PF.01 THE ROLE OF THE THYROID HORMONE MONOCARBOXYLATE TRANSPORTER 8 IN HUMAN PLACENTAL DEVELOPMENT

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Thyroid hormones (TH) are important for fetoplacental development. Monocarboxylate transporter 8 (MCT8) is a potent plasma membrane TH transporter expressed in the human placenta from 6 weeks of gestation and its expression increases significantly with advancing gestational age. MCT8 expression reduces proliferation in choriocarcinoma-like (JEG-3) cells. In order to investigate the role of MCT8 in human placental development, we transfected human wild type MCT8 or ''knocked-down'' endogenous MCT8 expression in primary cytotrophoblast cells from term placenta (CTs) and extravillous trophoblast (EVT)-like SGHPL-4 cells followed by 48 h treatment with 0 or 10 nM triiodothyronine (T3). Overexpression of MCT8 decreased viability (MTT assay) of CTs by 20% both in the presence ($p<0.001$) and absence ($p<0.01$) of T3, while downregulation of MCT8 expression resulted in increased CT viability by 20% ($p<0.01$ at 0 nM T3). Downregulation and overexpression of MCT8 in CTs did not cause a significant change in apoptosis (caspase 3/7 activity assay) nor syncytialisation (HCG ELISA). In SGHPL-4s, overexpression of MCT8 increased the effect of T3 on invasion into Matrigel by 2.5-fold compared to vector only control ($p<0.05$). Downregulation of endogenous MCT8 expression in SGHPL4s reduced apoptosis by 10% both in the presence and absence of T3 ($p<0.05$). These results indicate that MCT8 acts on trophoblast cells via both T3-dependent and T3-independent mechanisms and that the role of MCT8 varies between term CT cells and EVT-like cells. The fine-tuning of trophoblast viability, apoptosis and invasion is essential for human placental development. These results suggest that MCT8 plays a role in the regulation of trophoblast cellular function.

PF.02 ANTENATAL MANAGEMENT AND OUTCOME OF FETAL TACHYARRHYTHMIA: A 10-YEAR EXPERIENCE IN A TERTIARY FETAL MEDICINE UNIT

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Objectives: To review the antenatal management and outcomes of fetal tachyarrhythmias.
Method: Retrospective review of the management and outcomes of all fetal tachyarrhythmias between 1 January 1997 and 31 December 2006.
Results: During this period, 382 mothers were referred for fetal echocardiography for fetal dysrhythmia. Median gestation for referral was 30 weeks (range 19–41). 29 fetal tachyarrhythmias were identified. These were not associated with structural heart disease. Of the tachyarrhythmias, there were 24 cases of SVT, three cases of atrial flutter and two sinus tachycardia. In the SVT group, five fetuses were hydropic. Four of the hydropic babies were resistant to medical transplacental therapy and needed direct fetal therapy with amiodarone or adenosine. One died in the neonatal period because of prematurity and hydrops. 21 cases of SVT were successfully managed antenatally with medical transplacental therapy. From 2001 onwards, maternal flecanide therapy was rapidly introduced when there was poor response to digoxin (within 24 h). All three cases of atrial flutter required DC cardioversion postnatally. The two cases of sinus tachycardia were managed conservatively and were normal on postnatal examination.
Conclusions: In our experience, the overall prognosis for antenatally treated SVT was good. Medical transplacental therapies with digoxin or flecanide were safe and successful in reverting the SVT into sinus rhythm. Hydropic babies were likely to require direct fetal therapy.

PF.03 WITHDRAWN

PF.04 HOW EFFECTIVE IS SCREENING FOR CARDIAC ANOMALIES AND HOW ACCURATE IS THE PRENATAL DIAGNOSIS IN THE NORTHERN REGION?

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We determined what proportion of life-threatening cardiac malformations were suspected by routine antenatal screening and the subsequent diagnostic accuracy of tertiary fetal echocardiography.
Method: Four-year retrospective study of all cardiac diagnoses evaluated in the light of knowledge of all cardiac malformations arising from the matched Northern Region birth cohort.
Results: Of 750 cardiac malformations amongst live-born babies, only 181 (24%) were detected antenatally. Detection rates were highest for hypoplastic ventricles with 80% of hypoplastic left heart and 67% for hypoplastic right heart identified. However, the detection of lesions involving the outflow tracts remains disappointingly low with only 10% (4/42) of transposition of the great arteries being typical. The tertiary echocardiography diagnosis was completely accurate in 73%. For a further 16%, the main cardiac diagnosis was correct but there were additional cardiac defects present. For the 11% with an incorrect diagnosis, all had their main cardiac diagnosis changed after birth; however, none were found to have a normal heart. Common arterial trunk vs pulmonary atresia with VSD was the most common change made. The referral indications most like to prove positive was suspected abnormality of the four-chamber view (74% were abnormal) or extra-cardiac malformations (72%).
Conclusions: Only a quarter of cases resulting in a live birth had been identified by routine 20-week screening. Whilst the accuracy of tertiary echocardiography is high, overall prenatal diagnosis is unlikely to improve until further training addresses the need to include routine assessment of the outflow tracts.

PF.05 EXTRACTION AND ANALYSIS OF FETAL ECG BY TRANS-ABDOMINAL RECORDING USING MONICA AN24

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Background: Metrics of heart rate variability (HRV) are characteristic of cardiovascular autonomic dynamics; and the analysis of HRV is already a proven diagnostic tool in detecting cardiac pathologies in adults. HRV is the time record of risk rate (RR)-intervals estimated from the ECG. Analysis of fetal ECG (fECG) recorded trans-abdominally is challenging: signal-to-noise ratios are poor and fragmentation (lost data) is a significant problem. Hence, conventional approaches to HRV analysis are inappropriate.
Objective: To introduce a novel robust measure of fetal HRV and report an initial longitudinal series of 19 healthy fetuses.
Methods: Fetal RR-interval recordings were made using the Monica AN24 device in 19 pregnant women during induction of labour. For this study, only initial two-hour recordings were analysed. Raw fECG data were initially ''detrended'' using a novel Gaussian Process smoothing technique and then segmented into 5-min blocks. The frequency spectra of each block were determined using the Lomb Scargle Periodogram which inherently accommodates unevenly sampled and missing data without recourse to re-sampling. Re-sampling would only be acceptable for good SNR recordings. The HRV power was calculated in the statistically significant range (0.01 … 0.06) Hz.

Results: In 17 out of 19 cases, HRV power remained constant over a period of 2 h. In two cases, there was a significant upward trend.
Conclusion: We have demonstrated that fetal HRV power can be estimated non-invasively from the transabdominal fECG. The changes in HRV power potentially provide a sophisticated method of assessing fetal condition before and during labour.

PF.06 RADIOFREQUENCY ABLATION FOR SELECTIVE REDUCTION IN COMPLEX MONOCHORIONIC PREGNANCIES

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Objective: Monochorionic twins have placental anastomoses that, to varying degrees, create a common circulation. This presents unique challenges for selective reduction as occlusive procedures (bipolar cord occlusion, interstitial laser) are required to ablate flow in the umbilical cord to achieve asystole in the selected fetus. We describe a case series of 24 patients undergoing selective fetal reduction using radiofrequency ablation.
Study design: 24 monochorionic pregnancies (twins and triplets) were treated at our institution using radiofrequency ablation (RITA-Starburst SDE Electrosurgical Device, AngioDynamics Inc. USA) of the umbilical cord vessels at the level of insertion at the fetal abdomen. All procedures were performed under local anaesthesia. Thermal energy was applied until cessation of flow was demonstrated in the umbilical cord by pulse wave and colour flow Doppler. The 24 patients in our series consisted of 17 MCDA twins (seven with TTTs, five with fetal anomaly, four with TRAP sequence and one with severe IUGR), one set of MCTA triplets, four sets DCTA triplets (two with TTTS and two multifetal reductions). One set DCDA triplets and one MCMA twins. Gestational age at the time of the procedure ranged between 13^{+0} weeks and 27^{+4} weeks (median -18^{+1} week).

The procedure was technically successful in 100% of cases. MRI in the surviving fetuses was normal in all cases. One case miscarried, 12 have delivered and 11 pregnancies are ongoing with no complications seen on follow up scans. There were no maternal complications due to the procedure.
Conclusion: Radiofrequency ablation is a safe and effective procedure for fetal reduction in complicated monochorionic pregnancies.

PF.07 EVALUATION OF THE DOWN'S SYNDROME ANTENATAL SCREENING PROGRAMME USING DATA FROM THE BRITISH ISLES NETWORK OF CONGENITAL ANOMALY REGISTERS

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Aim: To assess information available in different regional congenital anomaly registers to enable surveillance of the Down's syndrome (DS) antenatal screening programme.
Methods: All eight regional registers (covering all births in Wales and approximately 50% in England) who are members of the British Isles Network of Congenital Anomaly Registers (BINOCAR) contributed data on maternal age, gestational age at prenatal diagnosis, outcome of pregnancy and details of local screening policies. The National Down's Syndrome Cytogenetic Register provided data for validation purposes. All cases with a diagnosis of DS and date of delivery during 2003–2006 were identified.
Results: Eight regional registers agreed to send data but not all were able to provide information on every item. There were 2445 cases of DS registered, a prevalence of 2.3 per 1000 births (range 2.1 to 2.9). The percentage of mothers of DS babies aged over 35 varied across registers from 56–65%. The prenatal detection rate was 55% (range 42% to 76%); 37% (range 31% to 61%) of prenatally diagnosed cases were diagnosed before 15 weeks of gestation and 4% after 23 weeks. The percentage of cases resulting in termination varied from 75% to 96%. Information on reasons for diagnostic procedures was available from four registries; 53% were detected as a result of a screening test, 18% following diagnostic testing for maternal age or family history and 29% following abnormal scan.
Conclusions: Detection rates, timing of diagnosis and termination rates vary widely between regions. Regional registers can provide information important for surveillance. Collection of an agreed core data set to enable appropriate monitoring of changing screening policies is recommended.

PF.08 SPINA BIFIDA – DOES LEVEL OF LESION INFLUENCE PARENTAL DECISION TO TERMINATE OR CONTINUE AN AFFECTED PREGNANCY?

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Background: UK termination rates for spina bifida are high.[1] The accurate assessment of upper lesion level represents a significant challenge, but it is only with this information that detailed prognostic information regarding mobility and continence can be attempted. Tertiary three-dimensional (3D) ultrasound is said to improve upon two-dimensional (2D), achieving diagnostic accuracy within one vertebral body in 80% of patients.[2]
Method: Parental decisions in 58 consecutive cases of isolated spina bifida referred to the tertiary Fetal Medicine Unit (2000–2008) were reviewed against level of lesion determined by 2D and from 2005, 2D+3D ultrasound.
Results: For the 22 live births, lesions commenced from C3 to S3 spanning 2–8 vertebral bodies; in 13 (60%) the upper level was L4 or lower. Two-thirds (36/58) elected to terminate with lesions commencing from T10–S1, the level was L4 or lower in a third. 19/36 consented to post-mortem examination. Recently, the level was recorded by the pathologist (without knowledge of the ultrasound findings) and corresponded exactly with the antenatal 3D ultrasound prediction in each of the five cases.
Conclusions: 3D ultrasound is proving highly accurate in determining upper lesion level; however, termination rates remain high. Whilst those who continued, vs those who terminated, the pregnancy had a greater proportion of ''lower '' lesions (L4 or below), there were equal numbers of ''lower '' lesions in each group. Final parental decision does not appear to be strongly related to the prognosis as predicted by the level and extent of lesion.

1. **Boyd PA,** Devigan C, Khoshnood B, *et al.* EUROCAT Working Group 2008, ''Survey of prenatal screening policies in Europe for structural malformations and chromosome anomalies, and their impact on detection and termination rates for neural tube defects and Down's syndrome''. *BJOG: An International Journal of Obstetrics & Gynaecology* **115**(6):689–696.
2. **Bruner JP,** Tulipan N, Dabrowiak ME, *et al*. 2004, ''Upper level of the spina bifida defect: how good are we?'' *Ultrasound in Obstetrics & Gynecology* **24**(6):612–617.

PF.09 ASSESSMENT OF PLACENTAL PERFUSION USING THREE-DIMENSIONAL POWER DOPPLER ULTRASOUND IN NORMAL PREGNANCY AND PRE-ECLAMPSIA

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Objectives: To test the hypothesis that (1) placental perfusion, as determined by three-dimensional (3D) ultrasound, decreases from the basal plate towards the chorionic plate and (2) placental perfusion is different in normal pregnancy compared to pre-eclampsia.
Methods: 10 women with normal pregnancy and 15 women with pre-eclampisa were studied. Three-dimensional power Doppler ultrasound was used to acquire individual placental volumes. Rotational measurements of placental volume were acquired using

virtual organ computer aided analysis (VOCAL™). The power Doppler signal were then semi-quantified within the "histogram facility ", which generates the three indices of perfusion, namely vascular index (VI), flow index (FI) and vascular flow index (VFI). The Student's t test was used to test for statistical significance.
Results: The results are quoted as the mean (standard error).
Conclusions: All three of the perfusion parameters (VI, VFI and FI) were lower in pre-eclampsia compared to normal pregnancy in all regions of the placenta. However, there was wide variability in the readings obtained. Hence we concluded that overall, these differences are not statistically significant. A decrease in perfusion from the basal plate towards the chorionic could not be demonstrated either. A larger study is planned. However, given the high variability of the readings, a similar conclusion may be reached.

Abstract PF.09

Vascular Flow Index			Vascular Index		Flow Index	
Pre-Eclampsia (PE)		Normal	PE	Normal	PE	Normal
Basal plate 20.3 (3.5)	26.5 (7.1) p = 0.82	50.1 (9.2)	41.7 (3.2) p<0.01	42.8 (9.5)	13.8(3.8) p = 0.38	
Mid region 8.2(3.7)	9.5(6.8) p = 0.74	20.4(7.3)	26.1(1.7) p = 0.73	33.4(2.3)	3.4(2.6) p = 0.57	
Chorionic Plate	18.7(6.8) 18.8(5.18) p = 0.13	36.1(9.7)	37.1(3) p = 0.32	44.4(5)	9(2.7) p = 0.01	

PF.10 REPRODUCIBILITY OF FETAL MYOCARDIAL PERFORMANCE INDEX

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Objective: The objective of the study was to establish the reproducibility of Doppler measurements to assess fetal cardiac function.
Methods: Measurements were made to 42 women undergoing normal singleton pregnancy from 20 weeks to 38 weeks gestation. Blood flow through the four cardiac valves was examined with Doppler. For the atrioventricular valves, the velocity and duration of the E and A waves and the interval (a) between E/A complexes were recorded. For the outflow valves the duration (b), peak and average velocity of flow in systole were measured. For each measurement, we used the average values from three consecutive complexes. Measurements were repeated to assess reproducibility. Myocardial performance index (MPI) was calculated as (a–b)/b.
Results: Mean left ventricular (LV) MPI was 0.346 with standard deviation of 0.142 and for right ventricular (RV) MPI were 0.405 and 0.153, respectively. For repeated assessment of MPI, the mean difference for LV MPI was −0.03 (95% limits of agreement (LA), −0.281 to 0.275) and for RV MPI was −0.02 (95% LA, −0.32 to 0.28). Mean Ve/Va for the left heart was 0.68 with standard deviation of 0.072 and for the right heart were 0.716 and 0.109, respectively. The mean difference for Ve/Va ratio for the left heart was 0.01 (95% LA, 0.203 to 0.223) and for the right was −0.01 (95% LA, −0.151 to 0.131).
Conclusions: Fetal MPI can be reliably measured and may be used to study the development of fetal cardiac function and may eventually provide better understanding of changes which may predispose to adult cardiac disease.

PF.11 ABSENT FETAL STOMACH – THE IMPLICATIONS

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Background: We sought to examine the diagnostic and prognostic implications of the finding of an absent stomach on routine obstetric ultrasound screening.
Methods: We searched our computer database over the previous decade for all cases in which this finding was described and reviewed the details of each case. We then cross-referenced with our local paediatric surgical unit and perinatal pathology department to obtain outcomes.
Results: We identified 84 cases. 24 had associated gastro-intestinal tract and respiratory anomalies; 22 had abnormal karyotypes (10 trisomy 18s, five trisomy 21s and one each of other aneuploidies or other karyotypical abnormalities); six had neuromuscular syndromes; three had major central nervous system anomalies; seven had renal anomalies causing anhydramnios; five had other genetic syndromes; two had placental insufficiency leading to anhydramnios; eight were found to have normal stomach appearances and had normal outcomes and seven had a normal outcome despite persistently absent stomach on ultrasound examination.

Of these 84, 26 underwent termination of pregnancy; nine suffered in utero fetal demise; eight died in the neonatal period; three died in infancy; 44 had a live birth and survived infancy and five outcomes were not obtained.
Conclusions: A persistently absent stomach on ultrasound scanning is associated with a guarded prognosis – with an incidence of abnormal karyotype of 29% and a high incidence of associated structural abnormalities. In only 9.2% of persistently absent stomachs was the outcome normal. We have not been able to explain why these normal fetuses did not demonstrate stomach "bubbles" on ultrasound.

PF.12 VESSEL DIAMETERS IN GROWTH RESTRICTED FETUSES

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Background: It is believed that fetuses with intrauterine growth restriction (IUGR) have compensatory cerebral redistribution of blood flow; however, there is little known regarding other vasculature tree compensatory mechanisms. Vasodilatory factors such as nitric oxide, Vasoactive Intestinal Polypeptide (VIP) and adrenomedullin have been shown to be increased in placentas and umbilical cord blood of fetuses with intrauterine growth restriction.[1–4] However, no study to date has provided an in vivo assessment of vessel diameters in growth restricted fetuses.
Methods: 72 appropriate for gestational age (AGA) fetuses and 11 IUGR fetuses underwent serial ultrasound examinations between 24 and 36 weeks gestation. Fetal biometry, estimated fetal weight, amniotic fluid index and Doppler analysis were calculated at each visit. Maximal vessel diameters for the umbilical, middle cerebral, carotid, ascending aorta, descending aorta, renal and femoral arteries were measured using power Doppler during systole utilising the cine loop function. Vessel diameters were then standardised per kilogram for each measurement. ANCOVA statistical analysis was performed to assess the impact of gestational age and IUGR on vessel diameter/kilogram.
Results: Vessel diameters/kg were significantly larger in all vessels in IUGR fetuses in comparison to AGA fetuses. Umbilical p = 0.008, middle cerebral p = 0.005, femoral p = 0.023, renal p = 0.021, descending aorta p = 0.008 and ascending aorta p = 0.004.
Conclusions: Although mechanisms are thought to exist in the IUGR fetus whereby blood flow is preferentially diverted to essential organs, this is the first study that has shown that generalised vasodilatation occurs in the growth restricted fetus.

1. **Rizzo G,** *et al*. Blood levels of vasoactive intestinal polypeptide in normal and growth retarded fetuses: relationship with acid-base and haemodynamic status. *Early Hum Dev* 1995;**41**(1):69–77.
2. **D'Anna R,** *et al*. Neurokinin B and nitric oxide plasma levels in pre-eclampsia and isolated intrauterine growth restriction. *BJOG* 2004;**111**(10):1046–50.
3. **Di Iorio R,** *et al*. Adrenomedullin is increased in the fetoplacental circulation in intrauterine growth restriction with abnormal umbilical artery waveforms. *Am J Obstet Gynecol* 2000;**182**(3):650–4.

4. **Tikvica A,** *et al*. Nitric oxide synthesis in placenta is increased in intrauterine growth restriction and fetal hypoxia. *Coll Antropol* 2008;**32**(2):565–70.

PF.13 DOES DOPPLER HAVE A ROLE IN MONITORING TYPE 1 DIABETIC PREGNANCY?

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Background: There is controversy regarding the role of Doppler in the assessment of fetuses of pre-gestational type 1 diabetes mellitus (T1DM) pregnancy.
Objective: To compare fetal and placental haemodynamics between type 1 diabetic and normal pregnancy.
Methods: 29 T1DM mothers were prospectively recruited to this longitudinal study involving a fetal ultrasound at 13 weeks, 30 weeks and 36 weeks gestation. For comparison, 30 cross-sectional healthy controls were recruited for each trimester. Doppler insonation of the umbilical artery (UA), umbilical vein (UV) and ductus venosus (DV) was performed in each trimester and middle cerebral artery (MCA) Doppler was performed in the third trimester.
Results: There were no differences between the cohorts in the first trimester. In the second trimester the pulsatility index (UAPI) was higher in the diabetic cohort (1.2 ± 0.2 vs 1.1 ± 0.2, $p < 0.05$). In the third trimester the DVPI was lower in diabetics than in the normal cohort (0.52 ± 0.20 vs 0.68 ± 0.19, $p<0.05$) but there was no difference in UAPI. Patients with pre-pregnancy vasculopathy had higher third trimester UAPI than those without. Macrosomic fetuses and those with a poor perinatal outcome had a lower MCAPI in the third trimester.
Conclusions: There are differences in the patterns of change of arterial and venous Doppler with advancing gestation between normal and T1DM pregnancy. These findings suggest that the fetal circulation in type 1 diabetic pregnancy differs to normal pregnancy, which may be a response to maternal hyperglycaemia.

PF.14 THIRD TRIMESTER UMBILICAL AND MIDDLE CEREBRAL DOPPLER IN TYPE 1 DIABETIC PREGNANCY – CAN TREND PREDICT RISK?

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Objective: To prospectively evaluate the umbilical and middle cerebral arteries in type 1 diabetes mellitus (T1DM) pregnancy and to correlate findings with glycaemic control, macrosomia, polyhydramnios and perinatal outcome.
Methods: In this prospective observational study, 93 patients with PGDM who underwent 105 full term pregnancies were prospectively recruited from the multidisciplinary diabetic pregnancy clinic. Fetal ultrasound was performed at 30 weeks, 33 weeks and 36 weeks' gestation. Patients also had a fetal ultrasound performed one week prior to delivery. Doppler insonation of the umbilical artery and middle cerebral artery was performed in each trimester and liquor volume was assessed.
Results: T1DM patients with poor glycaemic control in early pregnancy had increased umbilical artery resistance (UAPI) at 33 weeks (0.98 ± 0.24 vs 0.88 ± 0.19, $p<0.05$) and 36 weeks (0.93 ± 0.19, vs 85 ± 0.19, $p<0.05$). For those infants admitted to the neonatal intensive care unit, the 36-week MCA PI was significantly lower than those not admitted ($p<0.001$), thus leading to a higher cerebroplacental ratio (CPR: ratio of UAPI to MCAPI). The presence of pre-pregnancy vasculopathy, duration of PGDM, macrosomia or third trimester polyhydramnios did not affect the Doppler indices.
Conclusions: There appears to be an association between early pregnancy maternal glycaemic control and placental resistance in the third trimester. A decrease in MCA PI, suggesting cerebral redistribution, may be useful to predict at-risk fetuses. These findings suggest that the fetal circulation in type 1 diabetic pregnancy differs to normal pregnancy, which may be a response to maternal hyperglycaemia thus emphasising the importance of strict glycaemic control in the periconceptual period.

PF.15 REFERRAL PATTERNS AND FETAL ECHOCARDIOGRAPHY FINDINGS IN MOTHERS AT HIGH-RISK OF CONGENITAL HEART DISEASE: A 10-YEAR EXPERIENCE

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Objectives: To evaluate the referral patterns and fetal echocardiography findings in high-risk mothers over a 10-year period in a Tertiary Fetal Medicine Centre.
Methods: Retrospective review of all pregnant women who underwent fetal echocardiography between 1 January 1997 and 31 December 2006.
Results: 5182 mothers were referred for fetal echocardiography and a total of 7252 fetal echocardiography examinations were carried out during this period. The main reasons for referral were: i) previously affected child with congenital heart disease (CHD) – 26% ii) abnormal initial screening scan – 22% iii) maternal cardiac condition – 10% iv) infant of diabetic mothers – 8% and v) increased fetal nuchal translucency – 3%. 985 (19%) echocardiograms were reported as abnormal. The majority of the abnormalities were identified in mothers who had abnormal initial screening scan (62%). The echocardiogram was also abnormal in 9.5% of cases with increased fetal nuchal translucency and in 4.9% of infants of diabetic mothers. In those with previously affected child and maternal cardiac condition, the echocardiogram was abnormal in 2.5% and 1.8%, respectively.
Conclusions: Abnormal screening ultrasound scans (mid-trimester) and increased nuchal translucency (11 weeks to 14 weeks) had the highest yield in identifying CHD in mothers at high risk of having babies with CHD. Infant of diabetic mothers also have an increased risk warranting fetal cardiac screening for CHD. Normal fetal echocardiogram provides reassurance for the remainder of parents especially those with a previous child with a congenital heart disease or in those mothers with cardiac condition.

PF.16 PRENATAL DIAGNOSIS AND OUTCOME OF FETUSES WITH TRANSPOSITION OF THE GREAT ARTERIES

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Aim: To understand the spectrum and outcome following prenatal diagnosis of transposition of the great arteries (TGA).
Method: Over an eight-year period, all pregnancies in which the fetus was identified as having TGA on ultrasound examination at a Fetal Medicine Centre were reviewed. These data were compared with the Regional Congenital Anomalies Register (CAR).
Results: Prenatally, 75 fetuses were diagnosed with TGA. 16 cases were classified as simple (with intact septum or ventricular septal defect only). The remaining 59 were classified as complex i.e. they had additional intra-cardiac malformations. Following prenatal counselling, 18 (24%) couples chose termination of pregnancy. Of the 57 (76%) continuing pregnancies, three were stillbirths and five were lost to follow-up. Of the 49 live births, seven were neonatal deaths without surgery. 42 babies underwent surgery and 34 have survived to date. At the time of prenatal diagnosis, the overall

survival for simple and complex TGA were 92.8% and 55.3%, respectively (excluding terminations and lost to follow-up).

During the same period, there were 198 cases of TGAs identified by the Regional CAR. Of these, 122 were simple and 76 were complex based on the above definition. Only 11% of the simple TGAs were identified prenatally. The one year survival was 92.2% for simple and 64.3% for complex TGAs (excluding terminations).

Conclusions: The majority of prenatally diagnosed TGAs were complex and these lesions had a poor overall outcome. The antenatal detection rate for simple TGAs is very low. This emphasises and supports the importance of including outflow tract assessment during mid-trimester scanning.

PF.17 THE INCIDENCE OF CONGENITAL HEART DISEASE AND OUTCOMES OF FETUSES BORN TO MOTHERS WITH CARDIAC CONDITIONS

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Objectives: To determine the incidence of congenital heart disease (CHD) and outcomes of fetuses born to mothers with cardiac condition over a 10-year period at a tertiary Fetal Medicine Unit.

Method: Review of the outcomes of all pregnant women with cardiac condition referred for fetal echocardiography between 1 January 1997 and 31 December 2006.

Results: During this period, 5182 high-risk mothers were referred for fetal echocardiography. Of these, 503 (9.7%) were because of maternal cardiac condition. 12 mothers had an abnormal fetal echocardiogram report. Postnatally, nine were confirmed to have CHD. This gives incidence of 1.8% for identifying CHD in this group of mothers. 287 mothers were booked at Birmingham Women's Hospital and we were able to trace the outcome of their fetuses in 246 (86%). The majority of mothers had midline septal defects (106) or outflow tract obstruction (56). The median maternal age was 27 years (range 14–43 years). There were three fetal losses. 131 had normal, 86 had a caesarean section (31 elective and 55 emergencies) and 32 had instrumental delivery. The median gestational age was 39 weeks (24–44 weeks) and median birth weight was 3210 g (620–4580 g). 10.8% were born prematurely and 12.2% had babies with low birth weights (<2500 g).

Conclusions: In our cohort of mothers with cardiac conditions, there was a low incidence of affected fetuses with CHD. We did not notice any significant adverse antenatal or neonatal events. Normal fetal echocardiogram plays an important role in providing reassurance to the majority of these high-risk mothers.

PF.18 CLINICAL VALUE OF FETAL BRAIN MRI: INDICATIONS AND LIMITATIONS

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Background: Magnetic resonance imaging (MRI) is increasingly used to complement ultrasound (USS), providing further information regarding brain abnormalities. We compared the two diagnostic modalities, to determine which clinical situations benefit most from MRI.

Methods: We performed a retrospective study of all patients that had a fetal brain MRI between March 2006 and May 2008 (n = 60) in a tertiary Fetal Medicine Unit. The MRI and ultrasound reports were compared, as well as the fetal and neonatal outcomes, where available.

Results: Of 19 cases with isolated ventriculomegaly on USS, 16 were confirmed by MRI. Although the remaining three cases had additional abnormalities on MRI, all had severe ventriculomegaly on USS. In eight cases where ventriculomegaly was seen in combination with other USS findings, MRI provided useful information in four. Agreement between USS and MRI was noted in all 10 cases following a singleton death in a monochorionic twin pair. In all six cases with a suspected cerebellar abnormality, MRI was normal. In six cases where USS indicated a suspected isolated cystic abnormality, MRI agreed in five.

In two cases of microcephaly, MRI diagnosed severe gyral immaturity in one, confirmed by fetal autopsy, and a normal brain in the other pregnancy which continued to term.

Conclusions: MRI provides useful clinical information when USS suspects (1) ventriculomegaly associated with other brain abnormalities, (2) suspected cerebellar abnormalities (3) microcephaly.

It was not found to be useful in isolated ventriculomegaly, isolated cystic abnormalities or following a singleton death in a monochorionic twin pair.

PF.19 CAN ANTE-NATAL BOWEL DILATATION IN GASTROSCHISIS HAVE ANY PREDICTIVE FACTORS FOR COUNSELLING?

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Objective: To assess the clinical significance of ante-natal bowel dilatation in gastroschisis and its correlation with outcome. A prior literature search revealed no consensus as to the parameters consistently predictive of neonatal morbidity and mortality.

Design: A retrospective case note review between 1 January 1998 and 31 December 2007

Setting: Fetal Management Unit, Manchester

Sample: From 222 cases of ante-natal diagnosed gastroschisis, 146 mother-infant pairs were analysed further. All infants received neonatal care at St Mary's Hospital.

Methods: Data were split into groups on the basis of bowel dilatation: under 17 mm, under 20 mm and 20+ mm. Neonatal outcomes were reviewed to assess the prognostic ability of each antenatal parameter

Results: There are significant increases in the number of associated atresias, number of operations, time on total parenteral, episodes of central line sepsis, time to full enteral feeding and length of hospital stay when bowel is dilated to 17+ mm. 80% of neonatal/perinatal and deaths occurred in infants displaying at least 20 mm of small bowel dilatation in the ante-natal period.

Conclusions: Although a proportion of babies with dilated bowel will have an uncomplicated post natal period, counselling of parents when babies have dilated bowel should include the increased chance of post natal complications. When bowel is dilated to 20+ mm, the short gut syndrome should be discussed.

PF.20 WITHDRAWN

PF.21 WITHDRAWN

PF.22 THE PREDICTIVE VALUE OF MIDDLE CEREBRAL ARTERY INDICES FOR FETAL ANAEMIA AT THE TIME OF THE FIRST INTRAUTERINE TRANSFUSION

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Aim: To investigate the validity of the Mari "action line" in rhesus isoimmunisation and intrauterine blood transfusion.

Methods: In 2000, Mari *et al* suggested a 12% false positive intervention rate in the prediction of moderate/severe anaemia when fetal middle cerebral artery (MCA) PSV exceeds 1.55 MoMs. We evaluated our experience since 2000 using middle cerebral artery peak systolic velocity (MCA PSV) correlated with the fetal haemoglobin at the first intrauterine transfusion (IUT).

All cases requiring IUT between 1 January 2000 and 31 January 2009 were identified. All notes were reviewed to determine the

gestation at IUT, antibody type, MCA value prior to transfusion and fetal haemoglobin at the first IUT.

Results: 54 women underwent fetal blood sampling (FBS) for suspected fetal anaemia during the study period. Mari *et al* in 2000 defined moderate fetal anaemia as a fetal Hb 2–7 g/dL less than expected for gestation and severe fetal anaemia as fetal Hb >7 g/dL less than expected for gestation. The median gestation in our cohort was 28.2 weeks. In all cases, the fetal haemoglobin was less than two standard deviations (SDs) below the mean expected for that gestation. However when the degree of fetal anaemia was assessed, the false positive rate for fetal anaemia 5–7 g/dL less than expected for gestation was 18.5% and for severe fetal anaemia where the fetal haemoglobin is 8–10 g/dL less than expected is 53.7%.

Conclusions: MCA PSV 1.55 MOMs as the action line may identify many cases with moderate anaemia, some of whom are unlikely to need immediate intervention. Therefore the action line warrants further refinement.

PF.23 ACCURACY OF FETAL WEIGHT ESTIMATION BY TWO-DIMENSIONAL ULTRASOUND AT LIMITS OF VIABILITY AND IMPLICATIONS ON CLINICAL DECISIONS

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Objective: To assess the accuracy of the formulae for estimation of fetal birth weight and whether the formulae are more accurate in preterm or growth restricted fetuses (IUGR) at the limits of viability.

Design and Methods: This was a single centre retrospective comparative study to evaluate 44 published, fetal weight estimation formulae in 137 singleton fetuses delivered at the limits of viability (<1000 g). All fetuses had the last scan within 7 days of delivery (65 preterm and 72 IUGR fetuses). The accuracy of the formulae in both groups were assessed by comparing their absolute errors, mean absolute per cent errors, predictions within 10% and 15% of error and limits of agreement by Bland-Altman analysis.

Results: The mean absolute error ranged from 62±45 g (Roberts) to 356±95 g (Jordan) in preterm and 61±51 g (Hadlock) to 345±81 g (Jordan) in IUGR. Most of the Hadlock formulae (75% within 10% error) gave better predictions within 10% and 15% of error in IUGR compared to preterm group. In both preterm and IUGR, the Hadlock formulae tend to underestimate the fetal weight. The use of specific formulae targeted for very-low-birth-weight fetuses did not improve the accuracy of fetal weight estimation; and error in estimation is not significant between symmetrical and asymmetrical IUGR.

Conclusions: Our data show decreased accuracy of weight estimation throughout different categories of formulae with systematic and random errors being greater in growth restricted fetuses. These findings will have implications in counselling and management decisions regarding place of delivery.

PF.24 DOES FETAL MRI ADD USEFUL DIAGNOSTIC INFORMATION FOR COUNSELLING, PREGNANCY AND POSTNATAL PLANNING FOR BABIES WITH ANTENATAL CNS ANOMALIES?

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Background: A multidisciplinary antenatal central nervous system (CNS) clinic was developed to provide integrated, clinical assessment, diagnosis and pregnancy planning.

Aim: Assess value of antenatal MRI in this multidisciplinary antenatal CNS service.

Method: Retrospective audit (March 2002 to March 2008). Data were collected and analysed from case notes, fetal medicine reports and MRI reports.

Results: 172 referrals were made to the regional fetal medicine unit (FMU). Data were available on 142 referrals. 65 referrals were local, 74 network and three non-network. There were 70 completed pregnancies and 62 terminations. Completed pregnancies had an average of three USS in FMU. 14 were late terminations. 33 were referred for fetal MRI. MRI results correlated with USS in 25 cases. MRI provided additional information in eight cases. Postnatal MRI was performed in 16 cases. The postnatal and fetal MRI correlated in 13.

Conclusions: Conclusions: Fetal MRI is useful in confirming USS CNS diagnosis and providing additional diagnostic information. It is vital for optimum antenatal counselling, pregnancy and postnatal planning, for both ongoing pregnancies and the significant number of women who chose late termination. Our practice is to refer cases with antenatal CNS anomalies for fetal MRI in the second trimester and increasingly a repeat MRI in the third.

Abstract PF.24

USS	Fetal MRI	Postnatal MRI
Ventriculomegaly	Ventriculomegaly, cortical thinning	N/A
Ventriculomegaly	Ventriculomegaly, basal ganglia destruction	Antenatal MCA infarction
Partial agenesis CC	Normal	Heterotopia
Microcephaly	Lissencepahly	Lissencephaly
Dandy Walker	Agenesis of inferior cerebellar vermis	N/A
Ventriculomegaly	Colpocephaly, Ventriculomegaly	N/A
Arachnoid cyst, agenesis CC	Agenesis CC, Cortical thinning	N/A
Hydrancephaly	Aqueductal Stenosis	Hydrancephaly

CC, corpus callosum

PF.25 THREE-DIMENSIONAL MR RECONSTRUCTION AND EVALUATION OF THE CEREBELLUM TO WHOLE-BRAIN RATIO IN INTRAUTERINE GROWTH RESTRICTION FETUSES

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Fetal growth restriction often results in iatrogenic preterm delivery and a complicated neonatal period. In the longer term, these children may have neurodevelopmental delay and behavioural disorders.[1] Animal models and neonatal studies have demonstrated a reduction in cerebellar growth in intrauterine growth restriction (IUGR)[2]: however, there are no studies accurately measuring regional brain volume in IUGR fetuses.

We conducted three-dimensional reconstruction of the fetal brain and calculated total cerebral and cerebellar volumes using a technique described previously as MR snapshot volumetric reconstruction.[3] This allows accurate volumetry of the fetal brain in the presence of motion.

12 IUGR fetuses and eight normal controls were imaged, and the cerebellum to total brain volume ratio calculated. All the IUGR pregnancies were secondary to placental insufficiency and demonstrated reduction in growth velocity; three had cerebral redistribution, four had absent end diastolic flow and five had venous Doppler changes. There were no Doppler abnormalities, growth disorders, or structural abnormalities in the control group. The median gestation at the time of scan was 27^{+4} vs 26^{+6} in IUGR and normal pregnancies, respectively. The cerebellum to total brain volume ratio increased as gestation increased in both groups; however, it was significantly reduced in IUGR pregnancies ($p = 0.006$, gestation corrected). The gestation at delivery was significantly lower in IUGR pregnancies compared with normal pregnancies (median = 32^{+2} vs 38^{+2}, $p<0.001$).

This study demonstrated that in severe IUGR, cerebellar growth is compromised, despite cerebral redistribution. This aberration in regional brain growth may contribute to developmental delay seen in these children.

1. **Tolsa CB,** Zimine S, Warfield SK, *et al*. Early alteration of structural and functional brain development in premature infants born with intrauterine growth restriction. *Pediatr Res* 2004;**56**:132–8.
2. **Thompson DK,** Warfield SK, Carlin JB, *et al*. Perinatal risk factors altering regional brain structure in the preterm infant. *Brain* 2007;**130**:667–77.
3. **Jiang S,** Xue H, Glover A, Rutherford M, Rueckert D, Hajnal JV. MRI of moving subjects using multislice snapshot images with volume reconstruction (SVR): application to fetal, neonatal, and adult brain studies. *IEEE Trans Med Imaging* 2007;**26**:967–80.

PF.26 PROGNOSIS IN ISOLATED MILD TO MODERATE FETAL VENTRICULOMEGALY: A SYSTEMATIC REVIEW

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Objectives: We aimed to ascertain risk of aneuploidy, infection and neurological abnormality for the fetus diagnosed with isolated mild to moderate ventriculomegaly (10–15 mm). We also aimed to compare the neurological outcome between symmetrical vs asymmetrical and stable vs progressive ventriculomegaly.
Methods: A systematic review was conducted. Literature was identified by searching two bibliographical databases MEDLINE and EMBASE between 1994 and 2007 without language restrictions. The data extracted were inspected for clinical and methodological heterogeneity. Overall rates and CIs for each prognostic factor were calculated. Where there were comparative data, the odds ratio was calculated.
Results: The search strategy yielded 2150 relevant citations of which 28 studies (1496 pregnancies) were included in the review. The overall rate of infection was 1.5% and chromosomal abnormality was 5% (95% CI, 3% to 7%), respectively. The risk of neurological abnormality regardless of karyotype or infection screen was 14% (95% CI, 10% to 18%) and this reduced to 12% (95% CI, 9% to 15%) when both chromosomes and infection screen were normal. The risk of neurological abnormality was significantly lower in stable compared to progressive ventriculomegaly (odds ratio: 0.29 (95% CI, 0.15 to 0.58); heterogeneity $I^2 = 0\%$; $p = 0.54$). No significant differences were detected when symmetrical vs asymmetrical ventriculomegaly were compared (odds ratio: 0.91 (95% CI, 0.34, 2.41); heterogeneity $I^2 = 0\%$; $p = 0.96$).
Conclusion: This systematic review provides the physician with some estimates of prognosis in cases of isolated mild to moderate ventriculomegaly.

PF.27 WITHDRAWN

PF.28 OUTCOMES OF BABIES WITH SEVERE RHESUS DISEASE FOLLOWING IN-UTERO TRANSFUSIONS – A 10-YEAR EXPERIENCE

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Background: In-utero transfusion (IUT) has transformed the management and outcome of severe Rhesus disease.
Objective: To assess the outcomes of babies that had IUT in a tertiary Fetal Medicine Centre.
Methods: Retrospective analysis of all cases of IUT for severe Rhesus disease over a 10-year period.
Results: 263 IUT were performed in 80 pregnancies. Median IUT was three (range 1–8). Antibodies involved were: anti-D (84%); anti-Kell (13%) and anti-c (3%). 19 (24%) cases were hydropic: of these, three were intra-uterine deaths, two neonatal deaths and three were born elsewhere. 74 were live births (92.5%); median gestation 34 weeks (range 24–38), 11 babies ⩽30 weeks, five born elsewhere. Of the 69 infants born in our centre, three died in the neonatal period and one infant at 19 months, sudden infant death syndrome (SIDS). Median cord haemoglobin was 10.7 g/dL (range 5.7–20.9). 29/69 (42%) babies required 45 exchange transfusions (range 1–5). 57/69 (83%) babies required 151 top-up blood transfusions (median 2, range 1–20). Of those ⩽30 weeks, 9/11 survived (82%), two had retinopathy of prematurity and three had cranial ultrasound abnormalities. At two years, 7/9 babies were normal and two had developmental delay. 53/56 (95%) surviving babies >30 weeks had normal neurodevelopment at one year except one with sensori-neural deafness.
Conclusions: IUT is safe and does not appear to increase postnatal morbidity. In our experience, it has reduced the need for postnatal exchange transfusions. However, top-up transfusions are more likely.

PF.29 MATERNAL PLASMA AND AMNIOTIC FLUID ANGIOGENIC GROWTH FACTORS AND THEIR RECEPTORS (SVEGFR-1 AND STIE-2) IN MONOCHORIONIC TWIN PREGNANCIES COMPLICATED BY SEVERE TWIN-TO-TWIN TRANSFUSION SYNDROME

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Objective: To investigate the maternal plasma and amniotic fluid (AF) angiogenic growth factor(s) (AGF) and receptor(s) concentrations in twin-to-twin transfusion syndrome (TTTS).
Study groups: Prospective study of MC twins complicated by TTTS (n = 23). Plasma and amniotic fluid AGF were measured prior to treatment. In 91.3% there was severe, and in 8.6% mild, TTTS. These were compared to uncomplicated dichorionic (DC) (n = 12) and monochorionic (MC) (n = 7) twin pregnancies.
Methods: Plasma VEGF-A, VEGF-C, VEGF-D, PlGF, Ang-1 and Ang-2 and receptors, sVEGFR-1 and sTie-2 were measured by ELISA and/or FASTQuant human angiogenesis arrays.
Results: Plasma VEGF-C concentrations were significantly lower (10-fold) in pregnancies with TTTS as compared to uncomplicated twin pregnancies ($p<0.0001$). Maternal plasma Ang-2 and sVEGFR-1/PlGF ratio were significantly increased (two-fold) in TTTS ($p<0.01$). Logistic regression noted plasma VEGF-D was increased in severe TTTS (+22%), when cardiovascular compromise was present in both the recipient and the donor twin ($p<0.01$). These differences were independent of intertwin fetal size, AF volume or the number of placental AVA. The AF concentrations of VEGF-C, VEGF-A, Ang-1 and sVEGFR-1/PlGF ratio were increased compared to paired maternal plasma concentrations ($p<0.0001$) whilst AF concentrations of PlGF, Ang-2 and sTie-2 were significantly lower than plasma concentrations ($p<0.0001$). No significant association between maternal plasma and AF concentrations of AGF were noted. The overall survival of this TTTS cohort was 69.6% live births (32/46) with ⩾one survivor in 87% (20/23).
Conclusions: TTTS is associated with abnormal maternal circulating and AF concentrations of AGF. These findings constitute an imbalance in the homeostasis of angiogenesis in this pathological condition.

PF.30 MATERNAL SERUM MARKERS OF PLACENTAL DAMAGE AFTER FETOSCOPIC LASER ABLATION IN MONOCHORIONIC TWIN PREGNANCIES COMPLICATED BY SEVERE TWIN-TO-TWIN TRANSFUSION SYNDROME

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Objective: To assess baseline levels and changes in maternal serum alphafetoprotein (MSAFP) and f-βHCG after fetoscopic laser ablation (FLA), as markers of placental damage.

Design: Prospective case-cohort study. monochorionic (MC) twins complicated by twin-to-twin transfusion syndrome (TTTS) (n = 23) and a cohort of uncomplicated dichorionic (DC) (n = 12) and MC (n = 6) twin pregnancies were studied.
Methods: Serum samples were collected from the controls and MSAFP and f-βHCG measured. Samples were taken, prior to FLA and then at intervals (6 h, 24 h and one week) after treatment.
Results: The median MoM were not significantly different in uncomplicated DC or MC twin pregnancies (MSAFP 1.85 and fβHCG 1.66; MSAFP 1.40 and fβHCG 1.70, respectively). The median MoM were both elevated in MC twin pregnancies complicated by severe TTTS MSAFP 3.10 ($p<0.01$), fβHCG 5.75 ($p<0.0001$) as compared to uncomplicated twin pregnancies. In addition, post-FLA, the median MSAFP increased significantly at 6 h by 445% (636.6 U/ml) and remained elevated at one week (553.4 U/ml; $p = 0.001$). No significant difference in median fβHCG was noted post-FLA ($p = 0.36$). This rise in MSAFP appeared independent of the number of placental anastomoses coagulated, the total energy used or number of survivors. After FLA, the survival of fetuses to the end of the neonatal period was 59.9%, with ⩾1 survivor in 80% of pregnancies. In a small cohort in which amniodrainage alone was performed, no rise in MSAFP was noted.
Conclusions: MSAFP and fβHCG are increased in TTTS indicating an association with abnormal placentation. Post-FLA, a significant rise in MSAFP was noted for up to a week post-coagulation. This was not noted after amniodrainage.

PF.31 THE EFFECT OF FETOSCOPIC LASER ABLATION ON MATERNAL PLASMA AND AMNIOTIC FLUID ANGIOGENIC GROWTH FACTORS AND THEIR RECEPTORS IN MONOCHORIONIC TWIN PREGNANCIES COMPLICATED BY SEVERE TWIN-TO-TWIN TRANSFUSION SYNDROME

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Background: Twin-to-twin transfusion syndrome (TTTS) carries a significant risk of perinatal loss. Fetoscopic laser ablation (FLA) coagulates the abnormal placental arteriovenous anastomoses (AVA) integral to the pathophysiology of the condition and is the treatment of choice. FLA increases placental permeability and possibly trophoblast destruction that may affect homeostasis of placental angiogenic growth factors.
Objective: To investigate the effect of FLA on the circulating maternal plasma and amniotic fluid (AF) angiogenic growth factor concentrations in twin pregnancies complicated by severe TTTS.
Design: Prospective cohort study of monochorionic (MC) twins complicated by severe TTTS (n = 20).
Methods: Basal VEGF A, C and D, PlGF, angiopoietins (Ang) 1 and 2 and the soluble receptors, sVEGFR-1 and Tie-2 were measured in plasma and AF samples by ELISA and/or FASTQuant human angiogenesis arrays. Plasma levels were measured prior to and at six-hour, 24-hour and one-week post-FLA. Amniotic fluid (AF) samples were taken immediately prior to and after the FLA.
Results: Post-treatment at least 85% had survival ⩾1 twin (45% two survivors, 40% one survivor, 15% in-utero death of both twins). A median of eight AVAs were coagulated. Despite a significant increase in MSAFP post-FLA, only PlGF showed a significant difference after FLA (transient decrease, $p = 0.0314$). There were no significant differences in AF angiogenic factors after FLA, except VEGF-D, which increased by 8.4% ($p = 0.034$). Logistic regression noted that these changes were independent of intertwin size, number of survivors or the amnioreduction in mL/wk.
Conclusion: FLA causes increase placental permeability but limited evidence of trophoblast destruction with minor affects on the homeostasis of angiogenic factors.

PF.32 IMPROVING SELECTION FOR ANTENATAL CORTICOSTEROID THERAPY IN POTENTIAL PRETERM BIRTH

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Aim: To evaluate the subsequent delivery outcome following prophylactic maternal antenatal steroid medication in women presenting with precursors of early preterm delivery.
Objective: A prospective study was conducted of all singleton potential preterm births (<34 week) in order to calculate the ratio of treated to subsequent preterm delivery among patients completing a course of corticosteroids.
Results: For the 12 months to December 2008, 5% (414/8985) presented < 34 weeks with the potential for preterm birth and 277/414 (67%) completed a course of steroids; 80/8985 (1%) actually delivered of whom 58/80 (72.5%) completed corticosteroids (ratio of 5 to 1 for treated to delivered cases (277/58). Among 215 presenting with painful contractions, the diagnosis of labour was accepted in 10 cases (5%) and rejected in 205 cases (95%) ; five (2.4%) subsequently delivered before 34 weeks (after 4 weeks and 3 weeks, 4 days, 48 h and 2 h, respectively). Overall among 215 presenting with suspected premature labour, 118 (55%) completed a course of steroids including seven who delivered (ratio, 17:1). One case of 45 with minor haemorrhage delivered. The remainder (n = 154) presented with substantial APH, PSROM, materno-fetal complications and 132 received steroids including 50 of 63 who delivered (ratio of 2.6 to 1 for treated to delivered case).
Conclusions: In some categories the decision to give steroids is self evident. In this centre where the clinical diagnosis of preterm labour is over 95% accurate, the overuse of steroids (ratio 17:1 for treated to delivered cases) in this cohort could be significantly reduced and also for minor haemorrhage.

PF.33 ANTENATAL INTERVENTION IN THE MANAGEMENT OF LOWER URINARY TRACT OBSTRUCTION: A SYSTEMATIC REVIEW OF EFFECTIVENESS WITH META-ANALYSIS

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Congenital urinary tract obstruction can lead to perinatal mortality and morbidity with pulmonary hypoplasia and renal dysplasia. Bladder drainage by serial vesicocentesis, vesicoamniotic shunting or by open bladder surgery can be used to relieve the obstruction, attempting to avoid these sequelae. The objective of our systematic review was to determine the effectiveness of antenatal intervention by bladder drainage on perinatal survival in fetuses with congenital urinary tract obstruction.

We conducted electronic searches across many databases (database inception–2009) and checked reference lists. Two reviewers independently selected the articles without language restrictions. Data were extracted on study characteristics, quality and results to construct 2×2 tables. Pooled odds ratios (OR) were used as summary measures of effect, results were stratified according to predicted fetal prognosis using fetal urinalysis. There were 23 articles that met the selection criteria, 493 fetuses, 252 vesicoamniotic shunt cases. Meta-analysis was performed using studies of a high quality. Bladder drainage improved perinatal survival compared to no drainage (OR, 2.81; 95% CI, 0.94 to 8.45, $p = 0.06$). The group with poor predicted prognosis had a marked improvement (OR, 8.05 95% CI, 1.22 to 52.87, $p = 0.03$) compared to the group with good prognosis (OR, 2.44 95% CI, 0.61 to 9.86, $p = 0.21$). Our conclusion is that the current evidence shows an improvement in

survival with antenatal bladder drainage compared to no treatment being most marked in the group with poor predicted prognosis. These findings should be interpreted with caution due to the potential for bias with observational studies. A randomised controlled trial (PLUTO) is currently recruiting.

PF.34 EFFECT OF GESTATIONAL AGE ON THE ACQUISITION OF MIDDLE CEREBRAL ARTERY WAVEFORMS IN TWIN PREGNANCIES FROM 22 WEEKS' GESTATION TO TERM

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Objective: To evaluate the impact of gestational age on successful acquisition of middle cerebral artery (MCA) waveforms in twin gestations.
Methods: Eight experienced research sonographers received practical training in assessment of MCA blood flow in twin gestations participating in a large multicentre twin study. The success rate of acquisition of Doppler indices was analysed over time in a consecutive cohort of 300 twin pairs. Images were submitted to a central data quality assurance committee. Regression analysis was used to determine the effect of advancing gestational age and other factors on successful MCA Doppler interrogation.
Results: A combined total of 1681 ultrasound examinations of 300 twin pregnancies were performed between 22 weeks' gestation and term. 85% of pregnancies were dichorionic. 74% of examinations were successful in obtaining a satisfactory MCA waveform for both fetuses. The overall frequency of unsuccessful examinations increased with advancing gestation (correlation coefficient 0.169, $p<0.001$) with a significant fall in MCA acquisition beyond 34 weeks. In the third trimester, the frequency of successful studies was higher for the non-presenting fetus (71% vs 57% for the presenting fetus ($p<0.001$).
Conclusions: Successful acquisition of the MCA waveform in twin pregnancies correlates with gestational age. As multi-vessel Doppler studies are increasingly being incorporated into fetal assessment of twin pregnancies, the lower prospect of obtainable MCA waveforms beyond 34 weeks, particularly in the presenting fetus, renders this modality less applicable at advanced gestational age.

PF.35 SUCCESSFUL UMBILICAL ARTERY DOPPLER IN TWIN PREGNANCIES FROM 22 WEEKS' GESTATION TO TERM: EXPERIENCE FROM A LARGE POPULATION STUDY

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Objective: To determine the success rate of accurate Doppler interrogation of the umbilical artery in twin pregnancies from 22 weeks' gestation until term in a large population study.
Methods: Following training, eight experienced research sonographers assessed umbilical artery Doppler in twin gestations participating in a large multicentre study on twin growth patterns. The success rate of acquisition of Doppler indices was analysed over time in a consecutive cohort of 300 twin pairs. Images were submitted to a central data quality assurance committee. Regression analysis was used to determine which factors affected successful acquisition of the umbilical artery waveform.
Results: A total of 1681 ultrasound examinations were carried out on 300 twin pregnancies by eight research sonographers between 22 weeks' gestation and term. 85% of pregnancies were dichorionic. Multivariate regression analysis demonstrated that successful examination of the umbilical artery was weakly dependent on sonographer experience (defined by the cumulative number of scans; odds ratios (OR) 0.978, $p = 0.002$) but declined with increased body mass index (OR, 0.961, $p<0.0001$), advancing gestation (OR, 0.902, $p<0.0001$) and was more challenging in the presenting fetus (OR, 0.528, $p<0.001$). Umbilical artery Doppler success was unaffected by oligohydramnios (OR, 0.821, $p = 0.626$) or by chorionicity (OR, 1.09, $p = 0.289$).
Conclusions: This study highlights the impact of factors which could pose technical difficulties in examination of umbilical artery in twin pregnancies. As Doppler indices are increasingly being factored into critical decisions regarding the management of twin pregnancies, the accuracy of such determinations is paramount.

PF.36 A LARGE COHORT STUDY OF OUTCOMES OF MONOCHORIONIC TWIN PREGNANCIES COMPLICATED BY SEVERE TWIN-TO-TWIN TRANSFUSION SYNDROME TREATED BY FETOSCOPIC LASER ABLATION

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Critical appraisal of the literature indicates that fetoscopic laser ablation (FLA) is the optimal treatment for severe twin to twin transfusion syndrome (TTTS). Since October 2004, we have provided a supraregional service for this fetal therapy. In a four-year period, 119 monochorionic (MC) twin pregnancies complicated by severe TTTS were assessed and considered to warrant FLA. The maternal age of the cohort was 35 yrs (median; 95% CI, 25.4 to 36.8). And the gestational (GA) at diagnosis was 20 weeks (95% CI, 19.5 to 20.6). Quintero staging indicated that 3.4% were stage II, 87.4% stage III and 9.2% stage IV disease. All patients underwent FLA with regional anaesthesia using standard fetoscopic technique performed by two operators. In 84% of cases, operative amnioinfusion was utilised. Planned selective procedure was used and five (range 4–9) AVA were coagulated using a Diode laser. Therapeutic amniodrainage was performed at the end of the procedure (1600 ml (95% CI, 900 to 4600). The total survival of this cohort was 62.6% and in 84% of pregnancies there were one or two fetal survivors. There was 2I UD in 15.9%, one livebirth (LB) in 42.8% and two LB in 42.6% of cases. The GA at delivery (LB) was 33 weeks (95% CI, 31.8 to 32.8). Elective delivery was advised between 34 and 36 weeks. In three fetuses (2% of post-FLA survivors) there was ventriculomegaly noted post-FLA (in two TOP performed). In six babies (4%) there was MRI/US evidence of CNS abnormality in neonatal period. These data indicate that outcomes in this large single centre cohort are similar to internationally published data.

PF.37 THREE-DIMENSIONAL MAGNETIC RESONANCE IMAGING RECONSTRUCTION AND BRAIN VOLUMETRY IN INTRAUTERINE GROWTH RESTRICTION FETUSES

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Fetal growth restriction often results in iatrogenic preterm delivery, and a complicated neonatal period. In the longer term, these children may have neurodevelopmental delay and behavioural disorders.[1]

Analysis of the fetal brain using Magnetic Resonance Imaging (MRI) has been restricted to subjective analysis as objective analysis is hampered by fetal motion. We conducted three-dimensional reconstruction of the fetal brain and calculated total cerebral volume using a technique described previously as MR snapshot volumetric reconstruction[2] to enable volumetric quantification of the fetal brain.

12 intrauterine growth restriction (IUGR) fetuses and eight normal controls were imaged, and the cerebellum to total brain

volume ratio calculated. All the IUGR pregnancies were secondary to placental insufficiency and demonstrated reduction in growth velocity; three had cerebral redistribution, four had absent end diastolic flow, and five had venous Doppler changes. There were no Doppler abnormalities, growth disorders, or structural abnormalities in the control group. The median gestation at the time of scan was 27^{+4} vs 26^{+6} in IUGR and normal pregnancies, respectively. Total brain volume increased as gestation increased in both IUGR and normal pregnancies (median = 107 355 vs 95 257 mm^3). There was no significant difference in total brain volume between both groups. The gestation at delivery was significantly lower in IUGR pregnancies compared with normal pregnancies (median = 32^{+2} vs 38^{+2}, $p<0.001$).

This study demonstrates that even in severe IUGR, total brain volume remains comparable to that of uncomplicated pregnancies. The developmental delay faced by these children may be the result of aberrations in regional brain development.

1. **Tolsa CB,** Zimine S, Warfield SK, *et al*. Early alteration of structural and functional brain development in premature infants born with intrauterine growth restriction. *Pediatr Res* 2004;**56**:132–8.
2. **Jiang S,** Xue H, Glover A, *et al*. MRI of moving subjects using multislice snapshot images with volume reconstruction (SVR): application to fetal, neonatal, and adult brain studies. *IEEE Trans Med Imaging* 2007;**26**:967–80.

PF.38 GASTROSCHISIS – A WORRYING TREND

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Objective: To review in detail the rising incidence of gastrochisis in a tertiary maternity unit and correlate with known risk factors.
Study design: Retrospective review of antenatally diagnosed fetal gastroschisis cases over a 10-year period.
Results: There were 68 473 deliveries from 1998 to 2007 inclusive during which time there were 26 antenatally diagnosed fetal gastroschisis cases (3.8/10 000 deliveries).The incidence rose from 1.23/10 000 deliveries during the first half of the decade to 6.1/10 000 in the second half ($p<0.001$). There was a marked rise in 2007 with ten cases diagnosed (12.01/10 000 deliveries $p<0.00002$).

62% of the mothers were nulliparous and 30% of the remainder had a history of preterm labour. The average age of the mothers was 23.3 years with 42% less than 20 years old. 92% were single and 48% were unemployed. 44% of mothers were smokers with 15% admitting to use of recreational drugs.

The median gestation at delivery was 35^{+6} with an average birthweight of 2.18 kg (range 1.34 kg to 2.9 kg). There was a 56% cesarean section rate, 21.4% of which were elective procedures.

There was one intrauterine death and one early neonatal death. The remaining 24 babies underwent succesful surgical repair with an average hospital stay of 52.9 days.
Conclusions: The rising prevalence of gastroschisis is a trend acknowledged worldwide. The need for close antenatal monitoring, high caesarean delivery rate and length of neonatal stay post repair has significant resource implications. The incidence of gastroschis in our unit peaked at 12.01/10 000 deliveries in 2007. No significant change in risk factors was noted over the decade.

PF.39 ISOLATED DUODENAL ATRESIA IS ASSOCIATED WITH A LOWER RISK OF TRISOMY 21 COMPARED TO NON-ISOLATED DUODENAL ATRESIA

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Objective: To determine the rate of trisomy 21 (T21) in isolated compared with non isolated duodenal atresia (DA) and the outcome at one year of age.
Method: All DA cases registered in the Northern Congenital Abnormality Survey (NorCAS) between 1998 and 2007 were included. Regional survey data were used to calculate the incidence of DA.
Results: 72 cases of DA were identified giving a population incidence of one in 8579. The overall risk of T21 with DA was 30.5% (22/72). The risk of T21 with isolated DA was 22% (9/41) increasing to 42% (13/31) when other anomalies were present. An antenatal diagnosis was only made in 49% (35/72).

Pregnancy Outcome: 53 (74%) were alive at one year. Eight opted to terminate the pregnancy (including two late terminations at 28 weeks and 32 weeks for DA with T21). There was one spontaneous abortion and four antepartum stillbirths (two had DA with T21, one had DA+T21+ cardiac anomaly and one had multiple anomalies). Of six neonatal deaths, one had anencephaly, one had tracheal agenesis, one had VATER syndrome and two had associated cardiac anomalies with T21.
Conclusions: The risk of T21 with DA is widely quoted as 33%. This figure, however, includes isolated and non-isolated cases. This risk may be refined using a lower risk (22%) for isolated DA or increased to 42% when DA is non-isolated. Furthermore, non-isolated DA may indicate an additional syndromic diagnosis. This information may be used in prenatal counselling to aid decisions regarding further prenatal testing and subsequent pregnancy management.

PF.40 NUCHAL TRANSLUCENCY SCREENING FOR DOWN'S SYNDROME IN A DEDICATED MULTIPLE PREGNANCY CLINIC: A PATIENT SURVEY

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Objectives: To identify the uptake and factors that influence acceptance of nuchal translucency (NT) scanning as a screening test for aneuploidy in women with multiple pregnancy.
Design: Prospective questionnaire-based survey.
Setting: A dedicated multiple pregnancy clinic at a tertiary referral unit in Birmingham.
Methods: Women attending the clinic were interviewed at their anomaly scan appointment and they all completed a questionnaire.
Results: 120 consecutive women were recruited. The test was offered to 79% of women.17% booked and had an initial scan after 13^{+6} of gestation. Therefore 95% of eligible women were offered the test.68% received counselling by midwives, 31% by doctors.97% recorded that clear information were given and in 58% this included a written leaflet. 48% did accept the scan whereas 49% did not. The most common reason for not accepting was, that the woman would not act on a high risk result or consider termination 75%. 19% of the women did not want a screening test, 4% did not have enough information. Of the 64% of the women who accepted the test, 63% commented that the NT scan was very reassuring.
Conclusions: 79% of the women attending our clinic were offered NT screening (95% of all those eligible for the test). The take up rate of screening was 48%. This compares very similarly to our local singleton population where uptake of second trimester screening is less than 50%.The most frequent reason for declining NT screening was that the woman felt it would not influence the ongoing management of the pregnancy.

PF.41 INTRA-OPERATOR AND INTER-OPERATOR REPRODUCIBILITY OF FETAL THYROID CIRCUMFERENCE MEASUREMENTS

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Background: Recent guidelines recommend monitoring the size of the fetal thyroid using high resolution ultrasound in pregnant

women with elevated TSH receptor antibodies and/or on antithyroid drugs. Prior to introducing such an examination, it is essential to assess the reproducibility of thyroid measurements as follow-up examinations may be performed by different operators.

Objectives: To assess intra-operator and inter-operator variability in ultrasound measurements of fetal thyroid circumference.

Methods: The fetal thyroid gland was examined using transabdominal ultrasound. Two consecutive measurements of fetal thyroid circumference were performed by a single observer in 20 low risk women in order to assess intra-observer variation (10 at 20 weeks and 10 at 36 weeks). For assessment of inter-observer variation, the examinations were performed by two observers in a random fashion on a further 20 women of varying gestations between 20 and 36 weeks. Data analyses were performed using paired t-tests and correlation coefficient.

Results: Mean fetal thyroid circumference increased from 26.925±3.0 mm (mean±SD) at 20 weeks to 51.755±5.2 mm SD at 36 weeks. Repeat observations were highly correlated both for repeat measures of the same observer and between different observers (correlation coefficients all >0.99). There were no systematic differences between repeat measures either intra (mean difference 0.01±0.04 mm; $p = 0.54$) or inter-observer (mean difference 0.01±0.04 mm; $p = 0.86$)

Conclusions: It is possible to reliably reproduce measurements of the fetal thyroid circumference.

PF.42 ESTABLISHING APPROPRIATE POPULATION-SPECIFIC NORMAL RANGES FOR FETAL THYROID MEASUREMENTS

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Background: Recent guidelines recommend fetal ultrasound for detection of fetal goitre should be performed in pregnant women with elevated TSH receptor antibodies and/or on antithyroid drugs. However, there are large differences in the published normative data.

Objectives: To examine dimensions of the fetal thyroid in our population and compare this to the published norms.

Methods: The fetal thyroid gland was examined in 60 low risk women with no history of endocrine disease between 20 and 36 weeks gestation. Thyroid circumference and the AP diameter of each lobe were measured. Neonatal Guthrie results were obtained.

Results: Mean thyroid circumference was on average 2.6±0.6 mm (mean±SEM) higher than gestational-age adjusted norms for US (Ranzini) data, a difference of 0.4 of a standard deviation or 8%. 93% of values were within the 5th–95th percentile reference range. By contrast our data appeared quite different to Israeli (Achiron) data: mean thyroid circumference was12±0.6 mm (24%) below their mean, with the majority of cases below the 2.5th percentile (92%) and only 8% within the normal range. Compared to Italian (Radaelli) data: thyroid AP measurements were within the normal range in 98% of cases, although 90% were above their mean.

All babies studied had a normal Guthrie test.

Conclusions: Ultrasound detection of fetal goitre requires identification of appropriate normative data for the local population. Our population appears acceptably close to the norms previously published in the US and Italy.

PF.43 DISTRIBUTION OF BIRTHWEIGHT DISCREPANCY IN TWIN PREGNANCIES

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In multiple pregnancies increasing discrepancy in birthweight has been associated with adverse outcome but few studies have compared the incidence of discrepant birthweight between monochorionic (MC) and dichorionic (DC) twins.

We used the electronic patient records to identify all twin pregnancies and their chorionicity in women booked for delivery at the Princess Anne Hospital, Southampton from January 2003 to June 2008.

There were 212 dichorionic and 98 monochorionic twin pregnancies and 29 where chorionicity had not been recorded. We excluded three pregnancies where one twin died *in utero* more than one week before delivery (two MC, one DC) and five where the pregnancy miscarried (two MC, three DC). We expressed the discrepancy as the difference in weight between the babies as the percentage of the larger twin's birthweight. The mean discrepancy was 12.4% (range 0–58.2%) for monochorionic twins and 12.1% for dichorionic twins (range 0–69%). Twin birthweight discrepancy has previously been categorised as minimal if less than 15%, moderate from 15% to 30% and severe if >30%. The numbers and percentage of twin pairs falling into each category is shown in the table. Using Fisher's Exact Test there was no significant difference in the distribution of birthweight discrepancy between monochorionic and dichorionic twins ($p = 0.854$).

Dichorionic twins are genetically more diverse than monochorionic, but the similar distribution of birthweight discrepancy suggests that intrauterine influences have a greater role in determining differences in weight than genetic predisposition.

Abstract PF.43

Discrepancy	Mild (<15%)	Moderate (15–30%)	Severe (>30%)	Total
Monochorionic	64 (68%)	26 (28%)	4 (4%)	94
Dichorionic	147 (71%)	51 (24%)	10 (5%)	208

PF.44 AN AUDIT OF THE POSTNATAL MANAGEMENT OF ANTENATALLY DETECTED HYDRONEPHROSIS

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Background: Fetal hydronephrosis is detected in 0.5% of pregnancies by ultrasound (US) and may indicate pathology such as ureteropelvic junction obstruction or vesicoureteral reflux. A previous audit of antenatally detected hydronephrosis in Newcastle from 1998–2001 found only 44% of babies managed appropriately. Following this an integrated service run by a renal sonographer was instituted in 2006. This repeat audit assesses accordance with guidelines.

Methods: A retrospective audit was performed of cases with fetal hydronephrosis at 34 week scan in Newcastle, between 1 January 2006 and 1 March 2008; all were extracted from a bespoke database and records. 87 cases were identified and audited to 6 months postnatal age unless prior discharge.

Results: 6/7 standards were met – 100% requiring a postnatal US received one (90% within 10 day time frame), 95% of patients requiring discharge after post-natal US were discharged (standard 100%). 97% requiring a three-month US received it (standard 90%), 100% requiring discharge after the three-month US were discharged, and 100% requiring a six-month US or a MAG3 scan by 6 months received them.

One standard was not met; only 50% of cases requiring a plasma creatinine measurement before 6 months had one taken (standard 90%).

Conclusions: The introduction of guidelines coordinated by a renal sonographer has lead to a dramatic improvement in the management of antenatally detected hydronephrosis, with 97% receiving appropriate radiological follow-up after birth, 86% within the set time limits. The audit highlights problems obtaining a blood sample

for creatinine at the time of venepuncture for MAG3 injection, which needs addressing.

PF.45 MAGNETIC RESONANCE IMAGING OF THE PLACENTA AT 1.5 TESLA

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Fetal growth restriction (FGR) is a serious complication of pregnancy in which perinatal mortality and morbidity are significantly increased compared to normally grown infants. Placental insufficiency is a major cause of FGR and accumulating evidence indicates that several aspects of placental structure and function are often altered in this condition. MRI provides quantitative indices that may be used in non-invasive structural and functional assessment of the placenta. Previous work in the placenta at 0.5 T demonstrated differences in tissue relaxation times in complicated pregnancies.[1] Our hypothesis is that at increased field strengths of 1.5 T, these differences could be further defined and be of use in FGR in *utero*.

Methods: 20 women without pregnancy complications underwent a single MRI examination at 1.5 T between 22 and 38 weeks gestation. T1 and T2 relaxation times were assessed. Women were placed feet first in the magnet bore to reduce potential for claustrophobia, on a lateral tilt to reduce veno-caval compression and the acquisition time was limited to 30 min.

Results: These data represent the first measurements of these parameters at this field strength. Furthermore, the trends seen, with a sharp decline in T1 across gestation, suggest that improved analysis of placental heterogeneity will be possible at this field strength. Morphometric analyses of placental samples collected following delivery are being performed. Ultimately, comparisons between normal and FGR groups will determine whether MRI could be used to distinguish FGR in *utero*.

1. **Gowland PA,** Freeman A, Issa B, *et al*. In vivo relaxation time Measurements in the human placenta using Echo Planar Imaging at 0.5 T. *Magn Res Imag* 1998;**16**:241–247.

PF.46 OUTCOMES FOR ANTENATALLY DIAGNOSED SMALL OR ABSENT STOMACHS

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Objectives: To study outcome of fetuses with ultrasonographically diagnosed small or absent stomachs

Methods: Retrospective review of all fetuses on our database with ultrasonographically detected small/absent stomachs between January 1996 and December 2008. Data were collected from the Wessex Fetal Medicine and Wessex Antenatally Detected Anomaly (WANDA) registers. Gestational age, amniotic fluid volume, associated structural abnormalities and karyotypes were correlated with immediate postnatal findings.

Results: 48 cases with either a small (n = 17) or absent (n = 31) stomach were identified. Polyhydramnios was present in 31% (15/48). Additional structural anomalies were detected antenatally in 20% (3/15) of the polyhydramnios group and in 61% (20/33) of those with normal liquor volume. Among those who had karyotyping, the prevalence of aneuploidy was 17% in each group. There were a total of five cases with oesophageal atresia in our study group.

Median gestational age at birth was 37 weeks (range 25–41). Of the 41% (20/48) with no additional antenatally detected anomalies, 50% (10/20) had anomalies detected postnatally, including four with oesophageal atresia. In those with polyhydramnios, perinatal mortality was 29% including one stillbirth and three neonatal deaths. In those with normal liquor volume (n = 23), there were four intrauterine and four neonatal deaths (perinatal mortality 34%). In total, associated structural or chromosomal anomalies were detected in 73% (11/15) of the group with polyhydramnios and 76% (25/33) of the group without.

Conclusion: A small or absent stomach is associated with a guarded prognosis. In this group, polyhydramnios did not appear to be related to outcome.

PF.47 ABNORMAL PLACENTAL MORPHOLOGY DETECTED BY ROUTINE ANTENATAL ULTRASONONGRAPHY – CORRELATION WITH OBSTETRIC OUTCOME AND HISTOLOGY EXAMINATION

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Antenatal ultrasound is an established technique to identify fetal abnormalities which may lead to increased perinatal morbidity or mortality. As machine resolution has improved, detection of placental anomalies has increased. Recent studies have highlighted placental shape, morphology and echotexture as important in determining pregnancy outcome.[1]

During the past 18 months we have detected five patients with abnormal placental morphology at routine 12 week and 20 week antenatal ultrasound scans. Sonographic abnormalities included multiple hypoechoic vesicles throughout the placenta, placental calcification (such that the placenta was equiechogenic with bone), placental lakes and a cupcake placenta (narrow base with thick chorionic disc). Following the identification of placental anomalies, antenatal surveillance was increased. The obstetric outcome included one intrauterine fetal death, three cases of intrauterine growth restriction (IUGR) and two appropriately grown, developmentally normal infants. Histopathology confirmed ultrasound findings in all cases. Histology diagnoses for specific anomalies were: multiple hypoechoic vesicles–placental mesenchymal dysplasia, placental calcification–33% infarction with perivillous calcium deposition, cupcake placenta–extension peripheral infarction and chorionic regression, significant fibrin deposition. Placental lakes were confirmed histologically but showed normal third trimester villi elsewhere in the placenta.

This case series suggests that abnormal placental morphology detected on antenatal ultrasound correlates well with histological abnormalities. Although abnormal placental morphology is uncommon, such appearances on routine antenatal ultrasound should be identified and if present, additional surveillance for fetal growth and placental insufficiency should be undertaken.

1. **Toal,** *et al*. *AmJOG* 2008;**198**:330.e1–7.

PF.48 ESTIMATING FETAL WEIGHT AND ACTUAL FETAL WEIGHT IN DICHORIONIC TWINS: ACCURACY AND CLINICAL SIGNIFICANCE

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Background: Twins are at higher risk of morbidity and mortality and the common causes are preterm delivery and growth abnormalities. In twin pregnancies it is standard to monitor fetal growth and size to guide management decisions.

Methods: 42 consecutive dichorionic twin pregnancies delivered > 30 weeks gestation were reviewed to evaluate: i) accuracy of fetal weight estimation (EFW) of actual birthweight (BW) when scan was undertaken within 12 days of delivery; ii) percentage classified small for gestational age (SGA) defined as weight below the 10th centile using local population-based singleton vs dichorionic twin specific birthweight charts; iii) if either chart was better at

determining those admitted to Special Care Baby Unit (SCBU) and other neonatal morbidities.

Results: Accuracy: 68% EFW were within 10% of BW (mean error 8.92%, SD 6.77). SGA as defined by population vs twin specific charts: see table below.

Admission to SCBU: Singleton vs Twin chart–8.33% vs 5.95% of twins below the 10th centile admitted to SCBU. There were no neonatal deaths and no significant morbidities (ventilation, chronic lung disease, neurological morbidity etc.) in <10th centile group for either chart.

Conclusions: Our accuracy of ultrasonographic EFW is comparable with other studies. The difference between centile classification for singleton vs twin specific charts suggests that twin-specific charts should be used in clinical practice. Need for admission to SCBU and morbid outcomes is unpredictable based on weight alone.

Most likely, the leading cause of growth retardation is twining itself.

Abstract PF.48

Birthweight <10th Centile	Singleton Chart	Twin Chart
Twin 1	19.05%	4.76%
Twin 2	33.33%	16.66%

PF.49 RETROSPECTIVE REVIEW OF MONOCHORIONIC TWIN PREGNANCIES COMPLICATED BY TWIN REVERSED ARTERIAL PERFUSION

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Background: Twin reversed arterial perfusion (TRAP) sequence is a serious uncommon complication of monochorionic twin pregnancies. It complicates one in 35 000 pregnancies and is associated with a perinatal mortality rate of up to 75% if untreated.

Aim: To examine the incidence and outcome of TRAP sequence in West Midlands, UK

Methods: Retrospective review of monochorionic twin pregnancies complicated by TRAP sequence presented from 2000–2008.

Results: Median gestation of presentation of TRAP sequence was 14 weeks.

13/27 cases had active intervention while 14/27 were managed conservatively. Excluding terminations of pregnancy (TOP), there was no difference in the incidence of live birth ($p = 0.4815$) or stillbirth ($p = 0.5185$) whether or not patients were treated.

In 7/27 cases, ultrasound examination suggested abnormal anatomy of the pump twin (PT) which included cystic hygroma, tetralogy of Fallot and cerebral ventriculomegaly and enlarged liver.

In 5 cases the PT was hydropic and in 10 cases, there was evidence of cardiac decompensation.

In 9/27 cases, there was evidence of a rudimentary aorta in the acardiac twin and this was associated with hydrops in 6/9 cases. Presence of rudimentary aorta was not associated with hydrops in the PT.

6/8 IUDs occurred at 16 weeks gestation or less.

Conclusions: Small numbers precluded detailed analysis. TRAP sequence is associated with a very high perinatal mortality even when treated. Longitudinal studies needed to assess long-term neurological outcomes of survivors.

PF.50 FETAL SURVEILLANCE USING PATTERN RECOGNITION COMPUTER SOFTWARE

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Background: The assessment of fetal wellbeing is fraught with difficulty. The biophysical profile uses a number of parameters, one of which is fetal movements. We aim to revisit the biophysical profile using pattern recognition software instead of the human eye. We present some preliminary data.

Methods: Nine women with a normal pregnancy between 24 and 36 weeks gestation were recruited to the study. These patients were scanned for 1 min (Voluson E8 machine (GE, Kretz)) and fetal movements were recorded onto DVD. These 1-min recordings were evaluated using two forms of pattern recognition software called optic flow and block based motion analysis.

Results: There were nine women with 1-min DVD recordings (540 min of data). Compared to the human eye, block based motion analysis correctly identified fetal movement in 23% of cases. Block based motion analysis correctly identified no fetal movement in 26% of cases. Optic flow analysis was used in two cases but this method was abandoned as it was clearly inferior to block based motion analysis.

Conclusion: Optic flow is also known as dense motion field analysis. Block based motion analysis is also called motion estimation. The latter uses vectors for block of pixels and is widely used in current video compression standards. Our preliminary data suggest that of the two methods of analysis, block based motion analysis shows greater promise. We plan to conduct a larger study to investigate its potential further.

PF.51 PREPARING FOR IMPLEMENTATION OF NON-INVASIVE PRENATAL DIAGNOSIS INTO NATIONAL HEALTH SERVICES PRACTICE – THE RAPID PROJECT

LS Chitty. *On behalf of the RAPID team, Institute of Child Health, London, UK*

Non-invasive prenatal diagnosis (NIPD) using cell free fetal DNA (cffDNA) in maternal plasma is a reality for fetal sex determination and RHD status in high risk women. The prospects of widespread use for the diagnosis of single gene disorders and Down's syndrome screening/diagnosis have been raised in the research arena and may well be introduced in clinical practice in some countries soon. However, before clinical implementation much evaluation is required.

We have recently been awarded an National Institute for Health Research (NIHR) programme grant (RAPID) to undertake much of the evaluation required. We will:

1. Confirm laboratory standards for NIPD for:
   a. Fetal sex determination
   b. Single gene disorders
   c. Down's syndrome (DS)
2. Evaluate NIPD for those indications using the ACCE framework (Analytic and Clinical validity, Clinical utility and Ethical, legal and social aspects) including:
   a. Evaluating cost effectiveness
   b. Determining couples' choices, preferences and needs
   c. Considering wider ethical, legal and social issues
   d. Developing competences for health professionals
3. Develop an implementation plan for use by commissioners to establish NIPD as a National Health Services (NHS) service.

To do the work required we need close collaboration with bodies such as the National Screening Committee and UK Genetic Testing Network (UKGTN) to ensure the right data are collected, but we also need the support of fetal medicine and genetics units in England.

Here we will explain the study and how you can help in this exciting project which will result in safer prenatal diagnosis for families.

PF.52 ISOLATED SEVERE FETAL VENTRICULOMEGALY: OUTCOME AND ROLE OF CEPHALOCENTESIS IN MANAGEMENT

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Objective: To determine outcome of antenatal diagnosis of isolated severe fetal ventriculomegaly (ISVM); to assess the role of cephalocentesis in management.

Design: Retrospective review (2000–2008) of 45 cases referred to a tertiary referral Fetal medicine unit.
Background: Outcomes in cases of severe ventriculomegaly (atria of lateral ventricle >15 mm) are poorly reported. There is a deficit of large population-based studies in the literature. We describe the natural history of cases of severe ventriculomegaly and outcomes of those with standard management and those selected for cephalocentesis.
Methodology: A search of the Fetal Medicine Database (PIA Viewpoint) was used to identify all cases with severe fetal ventriculomegaly. Cases of mild (10–12 mm) and moderate (12–15 mm) were reviewed to assess progression and these were included.
Results: 45 cases of severe fetal ventriculomegaly were identified. Median gestation at referral was 26.9 weeks (range 19–40). Associated abnormalities were present in 57.8% (26/45). There were 19 cases of isolated severe ventriculomegaly. Cephalocentesis was performed in six cases. All resulted in perinatal loss. The remaining macrocrania (HC>95th centile) cases were delivered by caesarean section (nine) vaginal delivery (two). The 10 live born infants were followed up (6 months to 6 years): 50% had severe handicap, 40% had mild handicap and 10% a normal outcome (WHO classification).
Conclusions: Counselling cases of ISVM is difficult due to uncertain prognosis. In continuing pregnancies, parents need meaningful information about outcomes, survival and brain function. Our series indicates that the neurodevelopment outcome was poor in the majority of cases.

PF.53 CONFINED PLACENTAL MOSAICISM: RATE OF AMNIOCENTESIS AND PREGNANCY OUTCOME

SK Pankhurst, S Richards, HA Mousa. *Queen's Medical Centre, Nottingham, UK*

Objectives: To examine the rate of amniocentesis and pregnancy outcome among pregnant women who had a diagnosis of confined placental mosaicism following chorionic villus sampling.
Material and Methods: Cases were identified from fetal medicine, cytogenetic and molecular genetic databases. Data were extracted regarding demographic details indication for invasive testing, ultrasound findings, result of the test, options discussed, pregnancy complications and pregnancy outcomes.
Results: 35 cases had a diagnosis of confined placental mosaicism (CPM) made after examination. All attended for counselling and further referral to clinical genetic department were made when appropriate. 14 women (40%) opted for amniocentesis. A normal follow-up results were obtained in 12/14 cases. 12 women (34%) had termination of pregnancy without amniocentesis. Pregnancy complications included miscarriage (3/35; 9%), intrauterine fetal death (1/35; 3%), pre-eclampsia (1/35; 3%), growth restriction (3/35; 9%); preterm labour (1/35; 3%). Facial cleft lip and palate was diagnosed postnataly in one case. Overall, our live birth rate was 18/35 (51%) with a mean birth weight of 3.28 kg and none required admissions to the neonatal unite.
Conclusion: CPM is a counselling challenge for both fetal medicine and clinical genetics specialists. Our current rate of amniocentesis is lower than that previously reported. Further work is required to examine factors affecting decision making following the diagnosis of CPM. The overall 51% live birth rate highlights the impact of the diagnosis on the course of pregnancy and the need for close monitoring.

PF.54 FIVE YEARS' EXPERIENCE OF ULTRASOUND DETECTION OF CONGENITAL ANOMALIES AT SINGLETON HOSPITAL

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Background: Ultrasound (USS) detection rate of congenital anomalies varies from 28.4% to 98%.[1–3] Detection rate of congenital heart disease varies from 15% to 57%. [4 5] We wanted to find out our detection rate and compare with the quoted incidence of congenital anomalies in the patient leaflet of Antenatal scan.[5]
Method: Retrospective data collection from USS reports and Congenital Anomaly Register and Information Service (CARIS) database from 2001–2005.
Result: Total deliveries in that period −16 719. Total USS performed –13 496. Prevalence of congenital anomalies (CARIS) – 3% (482/16 719)

57% of anomalies were detected between >12 and <24 weeks. 15% were detected at booking scan ⩽12 weeks. 27% were detected on repeat scan at ⩾24 weeks.

Total USS detected anomalies – 383. 49 cases were missed in prenatal scan (cardiac–15. talipes and digital-14, Cleft–4, renal–6, TOF–3, Microcephaly–1, gastroschisis −1, others−5). 50 cases of anomalies cannot be detected on USS. After exclusion of these 50 cases the USS detection rate is 88%.

Detection rate of some major anomalies

Conclusion: The detection rate in our unit in the specified time period was very good. Detection rate of cardiac anomaly was also much better than that quoted in the Antenatal patient information leaflet. To increase the detection rate of cardiac anomalies further, inclusion of the outflow tract with the four chamber view should be done.

1. **Cedergen M** and Selbing A. Detection of fetal structural abnormalities by an 11–14 week ultrasound dating scan in an unselected Swedish population. *Acta Obstet & Gynaecol Scand* 2006;**85**(6):688–93.
2. **Souka AP,** *et al*. Screening for major structural abnormalities at the 11 to 14 week ultrasound scan. *AJOG* 2006;**194**(2):393–6.
3. **Saltvedt S,** *et al*. Detection of malformations in chromosomaly normal fetuses by routine ultrasound at 12 or 18 weeks of gestation – a randomised controlled trial in 39572 pregnancies. *BJOG* 2006 Jun;**113**(6):664–74.
4. **Westin M,** *et al*. Routine ultrasound examination at 12 or18 gestational weeks for prenatal detection of major congenital heart malformations? A randomised controlled trial comprising 36,299 deliveries. *BJOG* 2006;**113**(6):675–682.
5. **Gascard-Battisti,** *et al*. Antenatal screening for congenital heart disease: a retrospective analysis of 20 years of experience. *J Gynaecol and Obstetrics* 2006.

Abstract PF.54

Anomalies	Patient leaflet	Our detection
Spina bifida	90%	100%
Anencephaly	99%	100%
Major heart defect	25%	76%
Diaphragmatic	60%	100%
Renal	85%	96%

PF.55 LOW SECOND TRIMESTER MATERNAL SERUM ALPHAFETOPROTEIN AND PERINATAL OUTCOME

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Objective: To determine the association (if any) between unexplained low maternal serum alphafetoprotein (MSAFP) in the second trimester of pregnancy and adverse perinatal outcome.
Methods: A cohort of 31 980 women with singleton pregnancies who opted for routine biochemical screening for Down syndrome over a five-year period was obtained. All those with MSAFP levels <0.3 MoM and accurately dated karyotypically normal pregnancies that progressed beyond 24 weeks were identified. Controls were identified from consecutively screened women with pregnancies progressing beyond 24 weeks with normal MSAFP, matched for gestation age, maternal age, ethnicity and gender of newborn. Perinatal outcome of cases and controls were compared using paired *t*-test.

Results: 127 (0.39%) of the 31 980 pregnancies had low MSAFP (<0.3 MoM) but only 33 met the inclusion criteria (64 were excluded because of wrong dates and 30 because of spontaneous miscarriage). Women with unexplained low MSAFP weighed more than the control group by an average of 8 kg. There were no significant differences in smoking status, incidence of hypertension, preterm delivery (delivery <37 weeks), gestational age at delivery and birth weight in both cases and controls.
Conclusion: Unexplained low MSAFP is not associated with any adverse perinatal outcome after 24 weeks gestation and hence women with this can be reassured.

PF.56 NATURAL HISTORY OF ANENCEPHALY

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Anencephaly is a neural tube defect that occurs due to failure of neural tube closure at the cranial end of the embryo. Ireland has amongst the highest incidence of neural tube defects worldwide.

We aimed to investigate the natural history of these pregnancies from diagnosis to delivery and to determine timing of death.

This was a retrospective review of all cases of anencephaly (n = 24) diagnosed between 2003 and 2008 in tertiary-referral university teaching hospitals in Cork.

The majority of cases (23/24; 96%) were diagnosed antenatally at a median gestation of 20.4 weeks (range 13.4 to 28.4). The median maternal age was 30 years (range 17 to 41) and 54% were primigravida. Five pregnancies were complicated by polyhydramnios; three by preterm labour, and three deliveries were complicated by shoulder dystocia. The median gestation at delivery was 34 weeks (range 22^{+5} to 42^{+6}). In 71% of cases, labour was induced, and the median induction-to-delivery interval was 31 h (range 2 h to 12 days). Six patients (25%) had a prelabour intrauterine fetal death and eight patients (33%) had an intrapartum fetal death. Median neonatal survival time was 60 min (range 10 min to 8 days). Six parents agreed to donate neonatal organs for transplantation.

This study provides useful information for health professionals caring for patients with a diagnosis of anencephaly. The majority of these infants die prior to delivery but short-term survival is possible.

PF.57 PRETERM PRELABOUR RUPTURE OF MEMBRANES: MATERNAL BLOOD TESTS AND MATERNAL AND FETAL OUTCOME

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Background: Preterm prelabour rupture of membranes (PPROM) affects 1% to 2% of all pregnancies. It is associated with infection in approximately 50% of cases, leading to morbidity for both the mother and neonate. Inpatient management impacts on length of stay and outpatient management remains controversial.

Aim: To assess the relationship of raised C-reactive proteins (CRP) and white blood cells (WBC) in maternal blood in women with preterm premature rupture of membranes (PPROM) to latency, maternal intrapartum pyrexia and neonatal inflammatory markers.
Method: Retrospective case-note audit over a 14-month period collating data on gestation, investigations, frequency of observations and pregnancy outcome.
Results: The study included 50 patients. 34 women had raised CRP or WBC above normal range (raised group). Time to delivery from PPROM was similar in this group to those with normal markers (normal group) (11.54 vs 9.18, p = 0.2). In the raised group 12/34 (35%) had raised neonatal markers (CRP/WBC), compared to 1/16 (6%) in the normal group (p = 0.04). Maternal pyrexia occurred in 4/34 (12%) in the raised group, compared with 2/16 (13%) in the normal group (p = 1.00).
Conclusion: CRP and WBC tests are significantly related to neonatal inflammatory markers, but not time to delivery or intrapartum maternal pyrexia.

PF.58 PRENATAL DETECTION OF STRUCTURAL CARDIAC ABNORMALITIES ON ANTENATAL SCANS AND OUTCOME

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Aim: To determine the prenatal detection rate and outcome of structural cardiac abnormalities on antenatal ultrasound scans.
Study design: A retrospective study was done and all the scans referred for "cardiac views" over a period of 36 months from January 2006 to December 2008 were analysed. The referral indication, type of defect, karyotype and outcome were analysed. The cardiac abnormalities detected in the newborns coded by the neonatal unit were also analysed and the prenatal detection rate of the cardiac abnormalities by antenatal scans was calculated.
Results: Total scans referred to rule out cardiac abnormality were 266.The most common indication for referral for cardiac scan was maternal diabetes 26%. Isolated structural cardiac defects were isolated in 86% of the cases. 18% of the babies had aneuploidy. Termination of pregnancy was opted in 16% and 67% had live births. The number of babies with confirmed cardiac defects in the new born was 65 during this time period. Total number of cardiac abnormalities detected on scan was 39 for the same period. The sensitivity of the antenatal scans to pick up cardiac defects was 60%.
Conclusion: The majority of the cardiac abnormalities detected antenatally were complex defects. The majority of the defects detected postnatally were septal defects. Increasing problem of high Body Mass Index (BMI) is an additional challenge to detect cardiac abnormalities. Work load on the sonographers, training needs and the local hospital protocols may need to be looked into. Patients need to have appropriate and detailed counselling which should help them to choose the management options.