maternal or perinatal complication occurred in women delivered within 48 h of diagnosis or in women diagnosed postpartum.

Conclusions HELLP syndrome is associated with severe maternal and perinatal morbidity. Expectant management is rarely used in the UK.

PM.02 EFFECT OF 1,25-DIHYDROXYVITAMIN D_3 (1,25-D_3) ON EXTRAVILLIOUS TROPHOBLAST INVASION IN VITRO

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Introduction The invasion of maternal tissues by extravillous trophoblast (EVT) plays a central role in normal placentation. Inadequate EVT invasion is characteristic of pre-eclampsia, which is associated with low maternal circulatory concentrations of 25-hydroxyvitamin D_3 (25-D_3). Furthermore, trophoblasts from pre-eclamptic placentae demonstrate lower 1α-hydroxylase activity, which converts 25-D_3 to the active ligand, 1.25-D_3. We thus hypothesise that reduced vitamin D action leads to malplacentation and increase pre-eclampsia risk. To elucidate the mechanistic link we determined whether 1.25-D_3 has a regulatory effect on EVT invasion.

Methods Primary EVT cells were isolated from first trimester (9–11 weeks) human placentae (n = 5) following surgical termination of pregnancy. Isolated EVT, and in separate experiments, SGHPL4 (EVT-like cell line) were placed in 8-μm inserts coated with reduced growth factor Matrigel® and treated with increasing concentrations of 1.25-D3 (0.0.1.1.10 nM). EVT invasion was quantified by counting all the invaded cells visualised with Mayer's haematoxylin and eosin at 48 hours. A proliferative response to 1.25-D3 was assessed by MTT assays.

Results 1,25 D_3 promoted EVT invasion in a dose-dependent manner peaking at a dose of 1 nM. EVT exposed to 0.1 nM and 1 nM concentrations showed a 1.9-fold ($p < 0.05$) and 2-fold ($p < 0.01$) increase respectively in the numbers of invaded cells compared with untreated controls. Treatment with 10 nM 1.25-D_3 induced a 10-fold ($p < 0.05$) increase in invasion by SGHPL-4 cells compared with 0 nM but did not affect proliferation.

Conclusion This is circumstantial evidence that Vitamin D supplementation during pregnancy may potentially reduce the risk of developing pre-eclampsia as 1.25-D_3 promotes EVT invasion.

PM.03 RELATIONSHIP BETWEEN FETAL GROWTH, CARDIOVASCULAR ADAPTATION AND BIRTH WEIGHT

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Maternal cardiovascular adaptation in pregnancy is necessary for optimal fetal growth. The objective of this study was to explore the relationships between growth rate, fetal size at 10–14 weeks, birth weight and maternal cardiovascular adaptation in pregnancy.

This was a prospective study of 143 women planning to conceive. Crown rump length (CRL) was measured in 71 viable pregnancies at 6–7, 8–9 and 10–14 weeks in 1st trimester and biometry was performed at 22–24 and 32–34 weeks. First and 2nd to 3rd trimester growth rates were calculated. Cardiovascular assessments were performed pre-pregnancy, at 6–7 weeks, in 2nd and 3rd trimesters. We examined the relationships between 1st trimester CRL growth rate, CRL z-score at 10–14 weeks, 2nd to 3rd trimester fetal growth rate, birth weight z-score and cardiovascular adaptation.

First trimester fetal growth and CRL z-score were not related to 2nd to 3rd trimester fetal growth rate ($P = 0.2$, $P = 0.4$) nor to birthweight z-score ($P = 0.5$). However, 2nd to 3rd trimester fetal growth rate was positively correlated to birthweight z-score ($\rho = 0.758$, $P < 0.001$). Amongst the maximum cardiovascular changes the pre-pregnancy to 2nd trimester increase in cardiac output (CO) was significantly correlated to birthweight z-score ($\rho = -0.257$, $P = 0.03$).

Pregnancy induced cardiovascular changes by 2nd trimester may 'drive' later pregnancy fetal growth and birthweight. Contrary to previous reports based on assumption of growth on a single CRL measurement at 10–14 weeks, birthweight was not related to 1st trimester growth; but was related to 2nd to 3rd trimester fetal growth and maximum increase in CO by 2nd trimester.

PM.04 CARDIOVASCULAR INDICES IN THE EARLY IDENTIFICATION OF PRE-ECLAMPSIA IN WOMEN AT HIGH-RISK FOR HYPERTENSIVE DISORDERS OF PREGNANCY

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Objective Biochemical markers such as PlGF have been proposed as point-of-care tests for the early identification of women at risk of hypertensive disorders. The aim of this study was to ascertain whether biophysical markers are similarly predictive for the subsequent development of pre-eclampsia.

Methods This was a prospective study of women presenting in the third trimester of pregnancy to the day assessment unit with non-proteinuric hypertension and suspected diagnosis of preeclampsia. Stroke volume index (SVI), cardiac index (CI), systemic vascular resistance index (SVRI), pulse wave velocity (PWV), aortic augmentation index (AIx) and uterine artery Doppler mean pulsatility index (PI) were measured at recruitment. Comparisons of medians between groups were performed using Mann Whitney tests.

Results A total of 102 women took part in the study and 42 women developed hypertensive disease in pregnancy. At presentation, compared to those who remained normotensive, women who develop hypertensive disease in pregnancy have significantly higher SVRI (3251 vs 1851 dynes – sec/cm^{-5}/m^2, $P < 0.001$), aortic AIx (18.0 vs 5.05%, $P < 0.001$), PWV (8.41 vs 7.70 m/sec, $P = 0.003$) and uterine artery Doppler mean PI (0.87 vs 0.77, $P = 0.044$). However they had significantly lower heart rate (79.8 vs 87.3 beat/min, $P = 0.006$), CI (2.86 vs 3.83 L/min/m^2, $P < 0.001$) and SVI (37.5 vs 45.3 mL/m^2/beat, $P = 0.01$).

Conclusion Women who subsequently develop pre-eclampsia have distinct cardiovascular indices that may help discriminate them from those at high-risk of pre-eclampsia who remain normotensive. It remains to be established whether these indices may be used prospectively, either alone or in conjunction with biochemical markers, for triage and follow-up.

PM.05 POSTPARTUM DYSLIPIDAEMIA IN WOMEN DIAGNOSED WITH GESTATIONAL DIABETES MELLITUS

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Background Outside of pregnancy diabetes mellitus is an accepted risk factors for cardiovascular disease which should prompt screening for dyslipidaemia in adults.

Objective This prospective study examined the prevalence of dyslipidaemia in postpartum women diagnosed with gestational diabetes mellitus (GDM).
Methods Women with GDM were reviewed 6–8 weeks postpartum. A fasting lipid profile was performed. Clinical details were recorded from the medical records, including the woman's weight and body mass index (BMI) measured at her first antenatal visit.
Results Of the 98 women studied, the mean age was 33.0 years (range 23–45 years) and 30.6% (n = 31) were primigravid. The mean BMI was 30.6 kg/m^2 and 52% (n = 51) were obese. The overall prevalence of dyslipidaemia was 52% (n = 51). Total cholesterol was raised in 44% (n = 43), low-density lipoprotein was raised in 33% (n = 32) and triglycerides were raised in 16% (n = 16). Of the 51 women with dyslipidaemia, 73% (n = 37) had more than one abnormality in their lipid profile. The prevalence of dyslipidaemia was 78% (n = 14) in women with moderate to severe obesity (BMI > 34.5 kg/m^2) compared with 50% (n = 22) in non-obese women (p < 0.0001). Of the 5 women with an abnormal GTT postpartum, 80% (n = 4) had an abnormal lipid profile.
Conclusion Women with an abnormal GTT in pregnancy should be screened for dyslipidaemia postpartum at the time of their repeat GTT, and if the lipids are abnormal they should be offered cardioprotective interventions and ongoing monitoring of their lipid profile.

PM.06 LOW MOLECULAR HEPARIN WITHIN THE UTEROPLACENTAL UNIT

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Background Perturbation of the uteroplacental haemostasis has been implicated in placenta mediated pregnancy complications in thrombophilic women. LMWH may be effective in altering local thrombin production in the uteroplacental compartment.
Aim We determined the effects of LMWH (tinzaparin) on the peripheral, uteroplacental and fetal circulation and on haemostatic gene and antigen expression in placental tissue.
Method Eight women on antenatal LMWH prophylaxis (tinzaparin 75 IU/kg) due to moderate risk of VTE undergoing caesarean section (CS) and a control group of 15 healthy pregnant women undergoing CS had venous blood taken from the peripheral and uterine vein before delivery of placenta. Simultaneously, cord venous blood and placental biopsy was collected. Tissue factor pathway inhibitor (TFPI), thrombin antithrombin (TAT) and endogenous thrombin potential (ETP) were measured. Real-time PCR and ELISA were used to quantify mRNA and protein expression of TFPI and TF in placental tissue.
Results TAT levels within uterine vein are significantly higher compared to maternal peripheral circulation in both the control group (P < 0.0001) and LMWH group (P < 0.02). In the LMWH group, TAT is reduced compared with controls in the uterine vein (P < 0.001). ETP and TFPI within uterine circulation is reduced significantly in the LMWH group (P < 0.05) and (P < 0.02) respectively. Down-regulation of placental TFPI and $TFPI_2$ mRNA expression was also found (p < 0.05). Placental TF mRNA expression in LMWH group showed a non significant increase compared to control and this is replicated in placental TF antigen expression.
Conclusion TAT is reduced in uteroplacental circulation in thrombophilic women on LMWH prophylaxis and this is mirrored by decreased ETP in uteroplacental circulation. LMWH may be effective in reducing *in- vivo* thrombin production in the uteroplacental circulation of thrombophilic women.

PM.07 A PROSPECTIVE STUDY OF CHANGES IN MATERNAL CARDIOVASCULAR AND METABOLIC FUNCTION FROM PRIOR TO PREGNANCY TO POSTPARTUM

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Cardiovascular adaptation in normal pregnancy is the key to understanding cardiovascular function in pregnancy complications. The objective of this study was to investigate changes in maternal cardiovascular function during pregnancy, from a pre-pregnancy baseline to the postpartum period.

In this prospective study, 54 women had normal pregnancy outcome; 5 had preeclampsia (PE) and/or intrauterine growth insufficiency (IUGR). Detailed haemodynamics were assessed pre-pregnancy, at median gestation of 6, 23 and 33 weeks and 16 weeks postpartum. Lipid profile and renal function were assessed pre-pregnancy, in first trimester and postpartum.

While heart rate (HR) increased throughout pregnancy ($P = 0.001$), brachial and central BP, together with peripheral vascular resistance (PVR) and wave reflections were reduced very early in pregnancy ($P < 0.001$), followed by an increase in third trimester. Cardiac output (CO) increased to a peak by second trimester ($P = 0.001$). The HR, CO and PVR returned to pre-pregnancy values in the postpartum period. However, the reduction in BP was sustained postpartum. The MAP increased in second trimester rather than a decrease in women with PE/IUGR ($P = 0.02$). Lipids and creatinine decreased in first trimester ($P < 0.001$).

This is the first study to investigate longitudinal changes in central BP and wave reflections from pre-pregnancy to postpartum. We demonstrated profound changes in BP and arterial wave reflections very early in pregnancy; however CO peaks in the second trimester. The reduction in BP below pre-pregnancy values was sustained postpartum. Prospective studies of cardiovascular adaptation, beginning from pre-pregnancy are more likely to provide reliable estimates of pregnancy related maternal cardiovascular changes.

PM.08 METFORMIN, GLYCAEMIC CONTROL AND POSTNATAL GLUCOSE-TOLERANCE-TESTING IN WOMEN WITH GESTATIONAL DIABETES

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Background Metformin has been shown to be safe, effective and acceptable to women with gestational diabetes (GDM), and is recommended as the first-line pharmacological treatment for women who meet the usual criteria for insulin.
Methods We retrospectively reviewed case notes of women with GDM in the Royal Infirmary of Edinburgh (RIE) from January 2009–March 2011. Audit standards derived from local guidelines included: metformin as the first-line glucose-lowering medication in at least 90% of cases; average blood glucose readings <8.0 mmol/L over two weeks in at least 90% of cases (≥8.0 mmol/L was considered 'poor' glycaemic control); and postnatal glucose-tolerance-test (GTT) in all cases. Neonatal outcomes were observed.
Results Of the 113 pregnancies reviewed, 82.3% (93/113) of women required glucose-lowering medication. Metformin was used first-line in 94.6% of women requiring medication (88/93), and 99.6% of these continued treatment until delivery. Supplemental insulin was required in 44.3% of cases (39/88). Average blood glucose readings of <8.0 mmol/L were achieved in 93.6%, and 91.2% of cases during the second and third trimesters respectively. 70.8% of