collected and postprocessed by Crystal Vue and Realistic Vue technique (SAMSUNG WS80A with CV1-8 probe). In invert mode, the expanded trachea, the overall view of inversed diaphragm, the compressed heart was located in the midline of the chest can be showed in the posterior view (Figure 1). In the same condition and the lateral view, the position and shape of the airway obstruction site of the fetus, secondary expanded trachea and bronchus, the relation of aorta and trachea and bronchus has been shown. The obstruction site was on the clavicle level (Figure 2). On MSV mode and the coronal continuous plane, the highest position of the unobstructed trachea at clavicle level, and atresia of the larynx has been shown (Figure 3). In the Figure 2, a vein which connected right internal jugular vein and right atrium could be observed, and has the characteristic of the distal segment are widened, even wider than the proximal segment. (Figure 4).

Observing from the fetal abdominal cavity, we can see ascites, the surrounding abdominal organs, the diaphragm protruding to the abdominal cavity, and part of the lung tissue in the thoracic cavity (Figure 5).

Taking into consideration of the aforementioned findings, counseling of parents was done regarding the management strategy and prognosis, they requested for termination of pregnancy at 23 weeks+2 days. After delivery, the fetus body edema was obvious. The probe failed to pass through the laryngeal proved the laryngeal atresia. The parents refused further autopsy of the fetus. Obstruction site and reason of CHAOS are important for intrauterine and postnatal treatment, is helpful to judge the prognosis of fetus. The volume images have been postprocessed by Crystal Vue and Realistic Vue can display the overall and detailed information of anatomical structure in fetal, it helps to provide important consulting information.