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(Y8)



Pathognomonic Ultrasonographic Features of First- and Second-degree Uterine Inversion

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Objective: To identify the clinical features of ultrasound for the diagnosis of first and second degrees of uterine inversions.

Method: We retrospectively reviewed 11 ultrasonographic image-based cases from the literature and one case from our institution. By reviewing the texts and images of these cases, we tried to identify some ultrasonographic features for the recognition of uterine inversion.

Results: Four ultrasonographic features in the first and second degrees of uterine inversion (incomplete and complete) are proposed, namely, the bull's eye sign (10 out of 12 cases), crater sign (12 out of 12 cases), stuffed olive sign (4 out of 12 cases), and central blood flow (4 out of 4 cases).

Conclusions: Since the ultrasound is a useful and readily available equipment in the obstetric department, the ultrasonographic features identified in this study may help clinicians to better identify uterine inversion and timely, proper management to avoid severe obstetric complications.

Han-Ying Chen 陳涵英 (Y9)



Expanded genetic screening in Taiwan

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Objective: To assess the effect of a cost-efficient approach to developing a more accurate genotypic data set.

Materials and methods: Expanded carrier screening was introduced to nulligravid pregnant women, their spouse and individuals who were visiting for pre-gravid consultation at National Taiwan University Hospital Obstetric department clinic. For pregnant women, this examination would be introduced and exam during first trimester. 6ml of peripheral blood was drawn and kept at two tubes containing EDTA (Ethylene Diamine Triacetic Acid). The specimen was kept in room temperature and been processed within three days by Invitae. The spouse could have the blood drawn at pre-gravid consultation, 1st trimester of pregnancy or when his wife was reported positive result. Comprehensive genetic counseling was provided to whoever came back with positive screening result.

Result: Amongst the 455 patients screened with expanded carrier sequencing, 130 mutations were revealed from this sample size with a positive screening rate of 71%. Regarding the total sample population, paired (couples sharing the same variants) variants occurred at a rate of 4.8%. Amongst these mutations screened, GJB2 held the highest prevalence of 17%. Following by GJB2, CFTR at a prevalence of 8% When analyzing the detection rate of paired variants within couples, GJB2 maintained the highest prevalence of 42% and HBA1/HBA2 held the second highest prevalence of 13% followed by CFTR at 8%.

Conclusion: Through this advanced screening method, we could identify individuals who carries genetic problem without clinical expression. we can provide them with earlier intervention as well as treatment to prevent costly complications that may arise later in life.

Che-Yen Kuan 關哲彥
(Y10)



Clinical outcomes of induction of labor at different gestational weeks in low-risk nulliparous women

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Objective: Optimal management of pregnancies around 39 weeks gestational age in low-risk nulliparous women is inconclusive. This study aimed to evaluate the clinical outcomes of induction of labor at different gestational weeks using data in Chi Mei Medical Center between 2020-2021.

Materials and Methods: Two hundred and fifty-seven women were included in this study. Those women were divided in two groups – one group was less than pregnancy 40+0 week, another group was over pregnancy 40+0 week. All pregnancy women were admitted for induction of labor who were primiparous without gestational systemic disease, including preeclampsia and pregnancy induced hypertension or emergent condition including placental abruption, fetal distress, and eclampsia. The outcomes were Caesarean section (CS) rate, total induction time, fetal body weight, and neonatal intensive care unit (NICU) admission rate. The difference between two groups were calculated by t-test, Chi-square test, and odds ratio.

Result: Compared to women with pregnancy > 40+0 week, women with pregnancy < 40+0 week were not associated with higher Caesarean section (CS) rate (26.6% vs 22.0%; OR, 1.52; 95% CI, 0.72- 2.29), longer total induction time (NSD group: 1634 min vs 1525 min, $p = 0.38$, CS group: 2562 min vs 2373 min, $p = 0.34$), lower fetal body weight (NSD group: 3055.6 g vs 3096 g, $p = 0.38$; CS group: 3417.1 g vs 3356.5 g, $p = 0.45$), and higher neonatal intensive care unit (NICU) admission rate (1.4% vs 1.8%; OR, 0.79; 95% CI, 0.11-5.72).

Conclusion: Due to CS rate, induction time, fetal body weight and NICU admission rate did not get the significant different in this study, so if pregnancy women over 39 weeks, after well discussion, induction of labor maybe consider.

Pei-Chen Li 李佩蓁
(Y11)



Transvaginal cervical length measurement to predict successful labor induction

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Objective: To determine if the transvaginal sonographic measurement of the cervical length before labor induction can predict successful induction.

Materials and Methods: This prospective observational study recruited 60 pregnant women undergoing induction of labor at 37– 41 weeks from December 2018 to April 2020. Cervical length was measured by transvaginal sonography (TVS) prior to induction of labor. Induction of labor was performed according to hospital protocol. Age, parity, body mass index, Bishop score, hemoglobin, maternal disease, use of epidural anesthesia was also recorded. Labor induction outcomes including the cesarean section for failed induction, time of induction, and three labor stages were assessed.

Results: Among 60 women, 51 (85%) of the patients delivered vaginally with a mean of cervical length 2.71 ± 0.65 , and 9 (15%) required cesarean section with a mean cervical length of 3.38 ± 0.79 cm. The cervical length was significantly shorter in patients with successful labor induction ($P=0.007$). The induction time was 5194.50 ± 446.18 minutes and 1217.22 ± 879.94 minutes in women with failed and successful induction, respectively. The Bishop' s score was higher in the patients with successful induction (2.86 ± 2.17), compared with the patients delivered by cesarean section (1.67 ± 2.50). In multivariate analysis, the cervical length was negatively associated with successful labor induction [adjusted odds ratio (95 CI), 0.24 (0.06-0.96), $P=0.044$]. The total labor time was significantly higher in women with higher BMI and longer cervical length. Parity was negatively associated with total labor time. A Scatter plot also showed a negative association between cervical length and Bishop score. Women with a cervical length < 3.31 cm were more likely to have successful induction. Using this cut-off value the sensitivity of a successful labor induction was 78.4% and the specificity was 66.7%.

Conclusion: Transvaginal measurement of cervical length is a useful parameter to predict successful labor induction.

Hao-Yang Chang 張皓揚 (Y12)



Immediate postpartum hemorrhage with referral from local clinics : 10-Year Experience at Mackay Memorial Hospital, Taipei, Taiwan

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Postpartum hemorrhage (PPH) is one of the most common causes of maternal mortality worldwide, accounting for 25%– 30% of all maternal deaths. PPH may occur any time regardless of delivery method. Furthermore, risk of PPH is sometimes unpredictable; and sudden massive life-threatening hemorrhage may cause maternal mortality. Obstetricians should recognize this emergent situation as early as possible and to differentiate the hemorrhage that could be resolved immediately or need call for help or transferred to the medical center which has adequate staff, equipment, and blood bank to save the maternal life. Due to the limitation of equipment in local clinic, referral for treatment of acute postpartum hemorrhage is necessary.

From 2011 to 2020, 146 women experienced intractable primary PPH at local clinic were transferred to Mackay memorial hospital, Taipei, Taiwan. Women with diagnosis of delayed PPH was excluded.

Of the 146 women with complete record, 96 (65.7%) received vaginal delivery, 39(26.7%) received cesarean section and 11 (7.5%) received vacuum-assisted vaginal delivery. Uterine atony is the leading cause of PPH, but the majority of these patients transferred to our hospital had combined causes of PPH at the same time.

85 (58.2%) women were admitted to operation room for receiving surgical intervention, 11 (12.9%) underwent total hysterectomy, and the others received either hypogastric artery ligation, uterine compressive sutures or repairs of vaginal laceration. The decisions for use of these aggressive methods are sometimes difficult and their outcome is important because failure to reverse PPH could result in mortality.

3 women underwent transarterial embolization (TAE) before the surgical intervention, but 2 of them underwent further intervention after TAE failure. Only one patient received TAE successfully. 57 (39%) patients admitted in ICU. 3 patients expired and the mortality rate is 2%. One patient was transferred to other hospital for liver transplantation. The efficacy of referral system is important because delayed treatment due to lack of facilities could result in mortality, and most patients have good survival outcomes with timely treatment.

Sau Xiong Ang 鄧肇雄
(Y13)



Bio-functionalized magnetic nanoparticles for the immunoassay of C-reactive protein and procalcitonin in cervicovaginal secretions of pregnant women with preterm prelabor rupture of membranes to predict early-onset neonatal sepsis

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Objective: Early-onset sepsis is a major cause of neonatal morbidity and mortality. C-reactive protein (CRP) and procalcitonin (PCT) are acute phase reactants related to infection. The aim of this study was to explore the feasibility of measuring CRP and PCT concentrations in cervicovaginal secretions of pregnant women with preterm prelabor rupture of membranes (PPROM) using an immunomagnetic reduction (IMR) assay to predict early-onset neonatal sepsis.

Materials and Methods: This prospective study was performed at Mackay Memorial Hospital, Taipei, Taiwan from February 2015 to January 2018. Pregnant women with PPRM between 22 and 34 weeks of gestation were recruited. CRP and PCT concentrations in cervicovaginal secretions were measured using an IMR assay.

Result: Thirty-five cervicovaginal secretion samples were obtained. After excluding two neonatal deaths, early-onset neonatal sepsis was diagnosed in 15 of the 33 surviving neonates. There was no significant relationship between cervicovaginal secretion CRP level and neonatal sepsis, however cervicovaginal secretion PCT levels were significantly higher in the neonatal sepsis group than in the non-sepsis group (45.99 vs 9.54 ng/mL, $P = 0.039$). Receiver operating characteristic (ROC) curve analysis revealed a PCT cut-off level of 20.60 ng/mL to predict early-onset sepsis, and the area under the ROC curve was 0.71 (95% confidence interval 0.52 to 0.90, $P = 0.039$), with sensitivity and specificity of 73.3% and 77.8%, respectively.

Conclusion: Measuring the concentration of PCT in cervicovaginal secretions with an IMR assay can predict early-onset sepsis in neonates born to mothers with PPRM.

Meng-Syuan Lin 林孟萱
(Y14)



Differential Changes in Akt and AMPK Phosphorylation Regulating mTOR Activity in the Placentas of Pregnancies Complicated by Fetal Growth Restriction and Gestational Diabetes Mellitus with Large-For-Gestational Age Infants

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Background: Dysregulation of placental mechanistic target of rapamycin (mTOR) activity has been implicated in the pathophysiology of pregnancies complicated by idiopathic fetal growth restriction (FGR) and gestational diabetes mellitus (GDM) with large-for-gestational-age (LGA) infants. However, the underlying mechanisms remain unclear.

Methods: We obtained placentas from women with normal pregnancies (n = 11) and pregnancies complicated by FGR (n = 12) or GDM with LGA infants (n = 12) to compare the levels of total and phosphorylated forms of Akt, AMPK, TSC2, and mTOR among the three groups and used primary cytotrophoblast cells isolated from 30 normal term placentas to study the effects of oxygen– glucose deprivation (OGD) and increasing glucose concentrations on the changes of these factors in vitro.

Results: Placentas from FGR pregnancies had lower phosphorylated Akt (p-Akt) levels (P < 0.05), higher p-AMPK α levels (P < 0.01), and lower mTOR phosphorylation P < 0.05) compared to that of normal pregnant women. Conversely, women with GDM and LGA infants had higher p-Akt (P < 0.001), lower p-AMPK α (P < 0.05), and higher p-mTOR levels (P < 0.05) in the placentas than normal pregnant women. Furthermore, primary cytotrophoblast cells subjected to OGD had lower p-Akt and p-mTOR (both P < 0.05) and higher p-AMPK α levels (P < 0.05) than those cultured under standard conditions, but increasing glucose concentrations had opposite effects on the respective levels. Administering compound C, an AMPK inhibitor, did not significantly affect Akt phosphorylation but partially reversed mTOR phosphorylation. Administering LY294002, an Akt inhibitor, decreased p-mTOR levels, but did not change the levels of total and phosphorylated AMPK α .

Conclusion: These results suggest that Akt and AMPK are involved in the regulation of trophoblast mTOR activity in the placentas of pregnancies complicated by FGR and GDM with LGA infants.

Meng-Han Lu 盧孟涵
(Y15)



Prevention of defective physical and neurodevelopmental outcomes following
intrauterine growth restriction

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Aims: Increasing evidence indicates that lifelong health foundations are programmed *in utero* by signals that crucially affect early fetal growth plasticity. Dysregulated fetal programming-initiated intrauterine growth restriction (IUGR) contributes to long-term systemic, intellectual, motor and behavioral disorders without effective prevention. About 1,800 years ago, Chinese canonical medicine described treating spontaneous abortion with a multi-herbal formula, Guizhi Fuling Wan (GFW), with minimal side effects. Our previous results showed that GFW improved fetal-placental development in a spontaneous abortion /IUGR-prone CBAxDBA/2 mouse model. Thus, the current study aims to test the hypothesis that prenatal GFW improves development in IUGR-complicated progeny.

Main methods: Oral gavage of 8-week-old female CBA mice with vehicle or GFW (0.3 gm/kg in ddH₂O/day) initiated 7d before mating with 10-week-old male DBA/2 mice and continued throughout gestation. Neurodevelopment and neonatal growth of IUGR-prone offspring were monitored by several behavioral tests and various biophysical parameters. Placental development and expression of SNAT2, an amino acid transporter, were also evaluated.

Key findings: Prenatal GFW reduced body weight gain of CBAxDBA/2 offspring and serum leptin levels, lowered blood pressure, and improved glucose tolerance. GFW-treated CBAxDBA/2 offspring also displayed improved negative geotaxis, cliff aversion, open field, elevated Y-maze, and subjective handling tests. Moreover, placental maturity and SNAT2 expression were also promoted by prenatal GFW.

Significance: In conclusion, prenatal GFW promotes physical development in adult mice born with IUGR and improves vestibular and proprioceptive functions, labyrinthine reflexes as well as strength and coordination during neonatal development. The improvement of placental maturity and SNAT2 expression suggests the effects of GFW on fetal programming.