OP16.13
Clinical combining-application of ultrasound and MRI on multiplets malformations

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Objectives: To explore the diagnostic value of antenatal ultrasound combining with in utero magnetic resonance imaging (MRI) in multiplets malformations, and analyze their advantages and limitations.
Methods: In the period between 2004 and 2007, 105105 fetuses received ultrasound examination in our hospital. 268 cases were multifetation, including 64 multiplets malformations. And of them 11 multiplets malformations (gestational age ranged from 14–31 weeks), including 8 cases of twin pregnancy and 3 of triplet pregnancy, received MRI examination within 48 hours after ultrasound, all confirmed by autopsy. Retrospectively analyzed, the results of antenatal ultrasound and in utero MRI were compared.
Results: In 11 multiplets malformations, there were 6 conjoined twins and 5 acardiac twins with twin-reversed arterial perfusion (TRAP). MRI gave identical diagnostic results with ultrasound, but each had different advantages. (1) MRI was superior to ultrasound in the following aspects: 1. the large view with visualization 2 or 3 fetal organs, even the whole fetus, placenta and amniotic sac simultaneously; 2. visualizing diprosopy of cephalopagus and identifying complex intracranial structures clearly; 3. identifying internal organs of conjoined twins; 4. demonstrating the insertion of umbilical core and the connection with fetus and placenta in acardiac twin.; 5. It showed "leopard stripe sign" in placenta of acardiac twin. (2) Ultrasound was superior to MRI in two aspects: 1. detecting hemodynamic change in TRAP; 2. evaluating cardiac function and finding cardiac anomalies, such as hemicardia of acardiac twin.
Conclusions: Ultrasound and MRI are complement with each other in diagnosing multiplets malformations, The combining application of ultrasound and MRI could improve the diagnostic accuracy on multiplets malformations

OP17: OVARIAN MASSES

OP17.01
Prospective comparison of one-step and two-step models for the classification of adnexal masses as benign or malignant

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Objectives: In the first phase of a multicenter study by the International Ovarian Tumor Analysis (IOTA) group, 11 mathematical models were developed to distinguish between benign and malignant adnexal masses: 2 logistic regression models (LR1 and LR2), 3 Least-Square Support Vector Machines (LS-SVM), 3 Relevance Vector Machines (RVM), 2 Bayesian Multi-Layer Perceptrons (BMLP) and 1 Bayesian Perceptron model (BPER). In phase 2 of the IOTA study we investigated the optimal number of patients - i.e., those having uncertain classification by mathematical models or by an ultrasound expert - that might benefit from second stage testing.
Methods: The outcome of all models is a probability, increasing the uncertainty of diagnosis when positioned closer to the decision boundary. Each ultrasound expert classified masses as certainly or probably benign, uncertain or probably or certainly malignant. The AUC was calculated for each method after different percentages of patients had been removed either because the calculated probability of malignancy lay close to the decision boundary or because the ultrasound expert was uncertain about the diagnosis.
Results: 19 centers participated in this study and contributed 1940 new cases. When 0% to 25% of the patients were removed because of uncertain diagnosis, a monotone increase in AUC was observed from 0.9295 to maximum 0.9694. According to the subjective assessment of experts, 6% of patients were classified as 'uncertain' and 28% as 'probably' benign or malignant. For all models, a higher AUC was achieved when patients were removed based on pattern recognition by an expert than on probability given by the models.
Conclusions: When removing at most 25% of patients, LR1 and BPER were superior to LS-SVM, RVM and BMLP models. Because second stage tests introduce an extra cost, the number of patients referred to second stage testing should be kept to a minimum and be based on the expert's subjective assessment of diagnosis.

OP17.02
A critical analysis of three-dimensional power-Doppler angiography (3D-PDA) vascular sampling: Comparison between manual and 5-cc sphere sampling

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Objectives: To perform a critical analysis of 3D-PDA manual and 5-cc sphere vascular sampling in solid and cystic-solid adnexal masses.
Methods: 21 3D-PDA volumes from eighteen consecutive and unselected solid or cystic solid adnexal masses (13 malignant and 5 benign) were analyzed. Two different examiners (MP: non-experienced, and JLA: experienced) calculated 3D-PDA vascular indexes from tumor solid areas. First a manual sampling (plane A or C, 15°) was performed and then a 5-cc sphere sampling from the most vascularized area was done. Primary outcomes were Difficulty for identifying tumor or solid area borders, Difficulty for identifying true tumor vessels from preexisting vessels, Time spent for analyses and inter-observer agreement (ICC) for each method.
Results: In four (19%) out of 21 volumes sphere sampling could not be performed because it was not possible to obtain a sphere smaller than 5.5cc. This happened in cases in which image zooming was used when acquiring 3D volume. Non-experienced examiner found more difficulties analyzing 3D-PDA volumes both in manual sampling (29% versus 14% cases, NS) and 5-cc sphere sampling (35% versus 18% cases, NS). Mean time spent by non-experienced examiner was significantly ($P < 0.001$) longer than that spent by experienced examiner in both manual sampling (6.1 min versus 1.8 min) and 5-cc sphere sampling (2.9 min versus 2.0 min). Inter-observer agreement was high for both methods: ICC for Manual Volume, Manual VI, Manual FI, Manual VFI, Sphere Volume, Sphere VI, Sphere FI and Sphere VFI were: 0.993, 0.908, 0.913, 0.914, 0.929, 0.951, 0.850 and 0.953, respectively.