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Fetal Medicine

EP3.01

Placental phenotype of Turner mouse model: differences between XmO and XpO

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Introduction Turner Syndrome in humans arises from the loss of genetic material from one of the sex chromosomes, resulting in the 45,XO genotype, with the remaining X chromosome being maternally-inherited (Xm) or paternally-inherited (Xp). As the gene dosage and expressions of the Xp and Xm chromosomes may not be equivalent epigenetically, this study aims to investigate the different influences of Xm and Xp on placental phenotype, using a mouse model.

Methods 14 placentas from pre-term MF1 mice (3XX, 3XY, 5XmO, 3XpO) at 18.5 days post-coitum were isolated, formalin-fixed, paraffin-embedded and sectioned. To examine the morphological differences between the four placenta types, sections were stained histologically (H&E, PAS, Heidenhain's Azan) and immunohistochemically (for CDX2, CK19, fibronectin, laminin, pecam-1). Student's t-test was used to statistically analyse the different comparison parameters such as the size of the placenta and its constituent layers; as well as the estimates of cell density, and CDX2-positive and glycogen cell numbers in the junctional zone (Jz).

Results Wild-type (XX,XY) placentas are quite similar to each other. XpO placentas are significantly different from the other three genotypes, especially in the Jz, being thicker especially at the lateral end of the placenta ($P = 0.038$). Moreover, the numbers of CDX2-positive ($P = 0.0092$) and glycogen cells ($P = 0.017$) are increased. XmO placentas exhibit large morphological variations as some were phenotypically similar to wild-type placentas, while others were phenotypically similar to XpO placentas. Some XmO placentas ($n = 3$) also have a 15° upward tilt at the lateral end, not observed in the other genotypes.

Conclusion We conclude that Xm and Xp affect placental development differently. Xp, which is normally silenced in the extraembryonic tissues of the murine placenta, if activated in the absence of a second sex chromosome, will result in a placenta that is morphologically quite different from normal. Conversely, XmO placentas look phenotypically more normal, although they also exhibit some defects, thus suggesting that Xm alone is insufficient to form a normal placenta.

Our findings are consistent with literature stating that XpO foetuses are less viable than XmO foetuses, since we found that XpO placentas exhibit the largest degree of phenotypical abnormality, while XmO placentas share mixed characteristics between the wild-type and XpO placentas. Thus, XmO placentas may function better than XpO placentas to result in a viable pregnancy. This is also consistent with literature which documented that most of the human 45,XO foetuses that survive to birth have Xm.

EP3.02

Perinatal outcome screening using uterine artery Doppler, mean arterial pressure and pregnancy associated plasma protein-A at 11–14 weeks gestation

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Introduction Pre-eclampsia which affects about 2% of pregnancies is a major cause of maternal and perinatal morbidity and mortality. First trimester pregnancy associated plasma protein A (PAPP-A) may predict future perinatal complications, specifically abnormalities of fetal growth. Early prediction of hypertensive disorders can also be provided by measurement of blood pressure and calculation of mean arterial pressure (MAP) at 11–14 weeks of gestation.

Methods This was a prospective study conducted in 182 antenatal patients attending Perinatology and Department of Obstetrics & Gynecology, KIMS Hospital, Trivandrum, Kerala, between period of 2010–2012. All subjects with singleton pregnancy at 11–14 weeks were screened for PAAP-A levels in blood with adjustment to maternal age (17–44 years), race/ethnic group was considered. Blood pressure was measured in sitting position using calliberated mercury sphygmomanometer. Uterine artery Doppler was done using standard machines equipped with a 5 MHZ curvilinear transabdominal probe. Doppler indices studied were Pulsatility Index.

Results A total of 182 patients were considered for the study out of which 2 developed pre-eclampsia and 5 had gestational hypertension and 5 had intrauterine growth restriction (IUGR). In the present study PAPP-A was found to be associated with gestational hypertension with a P-value of <0.001. IUGR was not found to be associated with mean arterial pressure but had significant association with uterine artery doppler. PAPP-A was found to be associated with IUGR. Mean arterial pressure proved to be an average predictor of pre-eclampsia with 71% specificity. PAPP-A turned to be an excellent predictor for pre-eclampsia, gestational hypertension and a good predictor for IUGR.

Conclusion It has been shown recently that the inclusion of maternal parameters, namely body mass index, ethnicity, and previous maternal medical and obstetrical history, in prediction

algorithms further improves predictive accuracy of combinations of biochemical and ultrasonographic markers. The addition of such easily accessible variables that increase sensitivity, and thus decrease false-negative results, is of great value. From the perspective of integrative medicine, there is a clear need for prospective large-scale studies with rigorous study design criteria to determine the clinical usefulness of combinations of biomarkers in different geographic and healthcare environments.

EP3.03
Audit on management of SGA/IUGR in pregnancy

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Introduction Using the customised charts, the initiative of the West Midlands Perinatal Institute was to reduce the number of potentially preventable term stillbirths. In addition, the National Statistics Office showed that West Midlands stillbirth rates have fallen to below the national average for the first time in 50 years. Analysis of the regional database has demonstrated that this improvement is due to significant reductions in stillbirths with intrauterine growth restriction due to the specialist Growth Antenatal service. The Obstetrics department at the Birmingham City Hospital has a dedicated Fetal growth monitoring Antenatal Clinic. This Audit was aimed to review service outcome of the specialist AN growth clinic and to assess adherence to guideline – Local Management of IUGR/SGA & RCOG Green Top Guideline No 31.

Method Retrospective review of pregnancy case notes of women who attended the antenatal clinic between 1 August 2012 and 1 December 2012 was done. We have looked into 57 notes to ascertain: Appropriate referral of high risk women (e.g. Prev history of SGA/IUGR) to the antenatal clinic; if high risk patients were monitored with serial growth scans; if identified IUGR patients between 24 and 34 weeks were referred to Fetal medicine unit for detailed scanning; if identified IUGR patients were managed according to the local management guideline flowchart as given below; if imminent delivery plan was made for women more than 38 weeks with a single scan suggestive of IUGR; if imminent delivery plan was made for women with abnormal dopplers more than 36 weeks.

Results 100% result. Serial growth scan monitoring for all high risk women. Fortnightly scans for all SGA/ IUGR. Weekly LV/ Dopplers for oligohydramnios. Twice weekly LV/Dopplers for reccurrent DFM and IUGR. Plan of delivery made for all identified SGA/IUGR above 38 weeks/earlier if oligohydramnios or DFM.

Conclusions Areas to improve: Only 40% had FMU referral. Only 50% of those delivered before 36 weeks had steroids.

EP3.04
Case study: antenatal diagnosis of paternal uniparental disomy 14 (Wang syndrome)

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Background Uniparental disomy (UPD) is a rare chromosomal abnormality in which both copies of a chromosome pair are inherited from only one parent, with no copies inherited from the other parent. UPD has been observed to result through several mechanisms including trisomy rescue (ejection of an extra chromosome leaving a balanced cell with a 50% chance of both chromosomes being from the same parent) and from the presence of structurally abnormal chromosomes, including Robertsonian translocations. More rarely a cell with only one chromosome, from one parent, will replicate that chromosome (monosomy rescue). Due to methylation of different genes on the maternally and paternally inherited chromosomes, gene expression remains unbalanced leading to phenotypic features different for paternal and maternal UPD 14. Maternal UPD 14 produces a relatively mild phenotype. The rarer paternal UPD 14, first described by Wang et al in 1991, produces a syndrome characterised by axial skeletal abnormalities, joint contractures, dysmorphic facial features, and developmental delay/mental retardation. Here we present a rare case of Wang syndrome secondary to maternal Robertsonian translocation and monosomy rescue diagnosed antenatally.

Case Increased nuchal translucency (NT) of 4 mm was identified in a non-consanguineous Polish couple. Karyotype showed abnorrmality of chromosomes 14 and 14. Investigation of parental blood samples identified the mother with balanced translocation of chromosomes 14 and 21, and that the fetus had inherited no maternal copy of chromosome 14. The cell had performed monosomy rescue of the paternally inherited copy to rebalance itself. A diagnosis of Wang syndrome was made. Ultrasound features included a small bell shaped chest, fixed flexion of the arms and a small choroid plexus cyst. Parents opted to terminate the pregnancy. Fetal autopsy confirmed narrow thorax, coat hanger ribs, brachycephaly, low set ears, flattened bifid nose, prominent philtrum and micrognathia.

Conclusion Wang syndrome is the most severe phenotypic variant of UPD 14. Although very rare in the general population, the risks of this condition and other whole chromosome anomalies is significantly higher in individuals carrying balanced translocations. Accurate detection in the primary pregnancy allows not only an option of termination but also the opportunity for prenatal diagnosis at an earlier gestation in subsequent pregnancies.

EP3.05

Image scoring methods for standardisation of fetal biometry; experience from the INTERGROWTH-21st project

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Introduction Reliable biometry is necessary for accurate diagnosis of fetal growth disorders such as intrauterine growth restriction (IUGR), small for gestational age (SGA) and macrosomia. Sonographic fetal assessment largely relies on the measurement of specific anatomical landmarks at different gestational age; such as crown rump length (CRL) in the first trimester and femur length (FL), biparietal diameter (BPD) and abdominal circumference (AC) for later gestation. While these measurements do not assess fetal well-being they have been used for correct identification of fetal growth patterns throughout different stages of pregnancy and will reliably inform the obstetrician on the need for further tests and assessment. To ensure accuracy and standardisation of these measurements various image scoring techniques have been developed for training and research purposes.

Methods As part of the quality control in fetal growth assessment the INTERGROWTH-21st study group (www.intergrowth21.org) has adopted a unified point based image scoring system to ensure standardisation of technique among sonographers in all participating centres. A random 10% sample of images is chosen from each centre and re-measured by trained sonographer as part of quality control. To date more than 12 000 images have been subjected to this exercise. The methods used for assessing quality of FL, BPD, AC images by both the operator and an external reviewer are described in this presentation.

Results Both quantitative and qualitative techniques for testing inter- and intra-operator reliability and reproducibility of these measurements were found to be reproducible across populations. Preliminary results show high levels of agreement between the sonographers and the ultrasound quality control unit at Oxford. The levels of agreement for HC, AC and FL are 0.98 (0.95–1.00), 0.99 (0.96–1.00) and 0.98 (0.94–1.00) respectively.

Conclusions Our image scoring system for fetal biometry is reliable and reproducible. We recommend its adoption in routine practice to ensure accuracy and consistency in fetal growth assessment.

EP3.06

First trimester growth trajectories and biochemistry as a predictor of birthweight

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Introduction First trimester crown rump length (CRL) is known to be an accurate means of dating pregnancies. However, first trimester growth trajectories have recently been investigated as predictor of birthweight. This study was undertaken to evaluate the role of first trimester CRL as an early predictor of birthweight. We also studied the impact of pregnancy associated plasma protein-A (PAPP-A) and beta-human chorionic gonadotropin (β-hCG) measurements done routinely as part of the combined screening on birthweight.

Methods This retrospective study was conducted over a period of 6 years and included all low risk women with singleton pregnancies who underwent combined first trimester screening at our fetal care centre. Women with spontaneous conception who were sure of dates and in whom the difference between observed and expected crown rump length (CRL) was not more than +7 days were included. Women who conceived on assisted reproductive techniques (IVF, ICSI and IUI) in whom the date of conception was known with certainty were also included. The CRL was measured on 2D sonographic images as per standard criteria by Fetal Medicine Foundation (FMF) certified operators. Z-scores were calculated for CRL (z-CRL) and birthweights (z-BW). PAPP-A and β-hCG levels were converted to log10 of multiples of median (MoM). The association between CRL, PAPP-A and β-hCG with birthweight was analysed by using linear regression analysis. Small for gestational age (SGA) was defined as growth <10th centile and large for gestational age (LGA) was defined as growth >90th centile.

Results 1151 spontaneously conceived and 134 ART pregnancies were included. There were 112 (8.7%) SGA babies and 128 (9.9%) LGA babies in the study population. There was a positive correlation between the Z-BW and Z-CRL ($r = 0.0147$) but it was not statistically significant ($P = 0.597$). The PAPP-A MoMs, however, were significantly lower in the SGA babies ($0.92 + 0.63$, $P = 0.023$, ANOVA). On using the linear regression analysis, the log10 PAPP-A had a positive correlation with Z-BW ($r = 0.146$) and it was a strong independent predictor of birthweight ($P < 0.001$). The β-hCG MoMs were not significantly different in the three groups ($P = 0.84$).

Conclusions Growth trajectories in the first trimester and first trimester β-hCG are not strong independent predictors of birthweight but first trimester PAPP-A is a strong independent predictor of birthweight.

EP3.07

Risk of miscarriage following chorionic villus sampling on 315 cases for prenatal diagnosis of Thalassemia

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Introduction Approximately 10 000 babies are born with Thalassemia in India every year. Prenatal diagnosis of Thalassemia is the commonest indication for Chorionic Villus Sampling (CVS) in India. The primary objective of this study was to assess the miscarriage rates following transabdominal CVS for women with Thalassemia trait carrying singleton pregnancy.

Methods A retrospective longitudinal study was carried out at a diagnostic centre in Kolkata. Informed consents were obtained from all patients for transabodiminal CVS under direct ultrasonic guidance with local anaesthesia. All procedures were done by the same operator at the same clinic in 2 years between August 2011 and July 2013. The median gestation at the time of CVS was 12 weeks. All but two required single puncture. Patients were discharged immediately after the procedure on broad spectrum andibiotics for 5 days. Outcome data regarding vaginal loss, miscarriage, fetal affection, preterm labour, limb reduction and missed diagnosis were collected by direct questionnaire.
Results A total of 320 CVS were performed over 2 years. Five cases were excluded as the indications were different. Three of them were for Spinal Muscular Atrophy (SMA) and one each for Haemophilia and Sickle Cell Anaemia. 56 women were lost in follow up for various reasons. Other 259 women could be followed up, out of which 53 had already terminated pregnancy as their fetuses were shown to be affected by Thalassemia major. Out of the remaining 206 women, 185 have already delivered healthy babies and another 20 have crossed 24 weeks gestation but they are yet to deliver. There was one case of miscarriage which happened 6 days after the procedure.
Conclusion CVS has the advantage of making early prenatal diagnosis of hereditary haemolytic anaemia. This allows the option of early termination of pregnancy if required. The procedure is simple, safe, low cost and can be done at the ultrasonography clinic without inpatient admission. Our results, especially the rate of miscarriage, is consistent with the data published in the world literature.

EP3.08
Triaging of fetal problems for a cost effective and efficient work up in low resource settings

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Introduction Identification and management of fetal problems has become an important aspect of health care to pregnant mothers in India after establishment of Fetal medicine as a separate subspecialty. However, there are important concerns about the costs of a complete work-up in each case as the private health care system in India is primarily patient-funded. The dilemma of allocating resources to improving maternal care and future pregnancies versus a complete work-up of the presenting fetal problem has led us to formulate triaging methods to optimise the process for a cost effective and efficient work up in low resource settings.
Methods Fetal problems like fetal growth restriction, macrosomia, structural malformations and fetal demise in utero were identified primarily by antenatal ultrasound. Fetal karyotyping or genetic studies as indicated were performed in the pregnancies that were continued in anticipation of postnatal follow-up and therapy. Financial limitations affected the decision for parents opting against such tests in many of these cases. We thus adopted a method of triaging and the decision to perform amniocentesis and prescribe genetic tests was restricted in cases that carried an extremely poor fetal prognosis and opted for discontinuing the pregnancy and such cases were counselled for a detailed autopsy. All cases were counselled in detail regarding the ideal work-up procedure and the triage policy in the dearth of resources and the decision to follow the work-up plan was taken with the informed consent of the parents. With the financial limitations in consideration, the most optimal work-up plan was devised in each case and a plan for future pregnancies was formulated. Future pregnancies were followed up with the above plan and the outcomes were noted.
Results In a period of 5 years, 3280 cases with fetal problems were identified. Chromosomal/genetic testing was done for 542 cases. Detailed fetal autopsy was offered to 93 foetuses and a limited fetal autopsy done for 38 cases. In other cases only external morphology examination was possible. Based on this modified work-up protocol, further management in present pregnancy and plan of care in future pregnancies were devised to ensure good outcomes. The best results for future pregnancies in terms of good perinatal outcome and patient satisfaction were in the cases that were completely worked up at the cost of a higher financial burden to the patients. Nevertheless, the triage policy has been reasonably satisfying and has helped patients meaningfully in planning future pregnancies in low resource settings.
Conclusions A triage policy can be adopted to modify care in patient-funded settings with financial limitations. The health care policy planners must recognise the unmet needs of fetal care and allocate resources to health care workers which will enable better outcomes for patients with fetal problems and also help in establishing complete databases of fetal problems within our country.

EP3.09
Knowledge of Down syndrome screening amongst patients and health care professionals in Sri Lanka

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Introduction Different screening strategies have been proposed to detect high risk women during pregnancy for Down syndrome. In order to achieve effective screening, the patient making the choice and the staff offering the test must have a reasonable understanding of all facts relevant to the test. The aim of this study was to assess the existing knowledge and awareness of antenatal Down syndrome screening in patients and obstetric stakeholders across eight major obstetric centres in Sri Lanka.
Methods This was a prospective study carried out between January and June 2013 in eight tertiary care settings in 7 districts representing Northern, Western, Eastern, Southern and central provinces in Sri Lanka. A validated questionnaire was translated from English into Singhalese and Tamil and independently

translated back to English and piloted to confirm the accuracy of the translation. This translated questionnaire was distributed among antenatal patients and obstetric unit staff members.
Results A total of 1116 patients and 535 staff members were recruited. Present overall knowledge of Down syndrome among antenatal patients was poor in all 7 districts. Majority of patients were not aware that available options of screening for Down syndrome (Awareness about nuchal translucency- 21.6% (95% CI 14.7–30.6%), biochemical screening – 26.3% (95% CI 18.7–35.7%) invasive procedures- 23.3 (95% CI, 16.1–32.5%). Majority of staff members were also not aware about available screening strategies (Awareness about nuchal translucency- 29.3% (95% CI 21.3–38.9%), biochemical screening – 26.9% (95% CI 19.2–36.3%) but their knowledge of diagnostic tests were high (invasive procedures- 59.4% (49.6–68.5%). Moreover, there is no difference in knowledge in different part of the island.
Conclusions Adequate education on available screening methods of Down syndrome for the staff is a timely need so that the means would be available to disseminate knowledge to the wider patient and public populations.

EP3.10
Comparing the perinatal outcome of intra uterine growth restricted fetuses versus constitutionally small fetuses

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Introduction It is estimated that 3–10% of infants are growth restricted. Intrauterine growth restriction (IUGR) is an important reason for premature delivery, and has been reported to be associated with increased perinatal morbidity and mortality. The vast majority of term SGA infants have no appreciable morbidity or mortality. If not properly differentiated in the antenatal period itself a significant number of fetuses that are healthy but SGA will be subjected to high-risk protocols and, potentially, iatrogenic prematurity.
Methods This study was carried out in Kerala Institute of Medical Sciences, Obstetrics & Gynecology and Perinatology department from May 2011 to October 2013, to compare the perinatal outcomes of intra uterine growth restricted and constitutionally small fetuses. A total number of 146 pregnant women with singleton pregnancies between 24 + 0 and 40 + 0 weeks gestation who were found to have SGA fetuses were recruited in the study. Growth charts developed by Dr Suresh et al., (Mediscans Chennai) for the Indian populations are used. All of these patients were evaluated with detailed questionnaire. They were followed up untill delivery to assess the nature of onset of labour, admission test, mode of delivery, perinatal outcome in terms of apgar score, hypoglycaemia, respiratory distress, correction of neonatal jaundice (NNJ) and sepsis.
Results Evaluation of perinatal outcomes revealed low apgar scores in a 2.05% of the constitutionally small babies whereas 48% of the IUGR babies had apgar scores < 7 ($P < 0.05$). Hypoglycemia was noticed in 20.5% of the constitutionally small babies compared to 38.4% of IUGR babies. Respiratory distress was seen in 6.8% of the constitutionally small babies while 71.7% in the IUGR group had e/o RDS ($P < 0.05$). 13.69% of constitutionally small babies had NNJ whereas 47.3% of IUGR babies required phototherapy. 6.84% of the constitutionally small babies had evidence of sepsis compared to 43.3% of IUGR group ($P < 0.05$). 4 NNDs and 3 IUDs were noted in the IUGR group ($P < 0.05$).
Conclusions Among the SGA fetuses, IUGR babies were found to have increased adverse perinatal outcome compared to the constitutionally small ones. We strongly recommend the routine use of customized growth charts, standardized for Indian population in antenatal sonography to differentiate growth restricted fetuses from small normal fetuses and thus can avoid iatrogenic harm to them. A multi disciplinary approach is imperative, including early recognition and obstetrical management of IUGR, assessment of the growth-restricted newborn in the delivery room, possible monitoring in the neonatal intensive care unit, and appropriate pediatric follow-up.

EP3.11
Prediction of small for gestational age babies (before and after the customised growth chart)

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Introduction Small for gestational age (SGA) fetuses comprise a heterogenous group that have failed to achieve their growth potential and others that are constitutional or 'normal' small (50–70%). The potential risk to the growth restricted fetus includes still birth, iatrogenic prematurity, perinatal asphyxia, neonatal complications and impaired neurodevelopment. Abdominal palpation and measurement of Symphisiofundal height (SFH) forms an important part of antenatal assessment, however abdominal palpation detects approximately only 30% of small fetuses. Abdominal circumference (AC) and estimated fetal weight (EFW) are the most accurate measures of SGA. Customised SFH (growth) charts adjusted for maternal weight, height parity and ethnic group results in increased detection of growth restriction and fewer hospital referrals. In our unit at Scarborough General Hospital the customised growth chart has been implemented since October 2012. We have assessed detection of low birthweight babies prior to and after the implementation of the customised growth chart.
Methods Retrospective case notes review of births <3 kg during the period January to August 2012 and Prospectve review of births <3 kg following the implementation of the customised growth chart in October 2012.
Results Retrospective review 60 babies were identified in this category with birthweights <3.0 kg. 16(26.6%) were identified clinically to be measuring small for dates and referred for growth scans 3 of the 16 weighed <2.5 kg. 2 being preterm. 24 (40%) were assessed as appropriate for gestation clinically and not referred for growth scans. 6 of the 24 (25%) had birthweight

<2.5 kg and were admitted to the Neonatal unit, 2 were preterm deliveries at 31 and 36 weeks gestation and 4 were at 37–41 weeks gestation. 18 of the 24 had birthweights ranging from 2600 to 2990 g, and 4 were admitted to the neonatal unit. Prospective analysis 30 babies were identified that had birthweight <3.0 kg. 26 had customised growth charts. 23 (88.4%) were referred for ultrasound scans based on their customized SFH plots. 14 (61%) had low birthweight(<2.5 kg), 1 was a preterm delivery at 35 weeks and 13 were term deliveries at 37–41 weeks). 6 were admitted to the neonatal unit 9 (39%) had birthweights ranging from 2.5 to 2.9 kg, 1 was a preterm delivery at 36 weeks and 8 were term deliveries at 37–40 weeks.

Conclusion Our data show a better antenatal detection of small babies with the customised growth charts.

EP3.12

Lethal congenital malformation in pre-existing diabetes and gestational diabetes mellitus

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Introduction The global incidence of diabetes mellitus (DM) is on the rise and estimated to be 6.4% as of 2010. Diabetes in pregnancy is a well-known risk factor for congenital malformations. Good glycaemic control before and through organogenesis reduces the incidence. The objectives were to study the distribution and demographic characteristics of pre-existing DM and gestational diabetes mellitus (GDM) with lethal congenital malformation (LCM) in Malaysian tertiary hospitals.

Methods This is a retrospective cohort study of stillbirth with LCM in women with pre-existing DM and GDM from 1 January 2010 to 31 December 2012 from the National Obstetrics Registry. The National Obstetric Registry (NOR) in an online database that captures data from 14 tertiary hospitals in Malaysia. A total of 397 521 deliveries were analysed in this period of which there were a total of 2713 cases of pre-existing DM and 32188 cases of GDM. Descriptive analysis was used to analyse the data.

Results The published National stillbirth rate was 7.7 (2010), 7.6 (2011) per 1000 live births. The overall stillbirth rate in diabetic pregnancies was higher at 9.05 (2010), 7.98 (2011) and in 2012 it was 8.69 per 1000 live births from NOR. The LCM rate in 2010 with pre-existing DM and GDM was 3 and 1 per 1000 live births respectively and we saw a similar finding for all 3 years. LCM rate was higher with pre-existing DM as compared to GDM in age 30–39 years but the rates were high in age 50–54 years with GDM. In pre-existing DM, LCM rate was higher in Malays where else in Indians there was a higher prevalence of LCM with GDM for all three years. Prevalence of LCM in pre-existing DM in Para 2–5 was higher compared to GDM whilst LCM rate with GDM is prevalent in para 1 and Para 6 and more.

Conclusions This 3 year review shows the still birth rate due diabetic pregnancy was high. Stillbirth rate due to LCM was higher among pre-existing DM than GDM. Amongst all the communities the Indians had the highest rate of GDM as well LCM with GDM. Hence in light of these findings we recommend targeted screening for GDM.

EP3.13

Twin reverse arterial perfusion sequence- 14 year experience from a tertiary referral centre

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Introduction Twin reversed arterial perfusion sequence is a rare unique complication of monochorionic twin pregnancies, in which one twin has a rudimentary or non-functioning heart, that is perfused by its co twin through placental vascular anastamoses. The natural history of TRAP sequence may differ from patient to patient. Various management options have been described from conservative to invasive techniques to salvage the pump twin.

The aim of this study is to review all cases of twin reversed arterial perfusion (TRAP) sequence managed in a tertiary referral centre and to compare the outcome in conservatively managed cases with that of those managed with interventions.

Methods This is a retrospective study analyzing all TRAP cases that were managed in a tertiary centre from Jan 2000 to October 2013. Details assessed included (1) Gestation at diagnosis (2) Ultrasound features at Diagnosis (3) Treatment options offered (4) Outcome of these pregnancies and (5) Prognostic factors. Wherever possible, the outcomes and prognostic factors were compared between the groups with different management strategies.

Results Fifty-nine cases of TRAP were identified during the study period. Follow up was available in 46 (77%), among a total of 59 pregnancies complicated by TRAP sequence. Among, these 17 (37.8%) opted for elective termination of pregnancy and 29 (62.2%) continued their pregnancies. Among these 29 women who continued their pregnancies 10 were managed expectantly and 19 had an intervention for the twin with TRAP sequence. The intervention techniques used were alcohol ablation, coil embolization and interstitial laser coagulation. The overall survival rate in the group that had an expectant management was 80% and the mortality rate of the pump twin was 20%. The overall survival rate in the intervention group was 57.8% and the mortality rate was 36.8%. When intra fetal laser was used as the treatment of choice the survival rate was 82%.

Conclusions To date this study has the largest cohort of TRAP world wide and from the observations in our study, we conclude that (i) Conservative management does have a role in TRAP sequence in select cases. (ii) The type of intervention will depend on the facilities available in the fetal medicine unit. (iii) Interstitial laser when used as the modality of choice had improved pregnancy outcomes, which is in par with the other studies internationally.

EP3.14

Prevalence of minor markers for aneuploidy on second trimester genetic sonogram in a cross section of Indian population

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Introduction A second trimester anomaly scan is offered as part of routine assessment of fetuses in every pregnancy. On many occasions, the fetus is structurally normal but there are minor markers for fetal aneuploidies noticed during this scan. This causes a great deal of parental anxiety and confusion in cases where first trimester screening was low risk for aneuploidies. We have so far quoted the prevalence of second trimester markers based on published literature from the western world. The present study was conducted to establish the prevalence of minor markers for aneuploidies in the second trimester Genetic Sonogram in Indian population.

Methods Data were collected from 6489 mid trimester anomaly scans performed between 16 and 24 weeks in a cross section of Indian population at a tertiary care Perinatal centre in South India over 5 years. The minor markers that were evaluated were nuchal edema (>6 mm), intracardiac echogenic foci, echogenic bowel, short humerus, short femur, renal pelviectasis (>4 mm), hypoplastic/absent nasal bone, ventriculomegaly (>10 mm) and choroid plexus cysts. Women who were found to be high risk for aneuploidies based on genetic sonogram or serum biochemistry or a combination of both were offered amniocentesis for confirmation of fetal karyotype. All pregnancies were followed till delivery and the fetal outcome was noted in the form of a neonatologist's feedback aboaunty major aneuploidies.

Results The age group of the women in the study population varied from 19–43 years (mean 26.45 years). Most of the scans were done as routine anomaly scans (5244) while 1245 scans were done for risk reassessment due to positive serum biochemistry/ first trimester screening or suspicion of minor markers at other referral centres. The prevalence of at least one minor marker for aneuploidy was 7.1% (462 cases) and multiple markers were seen in 1.4% (89 cases). The most common minor marker seen was intracardiac echogenic focus 5.2% (340 cases) followed by renal pelviectasis (118 cases) and short humerus. Short humerus and short femur appear to be rather non-specific in Indian population. The humerus length of less than third centile was considered as short humerus to reduce the number of false positives. Amniocentesis was performed in 318 cases for high risk of aneuploidies based on minor markers and 13 cases of aneuploidies were detected (trisomy21–8 cases, trisomy 18-3 cases and trisomy 13-2 cases).

Conclusion Minor markers for fetal aneuploidies are commonly encountered in the routine anomaly scan. Their appearance in isolation poses a great challenge in counselling the women as a great deal of anxiety is generated. Most cases with minor markers on genetic sonogram had normal karyotype. Presence of multiple markers in combination with high risk on serum biochemistry was most commonly associated with fetal aneuploidies.

EP3.15

Role of routine antenatal steroids in term elective caesarean deliveries to reduce respiratory morbidity in newborns

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Introduction Antenatal corticosteroids are associated with a significant reduction in rates of neonatal death, RDS and intraventricular haemorrhage.

Aim To evaluate the use of steroid in women delivered electively by caesarean section between completed 36 and 38 weeks of pregnancy prior to introduction of updated Steroid Guideline by RCOG. To undertake a retrospective audit of patients who underwent delivery by elective caesarean section before completed 39 weeks pregnancy. To study the frequency, need and nature of neonatal resuscitation for babies born between 37 and 38 weeks of pregnancy. To detect the difference with antenatal steroid administration on neonatal outcome in terms of resuscitation at birth and support at SCBU.

Methods Audit Period: 1 of March 2011–1 of June 2011 (3 months). 'Quick Query' menu was used to extract cases from CMiS (Ciconia Maternity Information System). Exclusion criteria- emergency caesarean section, delivery after 39 weeks of pregnancy. An audit proforma was used as a tool for data collection. A retrospective case-note review of mother and baby was undertaken. Data were entered into a database and analysed using Microsoft Excel.

Results 63% of the babies were born before 38 weeks of gestation for previous caesarean section. Overall, 80% of the babies born did not receive steroids. In 42% of women, steroid was given in between 32 and 36 weeks of pregnancy. 90% of the babies at 37–38 weeks, had APGAR score of ≥9. In 37–38 weeks group, 7% required support immediately after birth and 13% required admission and care in SCBU. In conclusion, babies born from mothers who did not receive steroids antenatally required more support at birth and admission to SCBU for up to 2 weeks. Most babies recovered completely at discharge from hospital.

Conclusions Antenatal corticosteroids should be given to all women for whom an elective caesarean section is planned prior to 38 + 6 weeks of gestation. Elective lower segment caesarean section should not normally be performed until 39 + 0 weeks of gestation, to reduce respiratory morbidity, rather than the administration of antenatal corticosteroids.

EP3.16
Sri Lankan birthweight standards: clinical validation of birthweight percentiles in predicting perinatal and neonatal mortality

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Introduction We earlier validated birthweight charts for Sri Lankans using data of WHO global survey. Mathematically, we showed most of abnormal growth deviations could be detected by these charts. The aim of this study was to determine the clinical validity of different birthweight centile charts in predicting perinatal mortality and neonatal mortality.
Methods This was a retrospective analytical study conducted between April 2010 and October 2013. Patient data and mortality data were traced from respective unit and cross checked with hospital monthly perinatal statistics. Centile values of >90th (large for gestational age -LGA) 10th–90th (appropriate for gestational age -AGA) and <10th (small for gestational age – SGA) were created for our birthweight reference for Sri Lanka, birthweight references adopted by Sri Lankan child health development record (CHDR) and for commonly using Hadlock reference. Proportions of perinatal deaths and neonatal deaths among preterm (<37 weeks) and term deliveries were compared for SGA, AGA and LGA in 3 different birthweight centile references.
Results Among 12 505 singleton births, preterm and term neonates were classified differently for SGA, AGA, and LGA by our, CHDR and Hadlock birthweight references. SGA derived from our reference detected significantly higher proportion of neonatal deaths at term than Hadlock (OR 2.5 95% CI 1.04–5.98) charts. Furthermore, perinatal mortality in preterms was also significantly higher when SGA categorised according to our reference than Hadlock's (OR 1.8 95% CI 1.03–3.28).
Conclusions Our birthweight reference detects most true SGA infants and improves the classification of abnormal new-born size at birth determined by substantially higher perinatal and neonatal mortality. Our birthweight reference charts are clinically effective and can be used in Sri Lankan population.

EP3.17
The independent effects of maternal obesity and gestational diabetes on the pregnancy outcomes

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Introduction Obesity and gestational diabetes (GDM) in pregnancy are recognized risk factors for adverse outcomes, including caesarean section (CS), macrosomia and pre-eclampsia. The aim of this study is to investigate the independent effect of GDM and obesity on the adverse pregnancy outcomes at term.
Methods A retrospective cohort of postpartum women, in King Khalid University Hospital, were stratified according to body mass index (obese $\geq$ 30 kg/m^2, non-obese < 30 kg/m^2) and the results of GDM screening into the following groups, women with no obesity and no GDM (reference group), women with no obesity but with GDM, women with obesity but no GDM and women with both GDM and obesity. Adverse pregnancy outcomes included high birthweight, macrosomia, CS delivery and pre-eclampsia. Multiple logistic regression used to examine independent associations of GDM and obesity with macrosomia and CS.
Results 2701 women were included, 44% of them were obese and 15% had GDM. 63% of the women with GDM were obese. There was significant increase in the percentage of macrosomia, $P < 0.001$, high birthweight, $P < 0.001$, CS, $P < 0.001$ and preeclampsia, $P < 0.001$ in women with GDM and obesity compared to the reference group. Obesity increased the estimated risk of CS delivery, odds ratio (OR) 2.16, confidence intervals (CI) 1.74–2.67. The combination of GDM and obesity increased the risk of macrosomia OR 3.45, CI 2.05–5.81 and the risk of CS delivery OR 2.26, CI 1.65–3.11.
Conclusions Maternal obesity and GDM were independently associated with adverse pregnancy outcomes. The combination of both conditions further increase the risk.

EP3.18
Prenatal diagnosis of CNS defects

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Introduction With 75% of fetal deaths and 40% of infant deaths being a result of CNS malformations, early detection and management is vital. 2–3% of births are affected by congenital malformations annually, and CNS anomalies are second to congenital heart disease in the most frequent serious congenital anomalies. Ventriculomegaly affects 1.5/1000 births, and is the most common CNS anomaly described. With over 2000 different congenital CNS malformations described in literature, detection and management can be difficult, require different imaging modalities, and generate difficult and challenging management. Our article is a review of the detection and management of congenital brain anomalies in a district general hospital in the UK. The objectives were to determine whether CNS anomalies are detected in a timely manner; to determine whether patients received appropriate imaging and whether this was done at appropriate times; to evaluate whether referral to tertiary centers was made early and whether patients received MRI within the centre; to determine the local prevalence of CNS anomalies; to determine the outcome in all cases.
Method We conducted a retrospective study of 20 patients over a 4-year period, from 2009 to 2013, who booked at Epsom General Hospital. Using patient records, ultrasound scan reports and our electronic labour ward system, Protos, we were able to determine the number of pregnancies where anomalies were detected within

this time period and analyse our findings as per the objectives above. We collated data into standardised audit proformas and divided the data into subcategories according to our objectives.
Results The majority of our patients were multiparous women (65%), with an age range 19–40. Gestation at diagnosis of CNS abnormalities ranged from 12/40 to 31/40, with the vast majority being detected on the routine anomaly scan, and 15% detected at or later than 22/40. 80% of patients received serial ultrasound scans. 35% of patients were offered invasive testing. 85% of patients were referred to tertiary centres. The outcomes in 55% of cases were live births and 40% opted for termination of pregnancy. The most common abnormality detected was ventriculomegaly.
Conclusions Our findings demonstrate the importance of multidisciplinary teams in the early detection and management of pregnancies with CNS anomalies. Early detection is vital, and suspicion of such anomalies at early gestations must be monitored and evaluated by experienced clinicians to determine their significance. Referral to tertiary centres should be made early and enhanced imaging modalities including MRI scanning should be arranged as appropriate.

EP3.19
Role of fetal aortic isthmus pulsatility index in the prediction of perinatal outcome associated with preterm fetuses with intrauterine growth restriction

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Introduction Delivery of a baby with early preterm fetal growth restriction (FGR) poses a serious dilemma. Umbilical artery Doppler clearly identifies an 'at-risk' fetus, and the changes in the ductus venosus Doppler waveform may have a better association with subsequent neonatal morbidity than that based on umbilical Doppler abnormality in early preterm FGR. The most important independent risk factor for an adverse perinatal outcome is gestational age, especially before 32–34 weeks, when the risk is higher. Blood flow pattern in the aortic isthmus reflects the balance between both ventricular outputs and the differences in the impedance of both vascular systems. So, it helps to predict perinatal morbidity and mortality.
Methods A prospective study of the fetal AoI in a cohort of premature IUGR fetuses attending to Minia University Maternity Hospital, Egypt between the period of January 2012 and January 2013. Fifty-seven participants were divided into two groups according to fetal aortic isthmus pulsatility index (AoI PI) just before birth (group A = 30 with normal AoI PI and group B = 27 participants with Abnormal AoI PI).
Results Total morbidity and mortality rates were significantly higher in the group of abnormal fetal AoI PI. There was statistically significant difference for neonatal intensive care unit (NICU) and neonatal sepsis (95% CI 0.024–0.622, *P*-value 0.008) and (95% CI 0.053–0.934, *P*-value 0.03) but not for intrauterine fetal death and early neonatal death. Fetal AoI PI showed variable performances to predict the perinatal morbidity and mortality in relation to other studied vessels as shown in the receptor operating curves (ROCs).
Conclusion The authors suggest that aortic isthmus Doppler measurements are complementary to other Dopplers in early identification of fetal complications of the fetal growth restriction before deterioration and appearance of fetal acidosis.

EP3.20
Prenatal detection of an extra-adrenal neuroblastoma with hepatic metastases

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Background Neuroblastoma (NB) is the most common extracranial solid cancer in children and the most frequent cancer in infancy. However, detection in neonates is distinctly uncommon, and because most of these are situated in the adrenal gland, extra-adrenal lesions in the neonate are rare. Fetal detection is even rarer. We report a case in which USG and MRI were used in the detection and evaluation of an extra-adrenal metastatic NB in a fetus.
Case A 25-year-old woman, gravida 4, para 0, with known gestational diabetes and asthma, underwent her second prenatal sonographic examination at 35 weeks menstrual age as part of her obstetric management for diabetes. USG revealed a rounded retroperitoneal echogenic mass with vascular flow located within the mid abdomen of the fetus measuring 5.1 × 4.2 × 4.6 cm. On MRI of the fetus, a T1 and T2 isointense homogeneous mass was seen in the fetal retroperitoneum with measurements corresponding to the mass detected on USG. The mass did not appear to be related to the adrenal glands or kidneys. The mother had an uneventful vaginal delivery at 38 weeks gestational age, the neonate weighing 2.93 kg (15th percentile). The child was vigorous at birth with Apgar scores of 9 and 9. On neonatal examination, the abdomen was noted to be protuberant, with a palpable midline abdominal mass, elevated urine catecholamine levels. Multiple hepatic lesions throughout the right hepatic lobe were seen on postnatal USG. Pathologic analysis documented a stage IV NB. N-myc NB gene amplification study results were negative.
Conclusions The authors present a case of a fetal extra-adrenal NB with liver metastases. From an analysis of the literature, a homogeneously solid retroperitoneal mass of medium to low echo amplitude separate from the kidneys and adrenal glands is most likely an extra-adrenal neuroblastoma. MRI, by virtue of its multiplanar imaging capability and ability to differentiate blood products from other tissues, is very useful in leading to the correct diagnosis. Realising that this lesion has a propensity to metastasize to the liver will help avoid a failure to observe the metastatic deposits, as occurred in our case.

EP3.21
Case study: presentation, evolution and outcome of fetal haemorrhagic stroke

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Background Fetopathic effects of warfarin is known to extend beyond the first trimester. Published case reports of fetal SDH have uniformly reported a fatal fetal outcome; however the fetal intracranial physiology may be different from that of the space-restricted adult cranium.
Case Presentation: 33-year-old unbooked G2 at 24 weeks diagnosed with severe mitral stenosis, aneurysmal dilatation of left ventricle, chronic atrial fibrillation was started on warfarin. Fetal anatomy and growth were normal at 30 weeks. Mother reported transient decrease in fetal movement at 34 weeks accompanied with transient bradycardia on clinical auscultation. USG detected crescentic echogenic left sub-parietal mass, midline shift, prominent gyri, compressed left ventricle, and dilated contralateral ventricle. Left MCA PI was 2. Evolution: Mother was switched over to heparin. Fetal condition and the Sub Dural Hematoma was closely monitored. The lesion became echolucent with a condensed mass laterally. At 36 + 3 a 2620 g male baby was delivered by elective caesarean section in view of a BPD of 105 mm. Outcome: Baby was observed in NICU for 6 days. Intact reflexes, no neurological deficits at day 7. Post natal cranial USG and CT corroborated antenatal findings. Milestones were normal at 5 months follow up. At 10 months follow up, baby was on phenytoin for recurrent seizures with normal psychomotor development expected for that age.
Conclusion Plasticity of the brain and skull may enable the fetus to accommodate a large SDH asymptomatically. This has to be taken in to account while counselling women with fetal SDH as evidence about outcome is sparse.

EP3.22
Developmental programming of obesity and appetite: an introduction

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Introduction Developmental plasticity refers to the situation where a genotype is able to produce more than one phenotype in response to the conditions of the environment. Current research suggests that when developing organs and systems of the body are faced with adverse environmental conditions during their critical period of development, such as in utero or early life, they may change their structure and function to suit the environment.[1,2] This poster will aim to review and summarise current research on the possible mechanisms of in utero developmental programming of appetite and obesity.
Methods PubMed search of research papers related to developmental programming in animals and humans. The articles were read and summarised.
Results The mechanism by which programming occurs is not well understood. It has been proposed that obesity may be a sign of alterations in the development the appetite regulatory circuit during fetal and neonatal life. Leptin a fat-derived factor, produced by the ob gene has been shown to be important in the organization, formation and maturation of the hypothalamic feeding circuit which controls body weight. In mice, the period at which leptin is most important for the development of the appetite regulatory pathway seems to be during a neonatal period of maximal sensitivity and growth of the hypothalamic feeding circuit which occurs in parallel with the leptin surge.[3]
Conclusion Perturbations in perinatal nutrition which affect the timing of amplitude of this leptin surge may have enduring consequences on the programming of appetite which may result in the development of obesity.[4]
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EP3.23
Maternal characteristics, first trimester biochemistry and ultrasound markers to predict pregnancies at risk of preterm birth

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Introduction First trimester screening presents a unique opportunity to screen women for adverse pregnancy outcomes. Preterm birth continues to be a major cause for neonatal morbidity and mortality. This study was undertaken to analyze the role of maternal characteristics, maternal biochemical markers, i.e. PAPPA and β-hCG and uterine artery PI in prediction of preterm labour.
Methods This prospective study included all women who presented to Apollo Centre for Fetal Medicine for combined first trimester screening over a period of 5 years. Pregnancies with multiple pregnancy, chromosomal abnormalities and fetal abnormalities were excluded. The primary outcome was preterm delivery defined as delivery before 37 weeks. Predictive models

were made using logistic regression analysis and receiver operating curves (ROC) for each parameter alone and in combination. Informed consent was obtained from all patients and the study was approved by the hospital ethical committee.

Results A total of 971 women were recruited for the study out of which 145 (14.9%) were lost to follow up. Thus a total of 826 women were included in the final analysis. There were 87 (10.5%) preterm deliveries out of which 27 (3.3%) delivered at <33 weeks. Out of the total 87 premature deliveries, 50 (57.1%) were spontaneous and the rest were iatrogenic. Indications for iatrogenic preterm delivery included gestational hypertension, pre-eclampsia, and fetal growth restriction. Among maternal characteristics, high BMI (>25 kg/m^2) and a previous history of preterm birth (<37 weeks) were found to be significant predictors of preterm birth ($P < 0.001$ and $P < 0.01$ respectively). Beta-hCG was not found to be a significant predictor of preterm deliveries. PAPP-A was significantly low in all preterm deliveries ($P < 0.03$). Mean Uterine artery PI was high in all cases with preterm deliveries; the significance persisted even after excluding cases with pre-eclampsia ($P < 0.02$).

Conclusions Low PAPPA and high mean uterine artery PI in the first trimester are significant predictors of preterm delivery at <37 weeks. High maternal BMI and history of previous preterm delivery are also significant predictors of preterm birth.

EP3.24
Case study: prenatal diagnosis of Smith-Lemli-Opitz syndrome

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Background Smith-Lemli-Opitz Syndrome (SLOS) is an autosomal recessive disorder affecting approximately 1 in 20 000–30 000 births caused by homozygous or compound heterozygous mutation in the gene encoding sterol delta-7-reductase (DHCR7), which maps to chromosome 11q13. The affected gene DHCR7, on chromosome 11 codes for the enzyme dehydrocholesterol reductase which is the catalyst for the final step in the cholesterol synthesis pathway. The affected individual therefore has significantly reduced cholesterol levels leading to global anomalies in growth and development even before birth. Here we present a case of SLOS diagnosed through routine antenatal screening displaying some of the syndrome's recognised features, most notably growth restriction and failure of development of male external genitalia.

Case A white British non-consanguineous couple, with one previous healthy child born at term. At 11 + 5 weeks the nuchal translucency was 3.4 mm and combined screening gave an adjusted trisomy 21 risk of 1:228 (higher than her background risk of 1:679). The 20 week scan identified a globally small, phenotypically female infant with unilateral talipes. Diagnostic tests were declined by the patient at this point. Serial follow up scans showed profound fetal growth restriction most notable in the long bones, and microcephaly as well as additional anomalies including a single atrio-ventricular valve and low set ears on 2D and 3D ultrasound. Following discussion with the regional genetic team, the couple accepted an amniocentesis at 27 + 2 weeks, the karyotype reported as male, 46XY. The dichotomy between phenotypic and genotypic sex raised suspicions of SLOS, and subsequent microarray confirmed the diagnosis. After further counseling, the couple opted to terminate the pregnancy.

Conclusion Although the carrier rates for SLOS is estimated at 1:30 in the North and Central European population, the incidence of SLOS is much lower at 1:20 000. Thus, prenatal diagnosis of the condition is infrequent unless parental carrier status is known or there is a relevant family history. The earliest indication, in our reported case, was of increased nuchal translucency (at almost 95th centile). Further sequential ultrasound detected early onset severe growth restriction, talipes and cardiac defect. Complete failure of development of male external genitalia despite a normal 46XY karyotype led to the diagnosis, confirmed by genetic studies. The couple were later confirmed to be carriers, and prenatal gene testing will be offered in a future pregnancy.

EP3.25
Case study: Dandy-Walker variant – maternal diagnosis following prenatal diagnosis in her fetus

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Background Dandy-Walker malformation, a rare congenital anomaly that affects the cerebellum and its components affects 1 in 25 000–30 000 newborns. Dandy-Walker variant (DWV) comprises of cystic posterior mass with variable hypoplasia of the cerebellar vermis and no enlargement of the posterior fossa. It is known that many adults with DWV may be asymptomatic and incidentally diagnosed following neuroimaging for other reasons. We present a unique case wherein prenatal diagnosis of DWV in the fetus led to the same diagnosis in the asymptomatic mother.

Case A 29-year-old primigravida presented at 8 weeks of gestation for a dating scan. She followed up for her Nuchal Translucency (NT) scan which was normal (CRL 56 mm, NT 1.5 mm, Intracranial translucency 1.3 mm). This gave her a low risk of chromosomal abnormality and she returned at 19 weeks for the anomaly scan. At 19 weeks, ultrasound of the fetal brain showed a posterior fossa cyst with a hypoplastic cerebellum. Fetal MRI was performed on a 3T MR scanner which confirmed the hypoplastic cerebellar vermis, dilated 4th ventricle communicating with the cisterna magna, diagnosing Dandy-Walker Variant. No other fetal abnormalities were seen. Amniocentesis was performed which confirmed a normal karyotype. Since the mother's facies were unusual, consent was obtained for a maternal brain MRI, to look for familial cause of DWV. The maternal brain also showed findings consistent with DWV – hypoplastic cerebellar vermis, 4th ventricle communicating with a dilated cisterna magna with superior displacement of the tentorium. In addition, there were other abnormalities of the brain noted – partial agenesis of the corpus callosum, gliosis, haemorrhage in the periventricular parietal white matter, abnormal sulcation and dysplasia of the right parietal cortex.

The parents were counselled and they opted for termination of pregnancy. An uncomplicated second trimester termination of pregnancy was performed at 19 weeks 5 days. A male fetus with no external abnormalities was delivered.
Conclusion Dandy-Walker variant can be present in asymptomatic adults. The routine practice of prenatal ultrasound leads to prenatal diagnosis of abnormalities, DWV being one of these. There is a known familial association of this syndrome and usually, its manifestation runs true. However, in this case, the parents were not keen on continuing the pregnancy once the diagnosis and its potential implications were discussed. To our knowledge, this is the only case wherein a maternal diagnosis was made after prenatal diagnosis of the DWV in her fetus.

EP3.26
Ultrasound scan- accuracy in prediction of fetal weight

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Introduction Estimation of fetal weight is critical for antenatal and intrapartum decision making. In high resource settings, estimates of fetal weight are increasingly made by ultrasound, with clinical estimation of fetal weight, using palpation or measuring of symphsio-fundal height used only as method of identifying women who should receive scans. In this environment, it is essential that the ultrasound derived weight estimates are accurate. We report on an audit of the accuracy of ultrasound estimates of fetal weight within the routine clinical practice of our department.
Methods We identified 170 women in a period of 4 months from January to April 2013, who had ultrasound scans after 36 completed weeks and in whom fetal weight had been estimated. The scans were carried out by 5 ultrasonographers, using Toshiba Xario XG machines. Head circumference, abdominal circumference and femur length were measured in all cases, and weight estimated using the Hadlock C formula, via the machines' own internal software. After delivery of the baby, the ultrasound estimate was reviewed, plotted on the customised growth chart, and extrapolated to take account of the interval between the date of the scan and the date of delivery. This derived weight was compared to the actual birthweight, and the percentage variance calculated.
Results All the 170 women were singleton pregnancies delivered live at term. The influencing factors looked at were the BMI, age and parity. 60 (35%) women were with a BMI of more than 30. The women ranged from ages 16–43 years and parity 0–4, 103 women delivered babies whose birthweight was within the expected 15% of predicted weight by ultrasound scan. But the remaining 68 women had fetal weight which was either more or <15% of predicted weight. 32 (47.5%) women had fetal weight more than 25% of predicted weight and 36 (52.5%) women had fetal weight <25% of predicted weight by ultrasound scan.
Conclusions Prediction of estimated fetal weight by ultrasound scan with the help of Hadlock formula has an error of 15% to 25%. As these predictions have enormous influence on the obstetric management of the women leading to either false reassurance or unnecessary intervention in the form of induction of labour. In our retrospective study it has shown that there is a 40% room for error. The inaccuracy is more when the baby is predicted to be large for gestational age and the influencing factors include maternal BMI.

EP3.27
Contribution of preterm and preterm with lethal congenital malformation towards stillbirth rate from Malaysian tertiary hospitals

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Introduction The objective of this paper was to see if stillbirth from preterm contributed significantly to the overall stillbirth rate as well as if lethal congenital malformations (LCM) affected stillbirth rates both in preterm deliveries and in term deliveries.
Methods This is a retrospective cohort study from the National Obstetric Registry (NOR) from 1 January 2010 to 31 December 2012. NOR in an online database that captures data from 14 tertiary hospitals in Malaysia. During the 3 years there were a total of 397 521 deliveries with 2 835 cases of stillbirth. The total preterm deliveries in this period was 35 402 with stillbirth of 1 050. Chi-square test was used to analyse.
Results Preterm accounted for 6.7%, 9.3% and 10.7% of all births during 2010–2012. In 2010–2012 the stillbirth rate was 7.5, 6.8 and 6.9 per 1000 live births. Stillbirth in preterm during 2010–2012 was 1.93, 2.5 and 3.5 per 1000 live births. LCM in preterm causing stillbirth was 7.9 (2010), 6.34 (2011) and 6.60 (2012) per 1000 live births. Overall preterm in relation to stillbirth had *P*-value 0.696 (2010), 0.958 (2011) and 0.974 (2012) whilst LCM in this group with stillbirth had *P*-value 0.303 (2010), 0.362 (2011) and 0.444 (2012). Total LCM contributing to stillbirth from 2010 to 2012 had a *P*-value of 0.336, 0.400 and 0.422.
Conclusions The national perinatal mortality rate reported in 2009 and 2010 was 7.6 and 7.8 per 1000 live births. Stillbirth rate in 2010 from NOR was similar to the national average. Preterm causing fetal death was statistically not significant and LCM contribution towards preterm stillbirth and overall stillbirth rate was statistically not significant. Further studies need to be done to see factors contributing to still birth rates in Malaysia.

EP3.28
Prevalence of congenital anomalies in Dubai governmental hospital

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Introduction According to the World Health Organization (WHO) the term congenital anomaly includes any morphological, functional, biochemical or molecular defects that may develop in

the embryo and fetus from conception until birth, present at birth, whether detected at that time or not. Based on WHO report, about 3 million fetuses are born each year with major malformations. Several studies place the incidence of major malformations at about 2–3% of all live births. Despite the fact that incidence of some types of congenital anomalies has been declining during the past two decades in some countries, they are still a major cause of perinatal mortality. The purpose of this study was to find the prevalence of congenital anomalies in Dubai Governmental hospital during 2008–2012, and specifically to answer two questions: (1) What is the prevalence of congenital anomalies? (2) Is there any recent change in the prevalence of common associated factors leading to congenital anomalies?

Methods In this study we tried to assess the frequency and nature of congenital malformations (CMs) among total live births in Dubai based multinationals as well as the associated maternal and neonatal risk factors. Data were collected from the birth register and fetal medicine register retrospectively using the special data collection sheet.

Results 600 CMs were detected out of 39, 800 live births during the period of the study (2008–2012), constituting 15/1000. Males were more affected than females (1.8:1). Commonest system involved was the nervous system, followed by chromosomal abnormalities, urinary system, circulatory system, digestive system, cleft lip and palate, and respiratory, musculo-skeletal, genital organs, eye, ear, face, and neck, other congenital anomalies. Among the maternal risk factors detected were multi-parity, age of the mother at conception, maternal illness, medical disorders including diabetes, and intake of the drugs in first months. Consanguineous marriage was detected in 42.3% of cases.

Conclusions This study concluded that congenital anomalies in Dubai governmental hospital falls within the global incidence and similar in associated causes. There is also a critical need for establishing a sound reporting system for such cases and conditions to help the researchers and decision takers in planning health policies.

EP3.29
Complementary role of fetal autopsy in prenatally diagnosed congenital anomalies or unexplained fetal death; an Indian study

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Introduction Perinatal autopsy is an investigation offered to all couples who lose a fetus due to unknown reasons or who deliver a structurally malformed fetus. This is a specialised examination of the morphology of the fetus – external, internal and microscopic which helps in elucidating the finer details of organ formation and development. It complements antenatal ultrasound by helping to correlate the antenatal and post natal findings. In some cases the perinatal autopsy helps in detecting certain conditions that were not seen on antenatal scans and this sometimes changes the antenatal diagnosis thus altering the recurrence risk and probability of prenatal diagnosis in future.

Methods All cases with antenatally diagnosed structural malformations or unexplained fetal deaths in utero which led to termination of pregnancy were counselled for a detailed perinatal autopsy. A comprehensive autopsy was performed by a trained perinatal pathologist. The results of the autopsy were collated with other clinical details and investigations to arrive at a final diagnosis regarding the fetal problem and devise a plan for further pregnancies.

Results The acceptance rate for this investigation was 30% of all cases with fetal problems. In most cases a detailed autopsy helped in confirming the ultrasound based diagnosis. In a few cases there were new findings that were detected on the autopsy and actually helped in revising the final diagnosis significantly thus altering the recurrence risks.

Conclusions Perinatal autopsy by a trained Perinatal pathologist can provide answers to most cases of fetal malformations although some fetal problems still remain elusive. A multidisciplinary approach with Fetal Medicine, Genetics, Pathology and Immunology inputs may help in such cases.

EP3.30
Low first trimester PAPP-A and predictability of small for gestational age

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Introduction Low first trimester PAPP-A values in first trimester is associated with increased risk of small for gestation, pre-eclampsia and preterm delivery. There is no known adverse association for elevated PAPP- A. The aim of this study is to identify the role of low PAPP-A and a cut-off that would detect at least 70% of small for gestational age fetuses among twin and singleton gestation.

Methods This is a retrospective case series. A random group of 150 double marker reports where pregnancy outcome details were available. Parturition register reviewed and gestation, birthweight details correlated with first trimester PAPP-A values in MoMs. All PAPP-A samples were processed at the same lab (SRL Diagnostics, Mumbai). All PAPP-A samples were all obtained in the first trimester 11 weeks + 4 days – 13 weeks + 6 days gestation in the study period March 2012–January 2013. 15 samples were excluded, as the women moved out of area for delivery and had follow-up at our institute only until early part of the third trimester. Two further cases were excluded as miscarriage occurred <24 weeks. Results from 133 PAPP-A and birthweight pairs have been analysed for this study.

Results Total eligible study group = 133 Total SGA = 17 (<5th% Mediscan, Chennai). Among 17 SGA pregnancies 12 had PAPP-A < 0.7. This includes 9 preterm SGA & 3 term SGA. In total 32/133 had <0.7 PAPP-A.

Conclusion PAPP-A levels of <0.7MoM, in this study population, gave a positive predictive value of 0.73 and negative predictive value of 0.93 for SGA. Hence, as reported in current literature

there is role for PAPP-A in risk prediction for small for gestational age fetus. In our study population a cut off of 0.7 MoM helped identify most of the at-risk women.

EP3.31
Artefacts in obstetric ultrasound– a trainee's perspective. Is it a myth or a reality?

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Introduction Artefacts are incorrect information appearing on the display which does not represent the structures being imaged. Artefacts are results of improper scanning techniques, complex equipment technology and also due to ultrasound physics. They are commonly encountered in clinical practice and can pose a diagnostic challenge for trainees and residents. Artefacts are of crucial importance in obstetrics and gynaecology as they may be the cause of apprehension and anxiety when artefacts could be easily mistaken for a fetal anomaly. Hence it is extremely important to understand the basic principles of ultrasound so that one can recognize these artefacts and avoid incorrect diagnosis. The main aim of this study is to identify and discuss artefacts and their sources arising in ultrasound in clinical settings. This will lead to better understanding and to reduce errors in diagnosis by obstetric trainees.

Methods We searched the literature for evidence and databases such as Medline, Pubmed and Cochrane. We reviewed a wide range of publications. Five suitable articles were found and individual articles were looked at one by one sequentially. These articles were reviewed and an appraisal was done.

Results Various artifacts have been clearly described in the literature. Some of the common obstetric ultrasound artefacts are partial volume, attenuation, banding, reverberation, comet tail, resonance, multipath reflections, mirror image, misregistration and defocusing, ghost image, side lobes, range ambiguity, temporal resolution. It is vital to be aware of these limitations and the fact that it may be a cause of confusion in diagnosis. Visualisation in the correct plane and confirmed in at least one other plane is suggested in literature to avoid artefacts.

Conclusion Artefacts are a very common finding in ultrasound imaging. Understanding the basic physics will enable the trainees to overcome these artefacts and help them provide the best images. Combining physics, clinical history and adequate scanning techniques will be the key to high quality images. As there are no formal national or local guidelines there is a need for further research and proposal of guidelines and protocol for the benefit of patients.