OBGYN-S01

Uterine Peristalsis: The Impact on Embryo Implantation and Prevention Strategies

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Successful embryo implantation depends on high-quality embryos and good uterine/endometrial environment. Uterine peristalsis (UP) is one of the reasons to impact embryo implantation. UP changes its frequency and direction during the menstrual cycle. The frequency of UP significantly decreases after ovulation due to elevated progesterone and reaches a nearly quiescent status during the peri-implantation period. Studies showed that increased frequency of UP during the peri-implantation period negatively impact the pregnancy rates of IVF cycles; moreover, the UP frequency of pregnant women was significantly lower, compared to non-pregnant women either in fresh or frozen embryo transfer cycles. Therefore, UP during the peri-implantation period could detriment the pregnancy outcomes of IVF cycles.

In fact, no objective and user-friendly UP measuring tools are suitable for use in daily practice until now. Magnetic Resonance Imaging (MRI) and Electro Utero Graph (EUG) are quite expensive and invasive, respectively. Ultrasonography is a cheaper and less invasive way to measure UP, but it has its own limitations. Moliner et al. proposed a novel method, 4D ultrasound with coronal view, to assess UP. In my opinion, the 4D ultrasound method seems to be a more suitable tool to measure UP in daily practice.

Regarding prevention strategies for UP, progesterone and oxytocin receptor antagonist (OTR-a) are two agents to have been proven to obtain clinical effectiveness. A meta-analysis published in the journal of Human Reproduction Update in 2022 revealed OTR-a improved pregnancy rates in women undergoing IVF cycles; however, subgroups analysis from other meta-analysis showed the benefit was found in the repeated implantation failure group only, which was consistent with the data from NCKUH. In our data,

we found OTR-a using before embryo transfer might boost pregnancy rates in women with myoma or adenomyosis. However, large-scale studies are required to confirm the results.

OBGYN-S02

Congenital Uterine Anomalies and Infertility

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Congenital uterine anomalies (Mullerian duct anomaly) are congenital defects in the development of upper vagina and the uterus. It may associate with infertility and poor obstetrics outcome. With the introduction of 3D ultrasound, the diagnosis could be made more accessible and as accurate as MRI. This talk will review and compare the classification of congenital uterine anomalies suggested by ESHRE and ASRM. We will also discuss the debate on uterine septum resection.

OBGYN-S03

Application of Ultrasound in Urogynecology

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Ultrasound is a supplementary, and useful diagnostic procedure in urogynecology; perineal and introital ultrasound are the most recommended techniques. The position and mobility of the bladder neck can be demonstrated. In patients undergoing diagnostic work-up for urge symptoms, ultrasound occasionally demonstrates urethral diverticula, leiomyomas, and cysts in the vaginal wall. These findings will lead to further diagnostic assessment. The same applies to the demonstration of bladder diverticula, foreign bodies in the bladder, and intravesical endometriosis.

After the first consensus meeting on

ultrasonography in urogynecology, which was held in Zurich, Switzerland in 1995, established the first recommendations for standardizing urogynecologic ultrasound examinations. The aim of this meeting was to revise the recommendations based on the current state of research as presented in the international literature in this field. Urethral musculature can be imaged by 3D endovaginal ultrasound (EVUS), and magnetic resonance imaging (MRI). By using 3D EVUS, longitudinal and circular smooth-muscle visualization has been shown to be excellent. The primary role of applying 3D EVUS to study symptomatic women with UI is to detect what damage to the pelvic structures is responsible for the functional disturbances in order to guide appropriate and selective management. Another relevant role is evaluation of results after treatment and an understanding of the causes of failure.

Ultrasound is an useful diagnostic tool in urogynecology, which allows documentation of functional and morphologic findings. The patients' history, clinical examination, urodynamic testing, and imaging continue to be the cornerstones of comprehensive urogynecologic work-up. Thus, ultrasonography should be included in this training program of urogynecologic fellowship.

Obgyn-S04

Ultrasonographic Assessment of Ovarian Endometrioma and Endometrial Cancer

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Ovarian endometrioma (chocolate cyst) is a noncancerous and fluid-filled cysts, that usually was found located deep within the ovaries by classic endometriotic implants. With advancement of ultrasound technology, 1) ultrasound examination is an easy-noninvasive method in the differential diagnosis of endometriosis, and is useful in planning surgical intervention of ovarian endometrioma, as well as preoperative and postoperative medical

therapy. 2) the probes of higher-frequency scanning had been applied to improve diagnostic accuracy for ovarian endometrioma, that includes morphologic assessment with two-dimensional ultrasound and three-dimensional sonography, color Doppler, and power ultrasound imaging.3) Some reviews also focused the ultrasonography findings of ovarian endometrioma on differentiating benign and malignant tumors, and it is considered a viable alternative strategy to surgical extirpation on ultrasound-guided therapeutic aspiration of symptomatic ovarian cysts.

Endometrial carcinoma (EC) is the most common gynecologic cancer in developed countries. The incidence of EC appears to be rising globally, and the incidence of EC in Asia is also rapidly increasing. Endometrium is the mucous membrane that located inside walls of the uterus. It has a cell-rich connective tissue that embedded the endometrial glands. Endometrial hyperplasia thickens the womb lining, causing heavy or abnormal vaginal bleeding. Atypical endometrial hyperplasia increases the risk of endometrial cancer. By using transvaginal ultrasound images can visualize endometrial cavity and predict endometrial thickness. Therefore, clinical research has fully indicated that the accuracy of ultrasound endometrial thickness was estimated by endometrial thickness measurement compared to histological diagnosis on the prediction of the endometrial hyperplasia and cancer, even sonographic features have an association with grade and stage of tumor, and differ between high- and low-risk endometrial cancer.

OBGYN-S05
Fetal Cardiac Arrhythmia

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Fetal cardiac arrhythmia complicated in 1 to 2 percent of pregnancy which may be a life-threatening condition and cause fetal death. The

conduction system of the fetal heart is functionally mature by 16 weeks of gestation and normally produces a regular rhythm and rate between 110 and 160 beats per minute (bpm). Fetal arrhythmia refers to an abnormal fetal heartbeat or rhythm. It can be divided into ectopic beats, fetal tachyarrhythmiasand fetal bradyarrhythmias.

Fetal tachyarrhythmias are defined by fetal heart rate (FHR) >160 bpm. Five to ten percent of fetus with tachyarrhythmia are related to congenital heart disease. The most common fetal tachycardia is re-entrant supraventricular tachycardia which present as typical 1:1 conduction. The presence of fetal ectopic atrial contractions may trigger supraventricular tachycardia, which is generally seen between 24 and 32 weeks of gestation. Another type of tachyarrhythmia is atrial flutter, which typically has 2:1 conduction with atrial rates of 400 to 440 bpm and ventricular rates of 200 to 220 bpm. It is seen in about 30% of fetuses with tachyarrhythmia. Fetal tachycardia of any form that is intermittent, not accompanied by cardiac or valve dysfunction, and present <50% of the time is best not treated, but needs to be monitored closely. If more severe form fetal arrhythmia was noted, maternally administered of antiarrhythmic agents are used to treat fetal tachycardia. Digoxin has a long history of being the drug of first choice. If the fetal condition is not improving or is deteriorating despite adequate maternal digoxin levels (1 to 2 ng/mL), other medications should be considered. Flecainide, sotalol, and amiodarone are most widely used second line therapy. Use of sotalol and amiodarone may be effective in fetus with heart rate > 220bpm. Once heart rate is controlled, fetal heart rate should be followed two or three times per week. Maternal electrocardiograms and serum drug levels should be checked every one to two weeks.

Fetal bradycardia is defined as intermittent or persistent fetal heart rate (FHR) <110 bpm. Sinus bradycardia is a common type of fetal bradycardia. It may be associated with structural cardiac anomalies, heterotaxy, or long QT syndrome. Other cause of fetal bradycardia is heart block. A persistent ventricular rate <60 bpm is usually associated with complete heart block, while rates between 60 and 80 bpm can be due to nonconducted bigeminy or second- or third-degree block. If heart block was found, maternal blood should be sampled for anti-Ro/SSA and anti-La/SSB antibodies.

The fetus with a sustained arrhythmia can undergo labor and be delivered vaginally as long as fetal well-being can be monitored in some way. Pediatrics, neonatology, and/or cardiology should be available during delivery.

OBGYN-S06
Multi-disciplinary Team Approach in Prenatal Diagnosis of Congenital Heart Disease

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Advances in fetal ultrasound resulted in an increasing number of fetus with structural anomaly being diagnosed prenatally. Among these, congenital heart diseases (CHDs) are the most common structural malformation and are the leading birth defects causing neonatal mortality among birth defects. Despite the many benefits of performing a prenatal diagnosis in CHD, early diagnosis can also cause a great deal of psychological stress for expectant parents. Consultation with pediatric cardiac team provide parents with sufficient information and reduce their anxiety so that they can make an informed decision as to whether to continue the pregnancy. Herein we present a model of multi-disciplinary perinatal team providing care for fetal cardiac anomalies.

Prenatal diagnosis of congenital malformations could shorten the time interval from birth to neonatal admission/ treatment, thus may help in achieving a better outcome. A multidisciplinary perinatal team plays an important role in diagnosis, counselling, delivery and treatment planning.

OBGYN-S07
Fetal Therapy—NTUH Experiences

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Fetoscopic laser photocoagulation
--Quintero staging
--Instruments and techniques
--3 cases presentations
--Discussion and summary

Radiofrequency ablation
--Presentation of an emergent RFA for MCMA twin pregnancy after one fetal demise

OBGYN-S08

Outcome and Etiology of Fetal Pleural Effusion, Fetal Ascites, and Hydrops Fetalis underwent Fetal Intervention: A 9-year Retrospective Observational Cohort from a Single Institution

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Background: Hydrops fetalis, fetal pleural effusion, and fetal ascites are pathological accumulation of fluids in fetal compartments. Fetal interventions including shunting, fetal paracentesis, fetal thoracocentesis, and fetal pleurodesis was used to alleviate these fluid accumulations. The etiologies are varying and the outcomes are therefore uncertain.

Methods: We enrolled those who underwent fetal interventions for hydrops fetalis, fetal pleural effusion, and/or fetal ascites retrospectively from our institution during 2012-2021 to assess the etiologies and outcomes of these fetuses. Mandatory examinations including detailed sonographic fetal anatomy screening, fetal viability survey, chromosomal study, TORCH screening, parvovirus B19 PCR test and/or specific gene tests and Coombs test sonographic and specific genotyping were used to delineate the possible etiology. Long-term follow up was conducted by chart review and telephone interview.

Results: A total of 55 fetuses were enrolled. 48 of them had follow-up data. In which, 8 fetus ends in termination of pregnancy and stillbirth. 40 fetuses were born after fetal therapy. A total of 13 cases remained unknown etiology. Exome sequencing revealed three fetuses were affected with monogenic disorders when other genotyping modalities (including chromosome microarray and targeted small-gene-panel sequencing) failed to find the genetic causes. 25 babies were livebirths and 17 of them were healthy when submission.

Conclusions: Hydrops fetalis, fetal pleural effusion, and fetal ascites are heterogeneous in nature and the outcomes are hence varying even with fetal interventions. Exome sequencing may help confirming the diagnoses when monogenic inherited disorders are the causes and possibly alter the approaches of fetal intervention in the future.

OBGYN-P01

Reference Ranges and Z-scores for Fetal Cardiac Measurements from Two-dimensional Echocardiography in Asian Population

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Currently available fetal echocardiographic reference values are derived mainly from North American and European population studies, and there is a lack of reference z-score for fetal echocardiographic measurement in Asian populations. The aim of this study was to establish normal ranges of echocardiographic measurements and z-scores in healthy Asian fetuses. A total of 575 healthy pregnant Taiwanese with an estimated

gestational age from 14 to 38 weeks were enrolled voluntarily for this observational study. Standard two-dimensional echocardiography was performed to obtain measurements of the cardiac chambers and great arteries of the developing fetuses. In contrast to past studies, our sample was more evenly distributed for estimated gestational age (p<0.001). We present percentile graphs for 13 fetal echocardiographic measurements from the knowledge of estimated gestational age, biparietal distance, head circumference, abdominal circumference, and femur length. Most cardiac structures and developmental markers had linear models as the best-fitting, except for transverse aortic isthmus by estimated gestational age and transverse ductus arteriosus by femur length. Our findings indicate that estimated gestational age was generally the best model for fetal heart development, while head circumferences could be used as an optimal developmental marker to predict left atrium, right atrium, right ventricle, pulmonary annulus, and ductus arteriosus. Lastly, we developed nomograms for each of the 13 fetal heart measurements by each developmental markers. This is the first study providing echocardiographic reference ranges and nomograms for Asian fetuses. Computing z-scores from nomograms helps in standardizing comparisons and adds additional prognostic information to the diagnosis of congenital heart disease.

OBGYN-P02

Revisions to Mid-pregnancy Cervical Length Reference Range for Preterm Birth Screening Among Singleton Pregnancies in Taiwan – 10 Years' Experiences

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Objective: Our study aimed to build a normal reference range for routine mid-pregnancy cervical length screening for preterm birth (PTB) based on a large cross-section of Taiwanese singleton pregnancies. Based on our reference range findings, we aim to develop a Z-score and centile calculator.

Materials and methods: We performed a retrospective analysis of the routine mid-trimester cervical length measurement in low-risk singleton pregnancies (without known abnormal growth or karyotype, congenital malformation, history of preterm birth due to preterm premature rupture of the membranes, or history of cervical cerclage treatment). From November 2008 to June 2018, the cervical lengths of 51,644 Taiwanese low-risk pregnant women were measured by experienced sonographers via transvaginal ultrasound during second trimester fetal anatomical screening at 20–24 weeks of gestation. Kolmogorov-Smirnov test was used to assess the normality of the distribution. Cole's lambda, mu, sigma (LMS) method was applied to build mid-pregnancy cervical length reference range and calculate Z-scores. Cut-off values of 2.5, 2.0 and 1.5 cm were used to evaluate the number of pregnancies considered high-risk for PTB.

Results: Kolmogorov-Smirnov test showed that the cervical length measurements did not follow a normal distribution (<0.001). Reference range constructed by LMS method was presented in our study. Mean cervical length was 3.82 cm (SD = 0.62 cm). Overall, less than 0.3% of women had a cervical length shorter than 1.5 cm.

Conclusion: We are providing an open access calculator for z-score and centile calculation for use in clinical practice for assessing how CL measurement compares in normally developing singleton pregnancies. Further investigation is needed to determine if Z-scores can better assess risk for PTB compared to fixed cut-offs. Since Z-scores are used to assess large deviations from normal development, they may be a useful tool for risk assessment and can be the basis for future standardized screening protocol in Taiwan.

Keywords: Cervical length; Preterm birth; Reference range; Transvaginal ultrasound