ORAL PRESENTATIONS

1

Placenta mysteries unraveled

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Session outline:

This hands on session with fixed placentas, and selected photomicrographs, aims to demonstrate common or important pathologies that occur in the placenta that may have implications for the mother or baby.

Objectives:

At the end of this session you should be able to:

1. Teacher others a systemic approach to placental assessment
2. Discuss the approach taken to detecting abnormalities in the placenta
3. Identify common macroscopic abnormalities found in the placenta and be able to discuss their significance
4. Define, and discuss, the importance of the following terms:
    1. chorioamnionitis (grading and staging)
    2. chronic villitis
    3. chronic intervillositis
    4. maternal floor infarction/ massive perivllous fibrin deposition
    5. intervillous thrombus
    6. fetal vascular malperfusion
    7. maternal vascular malperfusion

reference: http://www.archivesofpathology.org/doi/pdf/10.5858/arpa.2015-0225-CC

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3

Type1 and type2 diabetes in pregnancy – what can we learn from international comparisons?

Robert Lindsay[1]

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Diabetes in pregnancy is associated with an increase in a variety of adverse outcomes for mothers and their children and have seen only modest improvements in recent years . In Scotland we have used a central diabetes register and record linkage to assess health outcomes in people with diabetes generally and more recently in women with pregnancy complicated by diabetes. I will review some of these outcomes and consider how these data can be used to improve health care in the longer term.

4

New strategies in managing hypertensive pregnancy

Andrew Shennan[1]

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The management of hypertension in pregnancy has always relied on stratification of risk. This ranges from identifying those to target with prophylactic therapies, such as aspirin, to deciding who to admit, monitor and deliver. Historical clinical features and the traditional use of blood pressure and proteinuria assessment have not been ideal in terms of their clinical utility. A combination of false positive and false negative assessments leads to over management, and cases being missed. Our increasing understanding of the pathophysiology of the disease has now resulted in angiogenic markers such as soluble flt and placental growth factor. A role for angiogenic biomarkers in the diagnosis of pre-eclampsia is emerging. Currently, diagnosis relies on parameters associated with end-organ complications of established disease. Angiogenic factors are implicated in the pathophysiology of pre-eclampsia, which may have the potential of identifying women earlier in their disease course, or with more timely diagnosis. Low maternal Placental Growth Factor (PlGF) concentrations (defined as below the 5th centile for gestation or ≤100pg/ml) have demonstrated high sensitivity (0.96, 95% CI 0.89-0.99) and a negative predictive value (0.98, 95% CI 0.93-0.995) for predicting the development of pre-eclampsia that requires delivery within 14 days. These very low PlGF concentrations were often seen weeks prior to diagnosis of pre-eclampsia in this cohort. The PROGNOSIS study by Zeisler et al, 2016 was a prospective, multicenter observational study of 500 women, which demonstrated that an sFlt-1:PlGF ratio cutoff of 38 has clinical utility.29 Values below this have cutoff have high negative predictive value of 99.3% (95% CI 97.9-99.9), with 80% sensitivity (95% CI, 51.9-95.7) and 78.3% specificity (95% CI, 74.6-81.7). The positive predictive value of an sFlt-1:PlGF ratio above 38 for a diagnosis of preeclampsia within 4 weeks was 36.7% (95% CI, 28.4 to 45.7), with 66.2% sensitivity (95% CI, 54.0 to 77.0) and 83.1% specificity (95% CI, 79.4 to 86.3). The authors propose that in women in whom PET is suspected clinically, an sFlt-1:PLGF ratio of less than 38 can be used to rule out the short-term development of the syndrome. The most likely area of clinical impact for PlGF is in 'point of care' testing in women posing a diagnostic challenge to the clinician. These 'point of care' tests could have a substantial impact on health resource use, avoiding unnecessary admissions for those who will have a more benign disease course and a longer 'time to delivery' interval. A cost saving analysis performed in 2010 showed that the addition of an angiogenic biomarker test can amount to a saving of £945 per woman due to its ability to reduce the rates of false-positive and false-negative diagnoses compared to current standard of care. Such tests have the potential to assist in risk stratification in women at high risk

of developing pre-eclampsia, singling out those with low PlGF to receive intensive surveillance to avoid adverse outcomes such as fetal demise. The PARROT study is underway to determine if the addition of PLGF testing to current management of women with pre-eclampsia will reduce the time taken to reach diagnosis, and thus improve maternal and perinatal outcomes.

5

SPRING study

Leonie Callaway[1]

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The SPRING study was a double blind randomized controlled trial of probiotics for the prevention of gestational diabetes in overweight and obese women. Preliminary data for this study will be presented.

6

Metabolic regulation of maternal metabolism by gut bacteria: hypotheses, evidence and speculation

Marloes Dekker Nitert[1]

1. University of Queensland, St Lucia, QLD, Australia

The composition of the gut microbiota changes over gestation. These changes may contribute to the increase in insulin resistance that occurs in pregnancy. It is still unclear how the bacteria in the gut affect insulin resistance. Potential mechanisms include direct effects on insulin levels through stimulation of incretin hormone secretion; alterations of adipokine levels through release of bacterial metabolites or changes to the inflammatory state of the mother. In this presentation, I will explore some of these hypotheses using samples obtained from the SPRING study. In addition, I will speculate on the complicating role of diet intake, given some recent publications linking gut microbiota composition with individual responses to carbohydrates outside pregnancy.

7

Diabetes and antenatal milk expressing (DAME): a multicentre randomised controlled trial

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8. Monash University, Clayton, Australia

Background: Despite no evidence, many maternity providers recommend that women with diabetes in pregnancy express and store breast milk in late pregnancy for use after birth (if required) to treat neonatal hypoglycaemia, thereby promoting early lactogenesis and exclusive breast milk feeding. The DAME trial investigated the safety and efficacy of this increasingly widespread practice. **Method**: A two-arm, multicentre, RCT was conducted. Women were randomised at 36 to 37 weeks gestation to standard care, or to twice daily hand expressing for 10 minutes until birth. All study sites agreed there would be no advice to women to express outside the trial. Randomisation was stratified by site, parity and diabetes type. The study was powered to detect a 10% difference in the proportion of babies admitted to special or neonatal intensive care (NICU, the primary outcome). Secondary perinatal outcomes included: gestation at birth, proportion of infants receiving exclusive breast milk during their hospital stay related to the birth, and women's views. Analyses are by intention to treat. **Results**: A total of 635 women were randomised to the trial between June 2011 and Oct 2015. The proportion of infants admitted to the NICU did not differ between groups (Adj. RR 1.06; 95% CI 0.66, 1.46), and no differences were found in any other neonatal outcome. The intervention was associated with increased exclusive breast milk feeding in the first 24 hours of life (Adj. RR 1.15; 95% CI 1.02, 1.28). There was no difference in mean maternal blood glucose after first three expressing episodes ((5.6 mmol/l; sd 1.0), and no difference in mean gestation at birth (mean diff. -0.05; 95%CI -0.21, 0.10). **Conclusion**: There is no harm in advising women with diabetes in pregnancy at low risk of complications to express breast milk from 36 weeks' gestation.

8

The Treatment of Booking Gestational diabetes Mellitus (ToBOGM) Randomised Controlled Trial

David Simmons[1]

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Background: Gestational diabetes mellitus (GDM) causes adverse pregnancy outcomes which are reduced with treatment from 24-28 weeks gestation. Testing women for overt diabetes-in-pregnancy at antenatal clinic booking is now recommended, increasing the number of women treated for early GDM, but without randomised controlled trial (RCT) evidence of benefit and potential for harm. TOBOGM is a multicentre RCT testing whether treating 'GDM' from booking reduces adverse pregnancy outcomes.

Methods and analysis: 'At risk' women <20 weeks gestation (n=4000) are recruited from the antenatal booking clinic across 12 hospitals and referred for an early oral glucose tolerance test (OGTT). Women with GDM by the 2014 ADIPS criteria (n=800) will be randomised to either immediate referral for GDM management or to defer treatment with a repeat OGTT at 24-28 weeks (along with women without GDM-'decoys'). Randomisation is stratified by site and by higher and lower OGTT glycaemic strata. Primary neonatal outcome for assessing benefit of treatment of Booking GDM is a composite of, respiratory distress, phototherapy, birth trauma, preterm birth <37 weeks, stillbirth/death, shoulder dystocia or birthweight ≥4.5kg. Primary neonatal outcome for assessing harm is reduction of neonatal lean body mass. Primary maternal outcome is pre-eclampsia.

Pilot Study results: Exclusions included gestation ³ 20/40 (48%), refused (5%), prior testing/refused OGTT (13%), no risk factors (16%). Overall 100/607 women consented but 28/100 were withdrawn (eg no OGTT). Gestation on entry was 17±2 weeks. There were 20/72 (28%) with Booking GDM. Of 10 randomised to treatment deferral, 1 withdrew, but 8/9 (89%) still had GDM at the 24-28 week OGTT. Neonatal hypoglycaemia (<2.6 mmol/l) was present in 22%/25%/21% of women in treated/deferred treatment/decoy groups.

Conclusions: An RCT of treating booking GDM is feasible. Most women with booking GDM, still have GDM at 24-28 weeks. The main TOBOGM RCT is now underway

Trial registration: ACTRN12616000924459

9

A low-fibre diet influences *Collinsella* abundance in the gut microbiome and alters maternal metabolism at 16 weeks gestation

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Background: The gut microbiota has recently been identified as a regulator of glucose metabolism in early pregnancy. We have reported a positive correlation between circulating insulin and genus *Collinsella*, although the factors dictating its abundance in the gut are unknown. Here, we aimed to validate the observed microbial-hormonal association and to determine if maternal diet plays a role in *Collinsella* abundance at 16 weeks gestation.

Methods: Gut microbiome profiles from 57 overweight and 73 obese pregnant women were assessed by 16S rRNA sequencing. Fasting insulin and macronutrient intake were correlated with 16S *Collinsella* counts. Participants were classified based on fibre intake (low: 13.8(12.1-16.1), high: 21.6(19.4-26.2) grams/day) and differences in microbial structure were analysed.

Results: Insulin levels were positively associated with *Collinsella* abundance (rho=0.30, p=0.0006), independent of maternal BMI. Of all dietary components, fibre was negatively associated with *Collinsella* abundance (rho=-0.19, p=0.025). Women with low fibre intake harboured more *Collinsella* counts and more lactate-producing bacteria. Higher fibre intake was associated with lower *Collinsella* abundance and enrichment of beneficial short-chain fatty acid producers.

Conclusion: This study validates the *Collinsella*-insulin association at early pregnancy. Low fibre intake may promote *Collinsella* overgrowth and overall changes in the gut microbiota composition affecting maternal metabolism.

10

Association between Gestational Weight Gain and Gestational Diabetes Risk in DALI: Vitamin D and Lifestyle Intervention for the prevention of gestational diabetes

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2. DALI consortium, Various, EU

Background: Excess gestational weight gain (GWG) is associated with the development of gestational diabetes mellitus (GDM). In the DALI study, significant limitation in GWG through a combined lifestyle intervention was not associated with reduced GDM development (1). We have now compared the effect of higher and lower GWG on the insulin-glucose axis to investigate possible reasons for the limited impact of lifestyle interventions on preventing GDM.

Methods: Pregnant women at risk of GDM with a BMI≥29 (kg/m^2) undertook a 75g oral glucose tolerance test (OGTT) before 20 weeks gestation. Those without GDM (n=437) at baseline received different structured lifestyle interventions (healthy eating

and/or physical activity). Comparisons were made between women above and below the median GWG at 24-28 weeks and 35-37 weeks (excluding GDM):approximately 7kg GWG difference by 24-28 weeks gestation.

Findings: Women achieving above the median GWG at 24-28/40 (≥5.65kg, vs below), had a lower baseline body mass index (BMI: 33.0±3.5 vs 34.6±4.2 kg/m^2, respectively p<0.001) and were more likely to smoke (20.8% vs 9.9% p<0.01), developing a higher fasting glucose (4.64±0.03 vs 4.56±0.03 mmol/l, p<0.05) and HOMA-IS (371.5±28.9 vs 253.3±28.9, p<0.01) by 24-28 weeks gestation. Women above the median GWG at 35-37 weeks (≥9.5kg) without GDM at 24-28 weeks, had a lower baseline 2 hour glucose (6.32±0.10 vs 6.60±0.11 mmol/l, p<0.05) but developed a higher HOMA-IR (4.30±0.19 vs 3.11±0.20, p<0.01) and HOMA-IS (460.8±28.3 vs 394.5±29.7, p<0.01) at 24-28 weeks, delivering babies who were more likely to be large for gestational age (LGA) 21.2 vs 8.6% p<0.01). GDM rates were non-significantly higher among women with the highest GWG at 24-28 and 35-37 weeks gestation (odds ratio 1.43 (0.79-2.60), 1.26(0.67-2.42)) respectively

Interpretation: Among overweight/obese women, more GWG is associated with an increase in insulin resistance and insulin secretion. Lifestyle interventions appear insufficient to overcome this increase in insulin resistance.

1. 1. Simmons D, Devlieger R, van Assche A, Jans G, Galjaard S, Corcoy R, Adelantado JM, Dunne F, Desoye G, Harreiter J, Kautzky-Willer A, Damm P, Mathiesen ER, Jensen DM, Andersen L, Lapolla A, Dalfrà MG, Bertolotto A, Wender-Ozegowska E, Zawiejska A, Hill D, Snoek FJ, Jelsma JG, van Poppel MN. Effect of physical activity and/or healthy eating on GDM risk: The DALI Lifestyle Study. J Clin Endocrinol Metab 2017;102: 903-913.

11

Continuous Glucose Monitoring in Pregnant Women with Type 1 Diabetes (CONCEPTt): a multicentre international randomised controlled trial

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Background: Pregnant women with type 1 diabetes are highly motivated to attain optimal glucose control, but neonatal outcomes attributed to maternal hyperglycaemia remain suboptimal. The aim of CONCEPTt was to examine the effectiveness of Continuous Glucose Monitoring (CGM) on glucose control, obstetric and neonatal health outcomes. Methods: In a multicentre, open-label, randomised controlled trial, we randomised 325 women with type 1 diabetes (215 pregnant, 110 planning pregnancy) using intensive insulin therapy, to capillary glucose monitoring with or without CGM. Randomisation was stratified by insulin delivery (pump or injections) and baseline HbA1c. The primary outcome was change in HbA1c from randomisation to 34 weeks gestation in pregnant women, and to 24 weeks or conception in women planning pregnancy. Secondary outcomes included percentage time-in-target (3.5-7.8 mmol/L), patient-reported outcome measures, obstetric and neonatal health outcomes. Results: There were clinically small differences in HbA1c, in pregnant women using CGM (mean difference -0.19%; CI95% -0.34 to -0.03%; p=0.02). Pregnant CGM users spent more time-in-target (68 vs 61%; p=0.0034) and less time hyperglycaemic (27 vs 32%; p=0.028) with comparable severe hypoglycaemia episodes and time spent hypoglycaemic. Their neonatal outcomes were significantly improved, with lower incidence of large for gestational age, less neonatal hypoglycaemia and 1-day shorter length of hospital stay. There was no apparent benefit of CGM in women planning pregnancy. Conclusion: Use of CGM during type 1 diabetes pregnancy is associated with improved neonatal outcomes, attributed to reduced exposure to maternal hyperglycaemia.

12

Pregnancy Outcomes in Recurrent Gestational Diabetes: a Study of Consecutive Gestational Diabetes Pregnancy Pairs

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The rate of recurrent GDM is high. It is uncertain as to whether outcomes are better or worse in the subsequent pregnancy. This study compared maternal and neonatal outcomes in consecutive GDM pregnancy pairs. This was a retrospective study of 424 consecutive GDM pregnancy pairs from two Sydney centres. Women with >1 GDM pregnancy were identified through in-house GDM databases. Demographic data were also obtained from the Obstetrix database and medical records. Women were 2.9±1.6 years older in the second GDM pregnancy, with a mean weight increment of 2.6±6.0kg and BMI increment of 0.9±2.6kg/m^2 (p<0.001 for both). GDM was diagnosed 4.6±6.9 weeks earlier and medication commenced 4.5±7.3 weeks earlier (p<0.001 for both). GDM was diagnosed prior to 22 weeks in 44% of second pregnancies versus 10% of first pregnancies (p<0.001), with a greater proportion requiring medication. Second GDM pregnancies were less likely to require ventouse/forceps (5% vs 14%, p<0.001) or emergency caesarean section (7% vs 16%, p<0.001), perhaps related to increased caesarean and elective sections in this group (p<0.001). There was no difference in customised birth weight centiles or neonatal complications such as shoulder dystocia, hypoglycemia, SGA/LGA, foetal/neonatal death, or a combination of these outcomes. Having an adverse outcome was highly predictive of a similar outcome in the subsequent pregnancy. There was a 33% risk of SGA in the second pregnancy and 45% risk of LGA in with women with previous SGA or LGA. Having a ventouse/forceps delivery, emergency section or perinatal death/dystocia/LGA/SGA outcome in the first pregnancy was associated with a 3.1-, 2.2- and 2.1-fold risk of the same outcome in the 2nd pregnancy compared to women without these complications. Our findings emphasize the

importance of early screening/intervention in women with a history of GDM, targeting the most intensive treatment to those with adverse outcomes the first time around.

13

Excess Foetal Growth and Glycaemic Control in Type 1 Diabetes and Pregnancy

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Introduction: A common complication of type 1 diabetes (T1D) is large-for-gestational-age (LGA) neonates (birthweight >90th centile for gender); however, the contribution of hyperglycaemia throughout pregnancy towards excess foetal growth is unclear.

Objectives: To examine the relationship between glycaemic control in each trimester of pregnancy and the incidence of excess foetal growth and LGA neonates in women with T1D.

Methods: In this retrospective, cohort study, 70 pregnancies in 61 women attending Royal North Shore Hospital, Sydney during 2012-2017 were identified. The Intergrowth-21st Project birthweight and Hadlock foetal abdominal circumference (AC) centiles were used to identify LGA neonates and excess foetal growth, respectively.

Results: The mean ± SD maternal age was 32.5 ± 5.4 years, with T1D duration of 15.4 ± 9.1 years and first trimester BMI of 26 ± 5kg/m^2. Thirty-nine neonates (56%) were LGA with a mean birth weight of 3,483 g, with 18 (46%) being macrosomic (birthweight >4000 g). Mothers of LGA neonates had significantly higher HbA1c levels in the first ($p < 0.0001$), second ($p < 0.0001$) and third ($p = 0.002$) trimesters and prior to conception ($p = 0.004$). Neonates born LGA had significantly greater AC by 28 weeks' gestation compared to non-LGA neonates ($p = 0.0014$), which was positively associated with second trimester HbA1c ($r = 0.365$; $p = 0.021$). Likewise, foetal AC at 34 weeks correlated with third trimester HbA1c ($r = 0.404$; $p = 0.008$). Using an HbA1c cut-off of 6% showed that second trimester HbA1c was more predictive of LGA neonates than third trimester HbA1c (sensitivity 74.1%, specificity 83.3% vs. sensitivity 69.2%, specificity 61.9%, respectively). There was no significant difference in early maternal BMI, maternal age or T1D duration between groups.

Conclusions: Achieving tight glycaemic control with an HbA1c below 6% by the second trimester may prevent excess foetal growth in T1D pregnancy.

14

Technical accuracy of blood glucose meters in pregnancy: a systematic review

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Aims: To undertake a systematic review summarising the available evidence on the technical accuracy of glucose meters used during pregnancy.

Methods: We searched 4 databases (PubMed, CINAHL, Embase, and Scopus) for publications January 2007 to April 2017. Eligible studies assessed the accuracy of glucose meters for any clinical outcome, including the screening, diagnosis, or treatment of hyperglycemia in pregnancy. The percentage of meter values meeting International Organization for Standardization (ISO) criteria, error grid analyses, mean difference between meter and laboratory plasma values and hematocrit influences were reviewed.

Results: Only 4 studies have assessed the technical and clinical accuracy of glucose meters during pregnancy during the past 10 years. The accuracy of the 10 commercially available glucose meters in pregnancy showed substantial variability, with the majority showing positive bias and a few showing minimal negative bias. The mean difference between meter and laboratory plasma values varied between -0.33 and 0.725 mmol/l. The Roche Accu-Chek Active glucometer showed the lowest mean bias and the highest proportion of readings within 5% of the plasma glucose values. Of the three glucose meters evaluated for the ISO 15197: 2003 criteria, all three met the recommended targets. Most glucose meters had >95% of the meter values in Zones A and B of the error grid analysis. Three meters, Optium, Optium Xceed 20 s, and Optium Xceed 5 s, showed a deviation from laboratory plasma glucose results with a change in maternal hematocrit levels. Most meters showed good precision (coefficient of variance<5%).

Conclusions: No glucose meters were identified with a total analytical error of <5%. No studies evaluated meter performance for the recent ISO 15197: 2013 criteria in pregnancy. Measures must be directed to achieve a total error of <5% with both the bias and imprecision to be less than 2% during pregnancy.

15

Pregnancy outcomes for rural women with gestational diabetes: A retrospective audit

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Introduction:

Management guidelines recommend that women with gestational diabetes (GDM) access a multidisciplinary team for education and care throughout their pregnancy. However, in rural areas, access to such care is often limited.

Aim:

To compare the perinatal outcomes of women with GDM attending rural hospitals with those attending the tertiary hospital in a single health district.

Method:

We conducted a retrospective chart audit of women with GDM mellitus who delivered in the Darling Downs between January 2012 and December 2013.

Results:

During the study period, 447 women with GDM delivered a total of 467 babies. In both groups there were high rates of overweight/obesity (76.9% and 79.9%, p= NS) and equivalent glucose results on OGTT.

Rural women were less likely to receive diabetes education (84.1% vs 94.4%, p<0.001), receive medical treatment (23.9% vs 46.6%, p<0.001), or achieve good glucose control (35.3% vs 57.9%, p<0.001).Â

Overall rates of Caesarean section were comparable for both groups (39.6% vs 41.1%, p= NS), while rural women referred for antenatal care were most likely to undergo an elective Caesarean section (44.8% vs 17.5%, p = 0.004).

There were similar rates of macrosomia (12.9% vs 11.1% p=NS) and hypoglycaemia (40.4% vs 38%, p = NS) in both groups. However, there was a significantly higher rate of shoulder dystocia in rural women (3.5% vs 0.6%, p=0.012).

Rural women were significantly less likely to breastfeed their babies (55.2% vs 77.5%, p <0.001).

Conclusion:

This study highlights the inequity of GDM care experienced by women living in rural Australia. Rural women were less likely to receive education or medical treatment, and less likely to achieve optimal glucose control. While the comparable neonatal outcomes are reassuring, the higher rate of shoulder dystocia and low rates of breastfeeding are concerning for these women.

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16

Novel strategies for optimal asthma management during pregnancy

Vanessa Murphy[1]

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Asthma is the most common chronic disease to affect pregnant women, and the prevalence of asthma is rising worldwide. In Australia, 12% of pregnant women have asthma, and up to 45% have an exacerbation of their asthma which requires medical intervention during pregnancy. Exacerbations have been associated with poor perinatal outcomes, including low birth weight and preterm birth. A systematic review and meta-analysis of the literature indicated that the risk for preterm birth was lowered when women's asthma was actively managed, suggesting that asthma is a modifiable risk factor for adverse perinatal outcomes. In this talk, novel management strategies which have been tested in randomised controlled trials will be discussed. One of these RCTs used a measure of eosinophilic lung inflammation (exhaled nitric oxide) to adjust asthma treatment with inhaled corticosteroids (ICS) and compared this to a symptoms-based approach. The novel strategy reduced exacerbations by 50%, altered the treatment profile (more women received inhaled corticosteroids but at a lower mean dose), and significantly improved quality of life. At one year of age, infants were significantly less likely to have experienced multiple episodes of bronchiolitis, and by 4-6 years of age, fewer children had doctor diagnosed asthma. This intervention improved outcomes for women with asthma during pregnancy, and represents the first evidence of a primary prevention strategy for asthma among children at high risk.

17

TIME TO BE DELIVERED – IS INDUCTION OF LABOUR A RISKY BUSINESS?

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Induction of labour is associated with increased fetal and maternal risks, and less maternal satisfaction. In spite of this, the rates of induction around the world have been rising over the past decade. The Australian Institute of Health and Welfare (AIHW) reported that the induction rate in Australia has increased from 20% in 1991 to 28% in 2012. The increasing use of assisted reproductive techniques, rising maternal age and co-morbidities such as obesity and gestational diabetes can be attributed to this trend in the induction rates. In 2015/16, Women's Healthcare Australia (WHA) reported a mean induction rate for primiparas as 33.5%, with a range of 15.8% to 51.6%. However, the rates of caesarean section have stabilized over the same period. There are a variety of methods that can be used for induction of labour. These range from pharmacological methods, the mainstay of which is prostaglandins, to mechanical methods such as catheters and balloons. Different methods of induction carry their own risks. This presentation examines the indications for induction of labour, the methods available and the implications on the outcome for the mother and baby.

18

Optimising fetal outcomes in women with medical disorders in pregnancy

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N/A

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Delivering late preterm infants: when does it pay to wait?

William Tarnow-Mordi[1]

1. NHMRC Clinical Trials Centre, University of Sydney, Sydney

The proportion of infants born between 34^{0} and 36^{6} weeks' gestation, or "late-preterm" infants is increasing. Because they are often the size and weight of some term infants, they may be treated by parents, caregivers and health professionals as developmentally mature and at low risk of morbidity. Their increasing incidence may reflect increased use of reproductive technologies and thus multifetal pregnancies or increased obstetric surveillance and intervention so that fetuses at risk of stillbirth from growth restriction, fetal anomalies and intrapartum asphyxia are identified and delivered earlier. The last 6 weeks of gestation represent a critical period of growth and development of the fetal brain and lungs, and of other systems. There is accumulating evidence of higher risks for health complications in these infants, including serious morbidity and a threefold higher infant mortality rate compared with term infants. This information is of critical importance because of its scientific merits and practical implications. However, it warrants a critical and balanced review, given the apparent overall uncomplicated outcome for the majority of LP infants. There is increasing evidence of long-term adverse neurodevelopmental and respiratory outcomes, with prenatal, neonatal, developmental, and environmental causes for these increased morbidities. This presentation will explore evidence supporting the practical implications for perinatal and neonatal care during infancy and childhood.

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Predictive markers for preterm birth in high-risk women with prophylactic intervention: a large prospective series

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Introduction

Quantitative fetal fibronectin (qfFN) and cervical length (CL) are reliable predictive markers for spontaneous preterm birth (sPTB) in high-risk asymptomatic women. However, it is important to consider the potential treatment paradox in this population. This study aims to investigate the impact of intervention (cerclage or progesterone) on the predictive ability of qfFN and CL.

Methods

This was a planned analysis of data from a large prospective cohort (EQUIPP, Evaluation of Fetal Fibronectin for the Prediction of Preterm Birth, n=2141). Women were grouped according to intervention (cerclage, progesterone or both). qfFN and CL measurements from the first visit between 22^{+0} to 27^{+6} were selected for analysis. The primary outcome was sPTB <34 weeks' gestation. Reciever Operating Characteristic (ROC) curves were generated. Area Under the Curve (AUC) was used to evaluate the predictive accuracy of each test with cerclage, progesterone or both interventions in situ.

Results

Predictive accuracy of CL and qfFN for the whole cohort [AUC 0.81 (0.76 to 0.86) and AUC 0.72 (0.64 to 0.80)] was comparable to currently published data. In women with cerclage in situ, test performance for CL and qfFN was maintained [AUC 0.79 (0.71

to 0.86) and AUC 0.72 (0.63 to 0.80), respectively]. Predictive statistics were similar if not better in women who received both interventions (cerclage and progesterone) [AUC 0.91 (0.81 to 1.00) for CL and AUC 0.72 (0.54 to 0.89) for qfFN].

Conclusion

In spite of theoretical concerns that predictive ability will be altered by the presence of prophylactic interventions, both qfFN and CL appear to remain reliable predictors for sPTB <34 weeks' with intervention in situ. CL may even be better in this population. This new evidence should reassure clinicians when assessing risk in women with intervention in situ.

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Changes in maternal abdominal subcutaneous fat layers using ultrasound: a longitudinal study

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Objectives:Abdominal subcutaneous fat (SF) an important endocrine organ for health outcomes, is divided into two layers, superficial (SSAT) and deep subcutaneous fat (DSAT), each with a different histological and metabolic function (1). Several studies have demonstrated a correlation between DSAT to visceral fat in the role of insulin resistance (2,3). Longitudinal maternal variances of these layers have not previously been examined. The aim, to investigate and describe, using ultrasound, the changes in maternal abdominal SF thickness (adipose tissue distribution), through pregnancy and post-partum within body mass index (BMI) categories.

Methods: Prospective longitudinal study of 214 women measured abdominal SF using ultrasound at 12-14, 18- 20, 26-29 and 33-36 weeks' gestation and 6-8 weeks postpartum. SF thickness (SFT) was measured in the midline, SSAT and DSAT were measured, medial to the anterior superior iliac spine using a linear probe. A ratio of DSAT/SSAT(D/S) was calculated.

Results: There were 43.9% (93) normal weight, 25.2% (55) overweight and 30.8% (66) obese recruited. At 12-14 weeks, the mean (SD) SFT measurement was 1.99 (0.91), SSAT 1.11 (0.57), DSAT 0.76 (0.78) centimetres and D/S ratio 0.66 (0.46). The D/S ratio increased with BMI. There were significant interactions of each plot on all abdominal fat compartments confirming a difference in fat mobilization for each BMI category. The obese decreased SFT, SSAT and DSAT during pregnancy. The overweight initially increased DSAT in the second trimester, then decreased SFT and SSAT. In normal weight women, SFT and SSAT remained stable whilst they gained DSAT. The D/S trajectory differed markedly and significantly across BMI categories.

Conclusions: This research has demonstrated a difference in fat mobilisation within the different BMI categories in the SFT, SSAT, and DSAT abdominal subcutaneous compartments in pregnancy.

Clinical significance: Understanding how fat mobilises may be key to understanding obesity related pregnancy complications.

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Women who develop hypertensive disorders of pregnancy have altered composition of the gut microbiota at 16 weeks gestation

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Introduction: The gut microbiota has recently been identified as a regulator of blood pressure in early pregnancy. It is not clear whether women who develop hypertensive disorders of pregnancy (HDP) already have an altered composition of the gut microbiota in early pregnancy. Objective: The aim of this study was to compare the composition of the gut microbiota at 16 weeks gestation between women who develop HDP with those who remained normotensive. Patients and Methods: Women who participated in the SPRING (Study of PRobiotics IN Gestational diabetes) RCT were grouped based on a clinical diagnosis of

HDP. DNA isolated from stool samples obtained at 16 weeks gestation were sequenced by 16S rRNA sequencing and analysed with the QIIME software suite. Network analysis of the gut microbiota composition was performed. Results: Women who developed HDP later in pregnancy (n=30) already had higher systolic (P = 0.025) and diastolic (P = 0.033) blood pressure than normotensive women (n=170) at 16 weeks gestation. The women who developed HDP tended to have a higher BMI (P = 0.10) and higher dietary fibre intake (P = 0.08) but similar fasting glucose levels (P = 0.25). While the groups did not differ in alpha diversity, the overall composition of the gut microbiota was significantly different between the groups (R = 0.101; P = 0.049). Network analysis identified a higher abundance of the genera *Collinsella, Ruminococcus, Acidaminococcus, Bifidobacteria, Haemophilus* and *Megasphaera* in the HDP group. Conclusion: Women who develop HDP later in their pregnancy have a gut microbiota that is dominated by carbohydrate fermenters. These bacteria have not previously been associated with hypertension but are more abundant in obese individuals outside pregnancy.

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Anaemia Clinical Practice Improvement, The Women's and Children's Hospital experience

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Aim: Iron deficiency anaemia is a common medical problem in pregnancy. In women delivering their babies at the Women's and Children's Hospital (WCH) in 2015, only 3.2% of non-anaemic patients needed a blood transfusion whereas anaemic women had a six times higher chance of needing a blood. The rate of anaemia at delivery (12.3%) was higher than peer hospitals and anaemic patients at delivery had three times higher chances of being transfused compared to those who are not. The obstetric transfusion rate at the WCH was approximately double NSW state-wide published data (1.4%). The WCH in conjunction with the Red Cross Blood Service initiated a clinical practice improvement project to improve blood product management in obstetrics. The aim was to optimise antenatal haemoglobin and iron stores in 100% of women coming into labour and increase oral iron therapy in women diagnosed with iron deficiency.

Methods: Haemoglobin assessment and optimisation flowcharts and a patient handout were prepared and distributed along across the antenatal, delivery and postnatal wards at the WCH. Maternity staff were educated using the CPI tools from November 2016 to January 2017. A telephone audit of 30 women diagnosed with iron deficiency was carried out to assess diagnosis and awareness and whether the patient handout was useful.

Results: Haemoglobin and ferritin tests increased at each trimester, with 67% of ferritin results confirming iron deficiency. Rates of anaemia at delivery decreased from 16.1% in 2014 to 11.5% in December 2016 (during the pilot project).

Conclusions: Adaptation of the above tools and education of staff and patients provided positive practice improvements in optimisation of haemoglobin and iron levels in obstetric patients, as well as decreased red cell transfusions.

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Increased abdominal subcutaneous fat thickness measured by ultrasound at 18-22 weeks gestation is associated with adverse maternal pregnancy outcomes.

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Introduction

Body mass index (BMI) is commonly used to classify obesity but does not account for distribution of adipose tissue. Australian studies have shown that abdominal subcutaneous fat thickness (SCFT) is associated with adverse pregnancy outcomes.[1,2]

Objectives

This single centre prospective longitudinal cohort study aimed to confirm if the SCFT measured at the routine 18-22 week ultrasound, is associated with maternal pregnancy outcomes.

Methods

Ethical approval was obtained. Data was collected on singleton pregnancies, at a tertiary centre with 4200 annual deliveries. Three abdominal SCFT measurements were obtained from standard cervix-placenta images from eligible women and averaged by one trained operator. Maternal antenatal and outcome data were obtained from the electronic patient record and the institutional obstetric database. Maternal outcomes included: gestational diabetes, gestational hypertension/pre-eclampsia,

delivery < 37 weeks and mode of delivery. Pearson's correlation coefficient was calculated and unadjusted logistic regression modelling utilised.

Results

Data was obtained for 1071 women delivering between February 2015 and June 2016. Their mean (SD) age was 30.6 (5.5) years; 439 (41.0%) were nulliparous and 747 (69.7%) Caucasian. The median (IQR) booking weight was 78 (69-90) kg and BMI was 24.39 (21.71-28.35) kg/m^2; 203 (18.9%) had a BMI >30 kg/m^2, 90 (8.4%) had PIH and 84 (7.8%) had gestational diabetes. The median (IQR) SCFT was 15.38 (12.8-19.6) mm. The booking BMI and SCFT were highly correlated (r=0.738, R^2=0.54). Each additional 1mm increase of SCFT was significantly associated with an increased odds of experiencing gestational hypertension/pre-eclampsia (OR=1.096, 95%CI: 1.063-1.130), caesarean delivery (OR=1.058, 95%CI: 1.036-1.081) and gestational diabetes (OR=1.053, 95% CI: 1.022-1.085).

Conclusions

SCFT was correlated with booking BMI and increased SCFT was associated with gestational hypertension/preeclampsia, mode of delivery and gestational diabetes. This population had fewer Caucasian women and reduced SCFT, compared with published data.[1,2] SCFT requires further exploration as a predictor of pregnancy outcomes.

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Repeatability of USCOM®-measured cardiac output and systemic vascular resistance in normotensive non-pregnant and pregnant women

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Objectives: To investigate the repeatability of ultrasonic cardiac output monitor (USCOM) measurements of cardiac output and systemic vascular resistance in non-pregnant and normotensive pregnant women.

Study design: Cardiac output and systemic vascular resistance were measured, using the USCOM, five times successively within 5 minutes in non-pregnant (n = 34) and normotensive pregnant (n = 32) women of any gestation with uniform technique by a single operator. The data were analysed using multi-level modeling and intra-class correlations.

Results: There was no statistically significant variation in either cardiac output or systemic vascular resistance with repeated measurement in non-pregnant or normotensive pregnant women. Intra-class correlations for cardiac output and systemic vascular resistance measurements were 0.921 (95% CI 0.887-0.947) and 0.934 (95% CI 0.905 – 0.956) respectively.

Conclusions: No extra information is added by making more than one USCOM measurement on the same woman under the same conditions in normotensive pregnant and non-pregnant women. The USCOM demonstrates excellent repeatability in this population. This finding should provide reassurance that single measurements using this system are of value in research and clinical practice.

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A comparison of fetal fibronectin and cervical length in predicting outcome in women with congenital uterine anomalies

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Introduction

The presence of congenital uterine anomaly is associated with increased risk of miscarriage and spontaneous preterm birth (sPTB). The mechanism is unclear, but may be related to stretch or cervical insufficiency. Fetal fibronectin (fFN) and cervical length (CL) are the current gold standard for prediction of sPTB in both symptomatic and asymptomatic women at high risk. However, it has not been established whether these tests remain reliable in women with congenital uterine anomaly.

Methods

Prospectively collected data from women attending a high-risk Preterm Surveillance Clinic between 2002 and 2015 with congenital uterine anomaly (unicornuate, bicornuate, uterus didelphus, septate or arcuate uterus) and singleton pregnancy were analysed. fFN and CL measurements from the first visit between 22^{+0} and 24^{+6} were included. fFN >50ng/mL and CL <25mm were considered 'positive'. Predictive statistics were calculated and compared for delivery before 34 and 37 weeks' gestation.

Results

In this cohort, 24% (15/63) had a preterm delivery before 37 weeks', and 10% (6/63) delivered before 34 weeks'.

For delivery before 37 and 34 weeks gestation, the positive likelihood ratios for CL were 12.8 (95% CI 1.55 to 105.92) and 14.25 (95% CI 2.94 to 69.12) respectively, compared to 2.57 (95% CI 0.65 to 10.15) and 4.56 (95% CI 1.17 to 17.79) for fFN. Negative likelihood ratios for both predictive tests were similar.

Conclusion

Women with congenital uterine anomalies are at high risk of sPTB. Within this group, CL appears to be a particularly reliable predictor, better than fFN. This is contrary to other populations. It is therefore important that clinicians are aware of this difference when planning management. Future research is needed to investigate the role of fFN in this population, and whether standard interventions such as ultrasound-indicated cerclage are equally valid in this group.

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Severe hypertriglyceridaemia in pregnancy

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Severe hypertriglyceridaemia (HTG) is a rare condition in pregnancy, which can lead to life-threatening morbidities for mother and fetus. We present two cases of women with severe HTG in pregnancy and recurrent episodes of pancreatitis. Both women were of Indian descent and had diet-controlled gestational diabetes. Despite being prescribed a very-low fat diet (<20% of caloric intake) and omega 3 fatty acid supplementation, peak plasma triglyceride (TG) levels in the two cases were 39.1 mmol/L and 47.3 mmol/L, respectively. In both cases, we used intermittent insulin/dextrose infusions in combination with fasting, which was modestly effective in reducing TG levels although the effect was not sustained on discharge from hospital and resumption of dietary restriction. Post-partum both women have ongoing elevations in TG levels. Genetic testing showed the women to be compound heterozygous for loss-of-function variants in *LPL* and *GPIHBP1*, respectively, genes which encode for key proteins in the lipolytic pathway. Complications of severe HTG in pregnancy include acute pancreatitis, hyperviscosity syndrome and preeclampsia. Various treatment strategies for severe HTG in pregnancy are described in limited published case reports. The mainstay of treatment is dietary modification, but many cases require additional treatment. Other options include omega 3 fatty acids, fibrates, niacin, intravenous heparin, intravenous insulin/dextrose and plasma exchange. There is insufficient evidence to recommend any single treatment modality over another; in these cases we chose to use intermittent insulin/dextrose infusions in combination with fasting in light of the perceived lower risk to mother and fetus associated with this treatment option. HTG is a rare but important condition in pregnancy to diagnose and increased awareness of this condition may lead to improved outcomes.

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Faecal microbiome in women in early pregnancy is altered in the setting of asthma.

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Introduction

There is increasing support for a link between early childhood microbiome composition and later development of asthma and atopy [1]. One possible mechanism for this association is the connection between the maternal and infant gut microbiome or “seeding” of the infant microbiome by a mother with asthma or atopy.

Objectives

We investigated whether the maternal gut microbiome in early pregnancy differs between women with and without asthma.

Methods

Faecal samples were collected at 16 weeks gestation (baseline) from women enrolled in SPRING (Study of PRobiotics IN Gestational diabetes), NHMRC funded trial supplementing overweight or obese women with probiotics from 16 weeks through pregnancy [2]. Ten women with asthma and 15 matched controls had DNA isolated from stool samples sequenced by 16S rRNA sequencing and analysed with the QIIME software suite. Samples were ordinated by principal component analysis (PCA). Taxa associated with asthma and healthy controls were identified using the linear discriminant analysis (LDA) effect size method.

Results

Preliminary analysis showed differences in the microbiome between the two groups. Women with asthma had decreased *Bifidobacterium longum* and increased *Ruminococcus callidus* abundance compared to women without asthma.

Conclusions

Lower levels of *Bifidobacterum longum* have been reported in children with allergy [3]. In mice, feeding with *Bifidobacterium longum* reduced airway inflammation [4]. Bifidobacterium species are thought to influence the host immune system.

A difference can be seen in gut microbiome composition in women with and without asthma in a cohort of overweight and obese women in early pregnancy. These initial findings suggest that mothers with asthma have an altered gut microbiome, similar to

that seen in studies of infants who later develop asthma and atopy. It is possible that the infants of women with asthma in pregnancy are inheriting a microbiome already primed for asthma and atopy development. This requires further exploration.

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Thrombocytopenia in Pregnancy: an overview of current Australian practice

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Introduction

Thrombocytopenia is frequently encountered in obstetric haematology clinics.

Objectives

We aimed to review the causes of thrombocytopenia in Australian women referred to haematology and assess their clinical outcomes. Secondary aims included evaluating how pregnant women with idiopathic thrombocytopenia (ITP) respond to different treatments; and assessing the safety and availability of neuraxial anaesthesia.

Methods

We conducted a multicentre prospective observational study of pregnant patients with thrombocytopenia, defined as a platelet count below $150x10^9$/L, referred for haematology evaluation. Patients were recruited over six months at four hospitals within NSW. Data was collected on maternal age and parity, comorbidities, treatment administered, labour analgesia, and maternal and neonatal outcomes. Ethics approval was obtained.

Results

59 patients were eligible for inclusion with a median age of 30, parity of 2 and gravida of 1. The most frequent diagnosis was gestational thrombocytopenia (51%), followed by ITP (37%), preeclampsia (3%), familial thrombocytopenia (3%), artefactual (3%), and myelodysplastic syndrome (2%). The platelet count for women with ITP was significantly lower throughout pregnancy than gestational thrombocytopenia (nadir 62 vs 91, p=0.0001), except at the time of delivery (102 vs 89, p=0.085). The incidence of postpartum haemorrhage (PPH) was higher than the national average at 24%, with women with gestational thrombocytopenia experiencing similar rates of PPH to women with ITP. The incidence of thrombocytopenia in babies born to mothers with ITP was 18%, with no haemorrhagic complications. Prednisone and IVIG had similar efficacy in ITP. No complications of neuraxial anaesthesia occurred but seven women were declined an epidural, including four with a stable platelet count above $80x10^9$/L.

Conclusions

Medical causes of thrombocytopenia are seen more frequently in obstetric haematology clinics. The incidence of PPH was increased, even in women with gestational thrombocytopenia. No complications of neuraxial anaesthesia were observed, but this intervention was not offered to all eligible women.

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Something old, something new... mineralocorticoid receptor antagonists in pregnancy

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Spironolactone, an aldosterone antagonist, was used extensively in the management of hypertensive disorders in pregnancy until demasculinisation of the external genitalia of exposed rats was reported by Hecker and colleagues in 1980. Mineralocorticoid receptor antagonists (MRAs) are highly effective in the management of resistant hypertension and primary aldosteronism. In addition, recent studies have demonstrated that MRAs significantly reduce blood pressure, severity of obstructive sleep apnoea (OSA), and arterial stiffness in patients with resistant hypertension and moderate-severe OSA. Eplerenone is a selective MRA that does not act as an androgen receptor blocker, thus reducing the risk of fetal anti-androgenic effects. Rat and rabbit studies demonstrated that when exposed to 30 times the equivalent therapeutic human dose, 100mg/day, there were no teratogenic or demasculinisation effects. To date the use of eplerenone has been reported in 6 human pregnancies in women with Gitelman syndrome, primary aldosteronism and cardiac failure, of which no teratogenic effects have been seen. Two cases of resistant hypertension associated with OSA in pregnancy, treated with eplerenone are presented. The potential role of using eplerenone in pregnancy as treatment for resistant hypertension is discussed.

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Hypercalcaemia in Pregnancy: Describing Three Distinct Case Presentations, Aetiologies and Acute Management Strategies for this Rare Condition

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Hypercalcaemia affects 0.3% of pregnancies and is a serious medical complication in pregnancy requiring specialist endocrine input (1). Maternal complications include hypertension, preeclampsia, nephrolithiasis and acute kidney injury. Foetal complications include intrauterine growth restriction, preterm delivery, neonatal hypocalcaemia and hypoparathyroidism, and foetal death in utero (2). We present 3 cases of hypercalcaemia within our tertiary hospital. Case 1 comprises a 30-year old primiparous female with known primary hyperparathyroidism who presented at 33 weeks gestation with a serum corrected calcium (CCa) of 3.16mmol/L. At presentation, she described x and z. She was managed with intravenous fluids and frusemide. Commiserate with her wishes, she underwent normal vaginal birth at full-term and delivered a healthy neonate with minimal complications. Case 2 describes a 34-year old primiparous female who presented in the first trimester of an IVF pregnancy with mild asymptomatic hypercalcaemia, CCa 2.6mmol/L. Prior extensive investigations including bilateral neck exploration and resection of a suspected culprit lesion failed to correct hypercalcaemia. A tentative diagnosis of familial hypocalciuric hypercalcaemia (FHH) was made and subsequently confirmed on genetic testing. Finally, Case 3 describes a 33-year old female who presented at 29 weeks gestation of her third pregnancy with rapidly progressive, debilitating back pain. MRI scan demonstrated extensive metastatic disease within the spine associated with pathological fractures. Importantly, she had known BRCA 2 genetic mutation and had undergone bilateral prophylactic mastectomy 4 years prior, following the detection of ductal carcinoma in situ. She had PTH independent hypercalcaemia (CCa 3.36mmol/L, PTH <4.0pmol/L) with an elevated PTH-related Peptide (PTHrP) level of 2.1pmol/L. Acute management comprised intravenous fluids, frusemide and calcitonin prior to caesarean section at 32 weeks gestation The pregnant state imposes limitations in treatment options, since antiresorptive agents are contraindicated in pregnancy(3). Our cases highlight the varied presentations, aetiologies and acute management of hypercalcaemia in pregnancy(4).

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Maternal body composition, energy homeostasis and micronutrient intake 6 months after hypertensive compared to normotensive pregnancy

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Introduction

After hypertensive pregnancy, women are at increased cardiovascular and cerebrovascular disease risk. Oxidative stress plays a key role in atherogenesis, and micronutrient antioxidant properties may be protective. Excess body fat (BF%) increases cardiovascular risk, however the relationship between BF% and micronutrient intake is unclear. This study aimed to compare body composition (BC), energy expenditure (EE) and energy intake (EI), including micronutrient intake, after hypertensive (HP) versus normotensive (NP) pregnancy.

Methods

A prospective sub-study of the P4 (Postpartum, Physiology, Psychology and Paediatrics) study. Women were studied 6 months after NP versus HP (preeclampsia or gestational hypertension). BC was measured using multi-frequency bio-impedance analysis, 24-hr EE using SenseWear™ Armbands, and EI using a three-day food diary and FoodWorks™ to calculate macronutrient and micronutrient intake.

Results

69 women (56 NP and 13 HP), mean age 32.2±4.4 and 31.2±5.3 years (p=0.47), and mean BMI 24.1±3.8kg/m^2 and 29.1±8.3kg/m^2 (p=0.05) respectively, had complete measurements. HP women had non-significantly higher BF% (39.4±8.6 versus 35.1±8.5%; p=0.10), non-significantly higher total EE (11106±2153 versus 10308±1654kJ; p=0.15), but significantly lower total EI (7833±1631 versus 9962±3159kJ; p=0.02) and EI/kilogram bodyweight (107±39 versus 159±55kJ/kg; p=0.002). HP women reported decreased intake of protein (p=0.03), total fat (p=0.02) and trans-fatty acids (p=0.02). Regarding micronutrients, the HP group reported lower vitamin E (p=0.04), vitamin B6 (p=0.03), vitamin B12 (p=0.05), vitamin A equivalents (p=0.03), retinol (p=0.02), alpha-tocopherol (p=0.02), and magnesium (p=0.005) intake. There were no significant differences in other macronutrient (carbohydrate, saturated fat, polyunsaturated fat, cholesterol) and micronutrient (thiamine, vitamin C, folic acid, beta-carotene, iron, calcium, zinc, selenium, iodine) intakes.

Conclusion

Six months postpartum, women with previous HP have significantly lower reported micronutrient intake compared to NP, potentially reflecting poorer diet quality. BC and energy homeostasis results suggest increased fat storage efficiency continues at least 6 months postpartum following HP, which may have adverse cardio-metabolic consequences.

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The utility of Albumin infusion in a pregnancy complicated by Familial Podocytopathy and sub-nephrotic range proteinuria.

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Familial podocytopathies are a rare group of glomerular disorders characterised by proteinuria. Podocyte damage or dysfunction results in disruption of basement membrane selectivity and structural integrity, and this in turn leads to significant proteinuria. Common familial podocytopathies involve genetic mutations genes encoding nephrin, podocin, a-actinin4, CD2AP, PLCe1 and TRPC6, with inheritance patterns being both autosomal dominant and recessive.[1] Proteinuria and underlying renal disease are associated with increased risks of adverse maternal and neonatal outcomes including pre-eclampsia, intrauterine growth restriction and preterm delivery.[2] We present a case of pregnancy in a woman with underlying familial podocytopathy who presented at 18 weeks' gestation with intermittent lower limb, facial and eyelid oedema. Blood pressure was 120/70 and serum albumin 15mmol/L. Urine PCR was within the normal range. She commenced prophylactic enoxaparin, was monitored second weekly and had serial growth scans. At 32 weeks' gestation, she developed worsening oedema and postural hypotension. Renal function remained stable, as did serum albumin at 15mmol/L. Maternal Fetal Medicine scans demonstrated a drop off in fetal growth velocity. She commenced twice weekly albumin infusions of 20% Albumin (200mls) aiming to maintain a serum albumin of 18mmol/L. Fetal growth tracking initially stabilised, before improving. Her oedema and postural symptoms resolved. Urine PCR increased to 109. She was induced at 38 weeks' gestation with the delivery of a normally grown infant. There are a number of management challenges in pregnancies complicated by nephrotic syndrome. This includes, but is not limited to, fetal growth restriction from reduced uteroplacental perfusion due to low colloid oncotic pressure and reduced effective blood volume. Supportive management with albumin infusion may improve placental perfusion and support fetal growth. Pre-existing podocyte damage is the likely mechanism of proteinuria following albumin infusion.

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2. 2. Piccoli GB, et al. Risk of adverse pregnancy outcomes in women with CKD. J Am Soc Nephrol. 2015;26(8):2011-22

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Evaluation of suspected pulmonary embolism in pregnancy and the puerperium

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Introduction

Pulmonary embolism (PE) is uncommon in pregnancy, however remains a major cause of maternal mortality in Australia. Assessment in pregnancy remains clinically challenging.

Objectives:

Retrospective observational series of pregnant women undergoing diagnostic imaging for suspected PE to assess incidence and clinical factors associated with a positive diagnosis and use of ancillary tests.

Methods:

Ventilation/perfusion (VQ) scans and computer tomography-pulmonary angiography (CT-PA) performed at a single centre from 2014-2016 on pregnant and post-partum women under the age of 45years were reviewed. Clinical information was obtained from patient records.

Results

141 scans (15 CT-PA, 126 VQ) were performed on 136 women. Average age 31years (±5), average BMI 27.7kg/m^2 (±7.1). Ten were diagnosed with PE (incidence 7%). All CT-PA were non-diagnostic or negative. Although 55% of women presenting were in the third trimester, post-partum was highest risk (incidence 11%). All patients diagnosed with PE had symptoms of dyspnoea and/or chest pain, as did 65% without PE. All patients investigated for asymptomatic tachycardia or palpitations alone were negative for PE. A normal ECG did not exclude PE (6/9 had normal ECG). Of those with PE, two had abnormal CXR(25%), compared with 20 in those without PE(23%). Two women with PE had a history of VTE (20%). Three of four women diagnosed post-partum had caesarean section delivery. Other traditional risk factors (pregnancy loss, gestational diabetes, obesity, smoking) did not appear more prevalent in those with PE.

Conclusions

Despite our perceived low threshold for diagnostic scanning, this study demonstrated a higher incidence of PE than reported elsewhere. Similar to other studies, the post-partum period had the highest incidence of PE. Although overlapping clinical symptom and non-specific ancillary tests (ECG, CXR) support the need for VQ/CT-PA in many women, in this small study we did not see any women with asymptomatic tachycardia diagnosed with PE.

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Non-invasive study of haemodynamic parameters in normotensive versus hypertensive pregnancies

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Background/Objectives: Major cardiovascular system physiological changes during pregnancy include decreased systemic vascular resistance (SVR) and increased cardiac output (CO). In hypertensive disorders of pregnancy, especially preeclampsia, these usual cardiovascular adaptations maybe deficient. This study aims to evaluate differences in cardiac function and haemodynamic parameters using point-of-care, non-invasive testing, in non-pregnant women, and in women with normotensive and hypertensive (chronic hypertension, CH, preeclampsia, PE gestational hypertension, GH) pregnancies.

Methods: Non pregnant (NP, n=33), normotensive (NT, n=73) and hypertensive (HT, n=57; 21 CH, 16 GH, 20 PE) pregnant women aged 18-45 with a singleton pregnancy studied cross-sectionally from 20 weeks' gestation in this ongoing prospective study. Haemodynamic parameters were obtained non-invasively via the Ultrasound Cardiac Output Monitor (USCOM) and liquid crystal sphygmomanometer. Women are followed prospectively and pregnancy outcomes, including preeclampsia development, ascertained.

Results: There was no statistically significant difference in average stroke volume (79mL/NP, 74mL/NT, 70mL/CH, 78mL/GH, 73mL/PE; p=0,67), cardiac output (5.5/5.9/5.8/6.0 and 5.7L respectively; p=0.75) and cardiac output index (3±0.6 versus 3±0.9 versus 3±0.8 versus 3±0.9 versus 3±1L/min/m2; p=0.084) between groups. Preeclamptic pregnancies had significantly higher SVR (1851±1111 versus 1204±381 dyne/se/cm^{-5}; p≤0.001) and systematic vascular resistance index (3653±2189 versus 2231±887dyne/sec/cm^{-5}/m^{-2}; p≤0.001) than NT pregnancies. As expected, HT participants had significantly higher mean arterial pressure, systolic (109±9mmHg NP,110±12 NT,129±10 CH,130±11 GH,138±12 PE; p≤0.001) and diastolic blood pressure (67±7, 69±9, 79±9, 81±9, 87±12mmHg respectively; p≤0.001) than NT or NP.

Conclusions: In this pilot study of non-invasive (USCOM) haemodynamic measurements, significant differences in systemic vascular resistance, but not overall cardiac output, were seen between normotensive and hypertensive pregnancies. A larger sample size is needed for further investigation, including determining whether USCOM may be useful in predicting which pregnancies will progress from gestational hypertension and/or chronic hypertension, to preeclampsia.

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Cardiac Structure and Function 6 months after Normal or Hypertensive Pregnancy: The P4 Study

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Introduction

Hypertensive disorders of pregnancy (HDP) are associated with 2-3 fold increased risk of future cardiovascular disease. Cardiac remodeling and abnormal systolic and diastolic function have been reported during an HDP pregnancy. Whether these changes persist post-partum is uncertain. We assessed cardiac structure and function 6 months post-partum in women with prior HDP.

Methods

A sub-group of the prospective P4 study (Postpartum, Physiology, Psychology and Paediatric study) cohort were recruited 6 months post-partum for transthoracic echocardiography (TTE) and 24 hour BP measurement (ABPM) between February 2014 and July 2017. Women had either prior HDP or NP (pre-existing HT was excluded). Transthoracic echocardiography was performed by a blinded echocardiographer.

Results

There were 39 women with prior HDP (33 preeclampsia, 6 gestational hypertension) and 40 NP. The HDP group was younger (31±5 v 33±4yrs, HDP v NP, p= 0.04). There were structural and functional differences on echocardiography. Structural differences included thicker interventricular septum (8.8 v 8.1mm, HDP v NP, p=0.007), thicker posterior wall (8.6 v 7.7mm, HDP v NP, p<0.001), greater relative wall thickness (0.37 v 0.35, HDP v NP, p=0.02) and higher left ventricular (LV) mass (109 v 94g, HDP v NP, p=0.02). The HDP group also had impaired LV relaxation as indicated by a higher E/E' ratio septal (8.78 v 7.5, HDP v NP, p=0.007). Systolic function between groups was similar as measured by global longitudinal strain and LV ejection fraction. LV mass correlated with 24hr SBP (r=0.24, p<0.05) and BMI (r=0.43, p<0.001). Diastolic function correlated with BMI (E/E' ratio, r=0.52, P<0.001) but not 24hr SBP.

Conclusions

At six months post-partum, there were subtle yet significant changes in cardiac structure and diastolic function in women with prior HDP. Our data suggest both haemodynamic and metabolic factors may contribute to these findings.

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The prevalence and pregnancy outcomes of Obstetric Cholestasis

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Introduction: Obstetric cholestasis (OC) or intrahepatic cholestasis of pregnancy (ICP) is associated with increased pregnancy risk as well as anxiety and depression in the mother. This study therefore determined the prevalence of OC in the Australian Capital Territory (ACT) and the pregnancy outcomes associated with OC.

Methodology: A retrospective clinical audit review was performed at The Canberra Hospital (TCH). Data was gained from the hospital's Birth Outcomes System (BOS). All other pregnancies were compared to OC pregnancies, to determine prevalence, management, and pregnancy outcomes.

Results: There were 10364 total pregnancies during the study period. The prevalence of OC pregnancies (*n*=66) was 0.64% as compared to all other pregnancies (*n*=10298). The primary clinical outcomes of OC, included a medium gestational age at delivery of 37 compared to 39+3 weeks (***p<0.001), and despite an earlier gestational birth age, there was no increase in NICU admission (*p<0.05). There was an increased likelihood of having an induction of labour (***p<0.001), and an increased likelihood of twin pregnancies and gestational diabetes mellitus (GDM) in the OC group (***p<0.001). The rates of caesarean section and perinatal mortality did not differ significantly (p>0.05) with 37.9% versus 28.4%, and 1.2% versus 1.5%, between OC pregnancies and all other pregnancies, respectively. Results also show that the majority of OC patients had pruritus (98.5%), deranged LFTs (87.9%), and elevated bile acids (83.3%). It was also observed that the majority of patients were managed with ursodeoxycholic (65.2%), with symptoms treated with antihistamines (30.3%), emollients (4.5%), and both antihistamines and emollients (13.6%).

Conclusion: This study found a correlation between OC and DM, and that the current clinical evaluation is reliable in capturing those with OC. Furthermore, this study demonstrated a significant relationship between OC and twin birth rates.

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Jeremy Oats Oration

Aidan McElduff

This oration is given to honour Professor Jeremy Oates for his role in the establishment and more particularly, the development of the Australasian Diabetes In Pregnancy Society. HIs focus has always been on improving the provision of clinical care to pregnant women, and for today's oration, particularly women whose pregnancy is complicated by diabetes. Best practice in clinical care is difficult. It requires a wide knowledge base, excellent judgement and empathy with the patient. Anyone who believes they have 100% success is exceptional or a fool.

Our knowledge base is often limited because of inadequate, wrong or wrongly interpreted data. It can be biased as can our judgement, by our experience and/or personality type. Facts often come with implicit subtext which is not known to the person utilising those facts. Current practice is also compromised by the tendency towards " one size fits all"; underpowered negative studies; or, poorly powered or poorly informed modelling. I will attempt to flesh out these concepts based on my own clinical and research journey in diabetes in pregnancy. I will suggest what I believe to be the most clinically important questions that need to be answered in relation to gestational diabetes.

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Excessive weight gain before and during GDM treatment – what is the impact?

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Background: Women with Gestational Diabetes Mellitus(GDM) commonly exceed Institute of Medicine(IOM) weight gain targets by first presentation to diabetes services(IOM, 2009).

Aim: Assess whether 1. Excessive weight gain before GDM diagnosis(EGWG) is associated with higher antenatal 75-gram oral Glucose Tolerance Test(oGTT) results 2. Continued excessive gestational weight gain(cEGWG) is associated with greater likelihood of insulin initiation and Large-for-Gestational-Age(LGA) infants.

Methods: Prospectively collected (1992-2015) data from GDM pregnancies managed by Australasian Diabetes in Pregnancy Society guidelines were analysed. Women received two dietetic appointments, with weight measured at each multidisciplinary clinic visit (weekly or fortnightly). Inclusion criterion: exceeding IOM weight gain targets at presentation(cEGWG was assessed incrementally: ≤0kg, 0.1-2kg, 2.1-4.0kg, 4.1-6.0kg, 6.1-8.0kg, >8.0kg). Exclusions: last recorded weight >4 weeks pre-delivery;

managed for <3 weeks; incomplete data. The relationship between EGWG on presentation, and oGTT fasting blood glucose(FBG), and 2-hour post l glucose load(PGL) values were assessed using independent samples-tests. cEGWG was included in logistic regression models adjusted for confounders predictive of insulin therapy and LGA. Outcomes: insulin therapy initiation, mean insulin dose and LGA rates.

Results: Of 3343 pregnancies, 776 met criteria(23.2%). Mean+SD: weight gain at presentation 16.3+5.0kg; total weight gain 18.0+5.8kg; weight gain during treatment 1.7+3.2kg. Those with EGWG on presentation had significantly higher mean FBG (5.4vs5.0 mmol/l, p<0.0001), but not 2-hour-PPG (8.6vs8.7, p<0.010). When adjusted for confounders, the FBG remained significantly higher in women with EGWG (p<0.0001). cEGWG was an independent predictor of insulin initiation, higher mean insulin dose and LGA (all p<0.0001). Incremental increases in cEGWG were associated with 24.7% (95%CI 11.0-40.1) and 30.4% (95%CI 16.8-45.7) increased likelihood of insulin initiation and LGA respectively.

Conclusions: EGWG before presentation with GDM was associated with a higher oGTT FBG but not 2-hour PGL. cEGWG was associated with a greater likelihood of insulin therapy initiation and having an LGA infant.

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Could we obtain better "value" from the pregnancy oral glucose tolerance test (OGTT) in diagnosis of gestational diabetes mellitus (GDM)? A secondary analysis using the Australian HAPO data.

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The 75gram OGTT remains the standard for GDM diagnosis in Australia, with one value > threshold considered diagnostic. IADPSG thresholds predominate, but "old ADIPS" thresholds persist in some centres. Both sets of thresholds originate from expert consensus. We hypothesised that using receiver operator curve (ROC) analysis and derived objective parameters would increase sensitivity and specificity of the OGTT results related to outcomes, specifically large for gestational age (LGA), fetal adiposity (FA) and shoulder dystocia (SD). We used data from 1248 women in the HAPO Brisbane cohort to develop the model, subsequently validated using 619 women from the HAPO Newcastle cohort. "Old ADIPS" (9.1% GDM) and IADPSG criteria (8.9% GDM), presented in that order, showed specificities of 90 - 92% but very low sensitivities for LGA (14%; 15%), FA (9%; 13%) and SD (20%, 30%). Areas under ROCs (AUROCs) were low, varying between 0.50 - 0.61. Using ROC analysis and derived "optimal" Youden cut-off points in a model including all standardised OGTT values (0, 1, 2 hours) markedly improved sensitivity: LGA 55%; FA 51%; SD 70%, but at the cost of lower specificity: LGA 68%; FA 73%; SD 67%. AUROCs improved to 0.62 – 0.79 and Youden indices were:- LGA 23%; FA 25%; SD 47%. However, this approach classified between 28 and 35% of women (depending on the outcome chosen) as at risk meriting intervention (ARMI). "Diagnostic" ROC thresholds, calibrated to a specificity: sensitivity threshold of 3: 1 in the same model, gave sensitivities of:- LGA 28%; FA 28%; SD 30% with specificities of: LGA 85%; FA 85%; SD 90%) at ARMI prevalences between 10 and 17%. Current GDM diagnostic algorithms provide poor risk stratification. Novel ROC based models still involve inevitable compromises between sensitivity, specificity and pragmatically manageable prevalences of women identified as at risk and meriting intervention.

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A NOVEL CALCULATOR TO DETERMINE THE RISK OF INSULIN THERAPY IN WOMEN WITH GDM

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Background: We previously published a 7-point risk factor predictor model for insulin therapy in women with gestational diabetes (GDM)[1].

Aim: To create a risk calculator for insulin therapy weighted according to the coefficients of variables, derived from the 7-point predictor model.

Methods: We analysed de-identified prospectively collected singleton pregnancy data (1992-2014) from women diagnosed with GDM at Bankstown-Lidcombe Hospital according to ADIPS(1998) criteria[2]. A logistic regression model was run with the seven dichotomised significant independent predictors of insulin therapy: maternal age >30 years, family history of diabetes, pre-pregnancy obesity (BMI ≥30 kg/m2), prior GDM, early diagnosis of GDM (<24 weeks gestation), fasting venous blood glucose level (≥5.3 mmol/l) and HbA1c at GDM diagnosis ≥5.5% (≥37 mmol/mol) on oGTT. A weighted risk score (WRS) using coefficients derived from the model was defined as:

WRS = constant + coefficient$_1$ x variable$_1$+.....+coefficient$_7$ x variables$_7$.

Probability of insulin requirement was = $e^{WRS}/(1+e^{WRS})$.

Results: There were a total 3075 GDM pregnancies. The logistic regression model demonstrated that diagnosis <24 weeks gestation and fasting plasma glucose ≥5.3 mmol/L were the strongest predictors of insulin requirement. The weakest predictor of insulin requirement was age>30. An electronic risk calculator (Microsot Excel 2007) was developed to calculate the probability of insulin therapy using the coefficients and formula described above (example patient shown below)

Calculator For The Risk of Insulin Therapy in Women with GDM

Variable	Coefficient	Coefficient x Variable	Input (Y/N)
Age>30	0.183	0.183	Y
BMI≥30	0.687	0.687	Y
Prior GDM	0.366	0	N
Family History	0.371	0.371	Y
Fasting≥5.3	0.828	0.828	Y
HbA1c≥5.5	0.632	0.632	Y
Diagnosis before 24 weeks	0.972	0	N
Sum of Coefficient x Variable		2.701	

Calculation	Value
Sum of Beta x Variable	2.069
Constant	-2.195
Calculated Weighted Risk Score (WRS)	0.506

Enter Y/N for patient

Probability Insulin Rx (%) $e^{WRS}/(1+e^{WRS})$	62%

Receiver operated characteristic (ROC) curves were plotted for both the unweighted 7-point scoring system versus the weighted risk/probability scores. The AUC were 0.715 (95% CI 0.693 - 0.736, p <0.0001) vs 0.730 (95% CI 0.710 - 0.751, p<0.0001) respectively.

Conclusion: A weighted risk/probability score calculator performed better than an unweighted 7 point system in predicting the likelihood of insulin therapy in women with GDM. This is a practical tool which can be used to identify GDM patients for closer monitoring or early insulin treatment

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2. (2) Hoffman L, Nolan, C, Wilson, JD, Oats JJN, Simmons D (1998) Gestational diabetes mellitus management guidelines. The Australasian Diabetes In Pregnancy Society. MJA pp169:93-97.

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HAVE THE NEW ADIPS GDM CRITERIA RESULTED IN A CHANGE IN THE CLINIC POPULATION AND/OR MATERNAL AND NEONATAL OUTCOMES?

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Background: Based on HAPO Study findings, the IADPSG proposed new Gestational Diabetes Mellitus (GDM) diagnostic criteria associated with a 1.75 increased risk of a Large for Gestational Age (LGA) infant. Endorsed in 2013 by WHO, worldwide adoption has been variable. Our Department implemented these Australasian Diabetes in Pregnancy Society (ADIPS) recommended criteria from 1-Mar-2016.

Aim: To compare characteristics and outcomes in GDM women diagnosed by new criteria (Group1) with those diagnosed by previous ADIPS 1998 Australian criteria (Group2).

Methods: From our database of prospectively collected data from an ethnically-diverse high-risk universally tested GDM cohort, we compared 12 months data for Group1 women [diagnosed 1-Mar-16 to 28-Feb-2017] with Group2 [diagnosed 1-Mar-15 to 29-Feb-2016]. Management involved two formal diet/GDM education sessions and weekly to fortnightly multidisciplinary clinic visits including an endocrinologist. Women self-monitored finger-prick glucose, fasting and post-prandially. Insulin was prescribed if treatment targets were not met: (Group1) FBGL<5.3mmol/L, 2hr post-prandial BGL<7.0mmol/L; (Group2) <5.5mmol/L and <7.0mmol/L respectively. Metformin was not used. Outcomes reported are for consecutive live singleton births.

Results: There were 455 women (Group1) and 402 (Group2). Comparing Group1 versus Group2: there were significant differences by major ethnic background group: European 21.3%vs19.4%; Middle Eastern 28.4%vs26.1%; SE Asian 20.9%vs32.8%; South Asian 20.7%vs15.9%; Other 8.8%vs5.7%. There were no other significant differences in baseline characteristics, including similar rates of overweight and obesity despite the significant change in distribution of ethnicities. Regarding outcomes, there were non-significant lower rates of insulin use, caesarean delivery and LGA, and higher early delivery rates in Group1. There were more Small for Gestational Age (SGA) infants in Group1 compared to Group2 [9.2vs4.7% (p<0.05)]. This remained significant following adjustment for ethnicity.

Conclusions: Following adoption of new ADIPS 2014 GDM diagnostic criteria, there was a significant reduction in SE Asian background diagnoses, but more SGA.

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Are the changes in diagnostic criteria for Gestational Diabetes Mellitus reflected in pregnancy outcomes: a retrospective assessment?

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We have shown previously that recent changes to the diagnostic guidelines for Gestational Diabetes Mellitus (GDM) increase the occurrence of GDM. The aim of this study was to compare in the same retrospective data maternal and neonatal complications between groups diagnosed using the new and old criteria in order to assess the impact on pregnancy outcomes. The study population was 647 women, most of who were diagnosed under previous guidelines following 50g glucose screening. Oral glucose tolerance testing (OGTT) and pregnancy care was at a tertiary centre between 2011 and 2015. All neonates were singletons. Neonates born to women now excluded from a GDM diagnosis with 120 min glucose concentration (8.1-8.4 mmol/L) had significantly less NICU/SCN admissions (5.8% s 13%; X^2, p=0.031) and 60% less premature deliveries (i.e. ≤37 wks gestation) (X^2, p=0.021) . Women diagnosed by new fasting criterion (5.1-5.4 mmol/L) and the new 60 min group (≥10 mmol/L) both had significantly more macrosomic neonates (i.e. birth weight ≥90%ile) in comparison to all other groups (18-20% vs <5%, X^2, p ≤ 0.005) and statistically fewer small for dates babies (7.9% vs 19.1% in new 120 min group) (X^2, p = 0.006). Overall low APGAR scores (<7 at 1 and 5 min) were reflected in the number of admissions to NICU/SCN and was greatest in the new fasting group (18% and 6% respectively). The number of LUSCS was statistically lowest (29.8%) in the new 120 min group and highest in the fasting group (42.1%) (X^2, p=0.017). Outcomes support the lowering of the fasting diagnostic criterion to extend management of GDM to limit growth of large birth weight neonates and their sequelae. The 120 min groups had an increased occurrence of low weight neonates, which might decrease with a review of management in this group.

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What is the relationship between pre-pregnancy BMI and fasting and post load OGTT values in Pregnancy?

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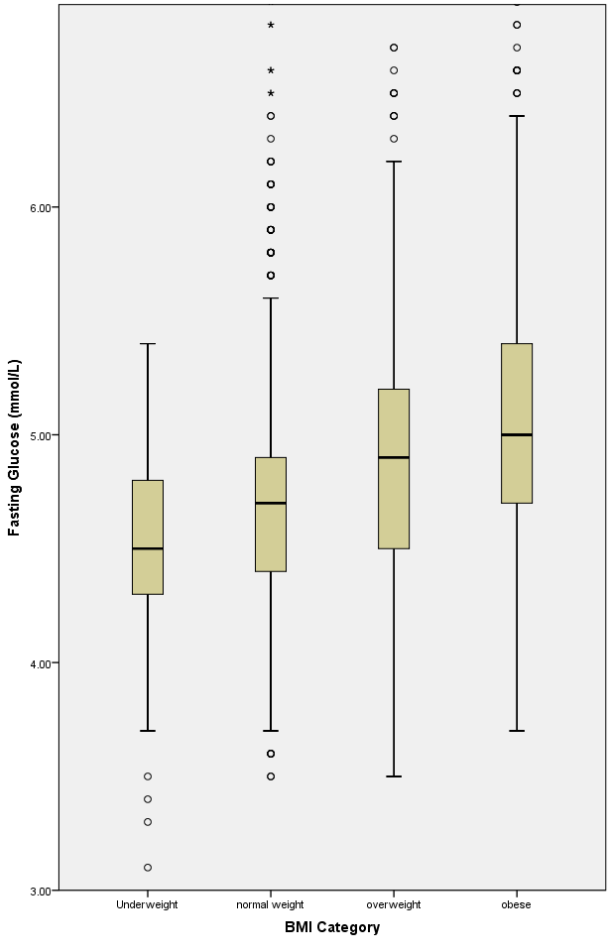
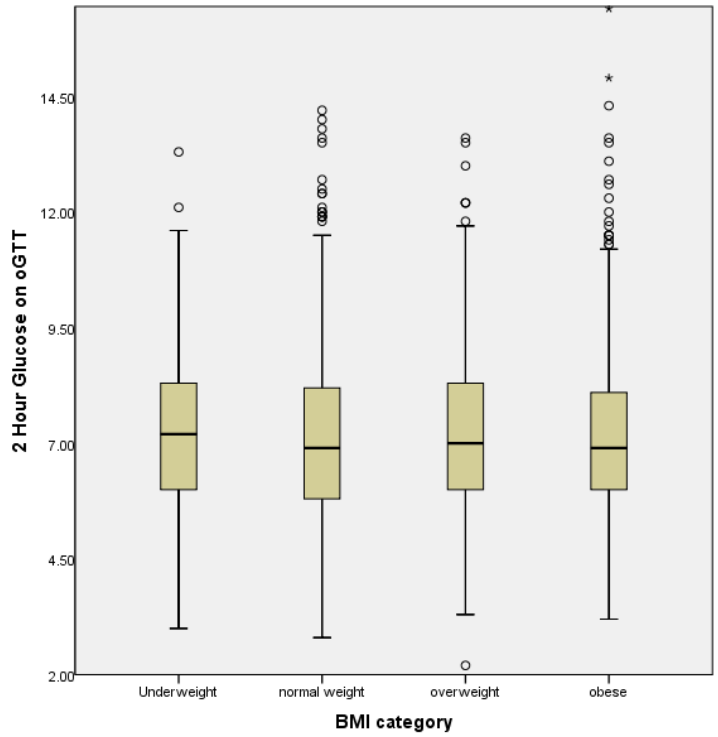
Background: The new ADIPS GDM diagnostic criteria includes a lower diagnostic fasting value cut-off for GDM on the 75g oral Glucose Tolerance Test (oGTT)(≥5.1mmol/L) and a higher 2-hour value (≥8.5mmol/L). Pre-pregnancy obesity is a known risk factor for the development of GDM. There is a paucity of evidence exploring the relationship between pre-pregnancy BMI and fasting and 2 hour post load oGTT values.

Aim: To determine the association between pre-pregnancy BMI, fasting and 2-hour post load oGTT values in women diagnosed with GDM.

Methods: Results of the 75g oGTT results were obtained from the Sydney South West Pathology Service database for singleton pregnancies between 2011-2015. Bivariate analysis (Pearson's correlation) was used to evaluate correlations between pre-pregnancy BMI and fasting and 2–hour values as continuous variables. Box plots were created between fasting and 2-hour values and BMI categories (underweight; ≤18.5kg/m^2, healthy weight; 18.5-24.9kg/m^2, overweight; 25.0-29.9kg/m^2, obese; ≥30.0kg/m^2) and oGTT results. Statistical significance was defined as p<0.05.

Results: Of a total of 10967 pregnancies, 3739 pregnancies had oGTT data. Pre-pregnancy BMI as a continuous variable was found to be positively correlated with the oGTT fasting BG value (Pearson's r=0.328, p<0.0001), but not the oGTT 2 hour value (Pearson's r=0.03, p=0.08). The Boxplot diagrams below demonstrate the relationships between BMI categories, fasting, and 2 hour glucose values.





Conclusions: The current findings suggest that pre-pregnancy BMI positively correlates with impaired fasting glycaemia but not the 2 hour post load oGTT value. Given both the lowering of the fasting glucose oGTT value cut off with new criteria and the increasing prevalence of elevated BMI in women of child bearing age, diagnosis of GDM based on fasting oGTT values is likely to increase. Further research into management of impaired fasting glycaemia in women with GDM and pre-pregnancy overweight or obesity is therefore warranted.

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Biomarkers and GDM risk prediction

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Background and aim: Gestational diabetes (GDM) presents a major health and financial burden in terms of screening, treatment and complications. We aimed to explore cross sectional relationships between serum biomarkers and glucose levels at hospital booking <20 weeks (T1) and at 24-28 weeks gestation (T2).

Methods: This is a cross-sectional, prospective sub-study of the TOBOGM pilot study, recruiting women from hospital clinics at Campbelltown public hospital, with high risk of GDM at the booking antenatal visit (<20 weeks gestation). Participants had an oral glucose tolerance test (new ADIPS GDM criteria), with fasted serum samples (for fasting C-peptide, insulin, glucose, triglycerides, adiponectin, leptin and 3-betahydroxybutyrate) collected at <20 weeks gestation (T1) and 24-28 weeks gestation (T2). Women randomised for treatment for their 'Booking' GDM at T1, did not have blood tests at T2. Univariate cross sectional analyses were performed using Stata.

Results: Data from 79 women were available for this sub study. Mean age was 28.3±5.4 years and BMI was 30.3±7.3 kg/m^2. At T1 and T2 there were 21/79 (26.6%) and 21/69 (30.4%) women with GDM respectively. Insulin (OR=1.016, p=0.001), C-peptide (OR=1.003, p=0.001), 3-betahydroxybutyrate (OR=1.013, p=0.008), leptin (OR=1.025, p=0.015) and adiponectin (OR=0.878, p=0.029) were related to GDM status at T1 via logistic regression analysis. At T2, insulin (OR=1.007, p=0.038), C-peptide (OR=1.002, p=0.016), 3-betahydroxybutyrate (OR=1.015, p=0.036), and triglycerides (OR=2.48, p=0.029) were associated with increased risk of GDM. Adiponectin and leptin were no longer associated with GDM status at T2. No other tested biomarkers reached statistical significance.

Conclusion: This pilot sub-study suggests that insulin resistance and 3-betahydroxybutyrate are related to GDM status at both hospital booking and at 24-28 weeks. Inflammation is related to GDM at booking. Further studies are needed to establish drivers of glucose status in pregnancy and to explore predictors of GDM development.

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Seasonality, temperature and pregnancy oral glucose tolerance test results in Australia

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The oral glucose-tolerance test (OGTT) is currently the standard method for diagnosis of gestational diabetes (GDM). We conducted a post hoc analysis using the Australian HAPO data to determine seasonal variations in OGTT results and the consequent prevalence of GDM. Women enrolled in the Australian HAPO study sites (Brisbane and Newcastle) from 2001 to 2006 were included if OGTT results between 24 to 32 weeks gestation were available (n = 2120). Fasting plasma glucose, 1-h plasma glucose, 2-h plasma glucose, HbA1c, and HOMA-IR values were categorized by season and correlated to monthly temperature records from the Australian Bureau of Meteorology for Brisbane and Newcastle. GDM was defined post hoc using the IADPSG/WHO criteria. Small but significant ($p < 0.01$ on ANOVA) elevations in fasting glucose (+0.12mM), HbA1c (+0.09%), and HOMA-IR (+0.88 units) were observed during the winter months. Conversely, higher 1-h (+ 0.19mM) and 2-h (+0.33mM) post-load glucose values (both $p < 0.01$) were observed during the summer months. The correlations between fasting glucose, 1-h glucose, 2-h glucose, and HbA1c with average monthly temperatures confirmed this trend, with positive Pearson's correlations between 1-h and 2-h glucose with increasing average monthly temperatures, and negative correlations with fasting glucose and HbA1c. Overall prevalence of GDM did not display significant seasonal variations due to the opposing trends seen in the fasting versus 1-h and 2-h post-load values. A significant winter increase was observed for fasting plasma glucose, HbA1c, and HOMA-IR, which contrasted with changes in1-h and 2-h post-load venous plasma glucose values. While overall prevalence of GDM did not vary significantly by seasons, this study illustrates that seasonality is indeed an additional factor when interpreting OGTT results for the diagnosis of GDM.

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A Case of Lactation Ketoacidosis following a Low Carbohydrate (Ketogenic) diet

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Lactation ketoacidosis is a rarely described form of elevated anion gap metabolic acidosis precipitated by the large glucose requirement incurred during lactation. When available body glucose stores are inadequate to meet the energy requirements of metabolism whilst lactating (such as in low carbohydrate diets), water soluble ketone bodies are derived from fat stores to be utilised as fuel. This occurs in a low-insulin, high-glucagon environment, where lipoprotein lipase stimulates hepatocyte mitochondrial conversion of fatty acids to acetyl-coA, to enter the ketogenic pathway and form acetoacetate, beta-hydroxybutyrate and acetone.

We describe a case of a woman, 5 months post-partum and breastfeeding twins, following a ketogenic very low carbohydrate diet designed to regain her pre-pregnancy weight, who presented unwell, with a pH of 7.065, bicarbonate 6.8mmol/L, serum ketones 7.1mmol/L, and an anion gap of 25mmol/L. Lactate was 1.04mmol/L. Diabetic and alcoholic ketoacidosis were excluded, as was ingestion of salicylate and other organic acids. A dietary history revealed a very-low carbohydrate, hypocaloric diet of approximately 35g of carbohydrate, and 1000 calories daily. The diagnosis of lactation ketoacidosis was made. Management included intravenous dextrose and adequate caloric intake, and her biochemistry normalised within 48 hours. Dietician review and education formed the cornerstone of her admission. There are only 5 cases of lactation ketoacidosis described in the literature, and of these, 2 occurred secondary to very low carbohydrate diets designed to promoted ketosis and weight loss. With the increasing popularity of ketogenic diets to regain pre-pregnancy weight, women who are breastfeeding should be educated about this concerning complication during lactation. Adequate caloric intake to support lactation should be encouraged.

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Factors associated with neonatal Hyperbilirubinaemia in Gestational Diabetes Mellitus

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Background: Neonatal hyperbilirubinaemia occurs more frequently in Gestational Diabetes Mellitus (GDM), than among normal pregnancies, however this correlation has not been thoroughly investigated in recent literature. The aim of this project was compare maternal and neonatal characteristics from pregnancies complicated by GDM and neonatal hyperbilirubinaemia.

Methods: This was a retrospective clinical audit of pregnancies complicated by GDM under the Macarthur Diabetes Clinic at Campbelltown Hospital between 01/01/2013 and 01/12/2015 using a standard audit sheet and standard clinical definitions. Hyperbilirubinaemia was defined as per NICE guidelines as total serum bilirubin>250 micromol/L at any given gestation. GDM was diagnosed as per ADIPS 1997/2013 guidelines before/after January 2015 respectively.

Results: Births from 652 women with GDM were studied and 30 (4.6%) had births documented as being complicated by neonatal hyperbilirubinaemia (index cases). Of these cases, 20 (66.7%) neonates required phototherapy. Mean age (30.15 ± 0.7 vs 31.93 ± 0.4) and pre-pregnancy body mass index (27.31 ± 0.5 vs 29.83 ± 0.3) were not significantly different, but maternal fasting glucose on oral glucose tolerance test was significantly higher in index cases (5.4±0.1 vs 5.1±0.1 mmol/l; p=0.026) who were also born earlier (36.9±0.5 38.7±0.1 weeks p<0.001) with lower birthweight (2841±127 vs 3312±25g p<0.001). There was also significantly higher incidence of neonatal hypoglycaemia (13.5% vs 2.0% p<0.05) amongst neonates with hyperbilirubinaemia and noted to have a non-significantly lower incidence of insulin treatment (27.38 vs 31.65%).

Conclusions: Significant neonatal hyperbilirubinaemia in pregnancies complicated by GDM is more likely among women with a higher fasting glucose or babies born earlier and/or with lower birthweight. The lower rates of insulin treatment among cases of neonatal hyperbilirubinaemia suggests that stricter glycaemic control may be beneficial in reducing the incidence of neonatal hyperbilirubinaemia. More research is needed to guide practice and reduce the incidence of neonatal hyperbilirubinaemia in GDM.

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Maternal glycaemic biomarkers associated with birthweight and 'large-for-gestational-age' infants in pregnancies affected by diabetes

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Publish consent withheld

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Hyperglycaemia associated with antenatal corticosteroid use

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Background: Antenatal corticosteroid treatment for pregnant women at risk of preterm delivery has been documented to reduce the incidence of neonatal respiratory distress syndrome, accelerate foetal lung maturation and reduce perinatal mortality. Several studies have demonstrated transient hyperglycaemia associated with antenatal corticosteroid use in women with Gestational Diabetes Mellitus (GDM), however the magnitude and duration of hyperglycaemia in each group is yet to be fully determined. International guidelines have recommended that women with GDM receiving antenatal corticosteroids are monitored closely and receive additional insulin, however to date, such protocols have yet to be validated. Methods: Pregnant women who were planned to receive 2 doses of antenatal betamethasone 24 hours apart, were enrolled to receive continuous glucose monitoring (iPro2 Medtronic) for 5 days' duration, commencing 2 days prior to first dose. Women with GDM were assigned to receive increased doses of insulin following the administration of betamethasone according to a pre-specified protocol. Peak glucose levels, nadir glucose and median glucose was calculated and compared between women with GDM with those without. Duration and degree of hyperglycaemia exposure was calculated from area and time under the curve. Results: Median peak glucose in those without GDM was 9.8 mmol/L (range 8.1–10.8), compared to 7.6mmol/L in those with GDM treated with insulin as per the pre-specified protocol. Peak glucose occurred between 08:40hrs and 36:30hrs post 1st dose corticosteroid. Hyperglycaemic exposure varied considerably in individuals, with median of 16.55mmol/L/hr (range 7.9–90.5) in those without GDM, and was greater than those with treated GDM. Time exposed to hyperglycaemia 72 hours after first dose of corticosteroid was between 12.5–65.3 hours. Conclusions: Exposure to antenatal corticosteroids results in significant hyperglycaemia both in women with GDM and in those without. A proactive insulin treatment approach in those with GDM may help to reduce hyperglycaemic exposure.

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Using insulin pumps in pregnancy: understanding insulin pumps

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Management of type 1 diabetes necessitates the delivery of exogenous insulin to replace absent endogenous secretion. The delivery needs to mimic as closely as possible the normal physiological pattern of insulin secretion, which includes basal insulin release and meal-related secretion spikes. This is achieved through either Multiple Daily Injections (MDI) of basal and rapid acting insulins or Continuous Subcutanenous Insulin Infusion (CSII) of rapid acting insulin via insulin pump. An insulin pump is an external battery powered mechanical device about the size of a mobile phone. Rapid acting insulin (insulin aspart (Novorapid) or insulin lispro (Humalog)) within a reservoir is pumped via thin tubing to a small cannula inserted subcutaneously controlled by a computer according to settings.

Pump settings include:

- Basal infusion rates: custom built rates variable according to the time of day.
- Bolus settings: carbohydrate(CHO) to insulin ratio (CHO:insulin), as grams of CHO/unit of insulin; insulin sensitivity factor (ISF), as mmol/L glucose lowering per unit of insulin.
- Glucose target (e.g. 5.5±5 mmol/L)
- The CHO:Insulin ratio, ISF and glucose targets can vary according to the time of the day.

All settings are revised periodically according to glucose profiles. Lower or higher temporary basal rates can be set for exercise/ sick days. Bolus insulin is given at times of meals and snacks according to carbohydrate content and the blood glucose concentration. Boluses can also be given as corrections for elevated blood glucose levels between meals. Insulin pumps can have connectivity with continuous glucose monitoring (CGM) with a low glucose suspend feature. As insulin pumps infuse rapid insulin only, their failure will rapidly result in hypoinsulinaemia, with a high risk of diabetic ketoacidosis. Insulin pumps offer increased flexibility in insulin delivery and should assist women with type 1 diabetes to achieve optimal glycaemic control for improved pregnancy outcomes.

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Insulin pump therapy in pregnancy

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This presentation will explore the use of insulin pumps in pregnancy, focussing on practical applications as well as research-based outcomes. Insulin pump therapy (IPT) is now established as a safe and beneficial way of insulin delivery during pregnancy. It can be particularly helpful in managing the changes in glucose metabolism that occur across pregnancy, especially in the setting of morning sickness, the onset of insulin resistance during mid-pregnancy and during the peripartum period. Optimising blood glucose levels with IPT requires a motivated patient and the support of a highly skilled and supportive multi-disciplinary team. It specifically requires knowledge about basic and advanced pump functions, siting cannulas, adjusting insulin settings to accommodate changing requirements and the ability to problem solve with blood glucose data at a highly sophisticated level. Evidence suggests that glycaemic control with pumps is not inferior to subcutaneous multi-dose insulin (MDI) regimens in pregnancy. High quality research comparing IPT with MDI regimens with respect to maternal and fetal outcomes is still emerging. However, recent research has demonstrated the benefits of continuous glucose monitoring in pregnancy for improving neonatal outcomes with both IPT and MDI. Insulin pump and related technologies are continuing to progress, with closed loop insulin delivery evolving as a promising option for pregnancy.

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Cardiac disease in pregnancy and the patient experience

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Background
Cardiac disease in pregnancy is associated with maternal morbidity and mortality. It is a leading cause of maternal mortality in high income countries such as Australia. There is limited research on the patient experiences of women with cardiac disease in pregnancy and the impact on planning and managing healthcare for women. The aim of this study was to explore the decision-making processes and health care experiences of women with cardiac disease who were either pregnant or contemplating pregnancy.

Methods
We conducted a systematic review of qualitative research of the experiences of women with cardiac disease in pregnancy following the PRISMA statement guidelines. We identified 1018 publications with 11 included in the meta-synthesis and thematic analysis.

Results
Women with heart disease reported a spectrum of health care experiences. The four main themes were: 1) women's autonomy and control (including four distinct foci: taking charge of decision-making, lack of control, emotional uncertainty of decision-making, and helplessness, fear and vulnerability); 2) health care experiences (with three foci: health information needs, responsive care, and listening to women); 3) self-care and risk awareness in pregnancy; and 4) social support for decision-making.

Conclusions
There is limited integrated, women-centred care for women with cardiac disease in pregnancy. Co-design of services that includes the voice and experiences of women are needed to inform women-centred approaches to managing complex care in pregnancy.

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SOMANZ Priscilla Kincaid-Smith Lecture

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Although maternal mortality is shown to be declining, it is estimated that around 800 women die daily as a result of complications of pregnancy. 85% of this burden lies with Sub-Saharan Africa and Southern Asia, with all ten of the countries with the highest maternal mortality ratios being in Africa. Pre-eclampsia (defined as hypertension and proteinuria occurring during pregnancy) is associated with around 40,000 maternal deaths annually, with the vast majority of these also occurring in low and middle income countries. The World Health Organisation estimates that around 26% of severe maternal outcomes are associated with pre-eclampsia or eclampsia, making it the second leading cause of such outcomes. Pre-eclampsia is also associated with poor fetal outcomes, including fetal growth restriction, and intrauterine fetal death. Restricted or under-staffed maternity services, particularly in rural areas with poor transport systems, mean that women may present late or infrequently to antenatal care. However, even when uptake of antenatal healthcare in low and middle-income countries is high, pre-eclampsia remains under-diagnosed. Given that urinalysis by dipstick has low specificity, early and accurate identification of at-risk women depends on regular and accurate blood pressure monitoring. However, training in the use of the technically challenging sphygmanometer is often lacking, and equipment may be lacking or defective. Once pre-eclampsia is diagnosed (often at a late stage), skilled management is essential: currently this is timely delivery of the infant with trained professionals in attendance, preceded by seizure prevention and antihypertensive control. However, access to such care may be restricted by limited transport and referral options, particularly for poor women in rural settings. Although magnesium sulphate has been shown to be effective in the prevention of eclamptic seizures, it is yet to be used widely in many low and middle income countries. Access to antihypertensive medication may also have similarly limited availability. These are only temporising measures that reduce morbidity prior to delivery. Efforts to reduce maternal morbidity and mortality due to the complications of pre-eclampsia in low and middle income countries are therefore based around improving primary care centres' abilities to identify at risk women (especially by accurate blood pressure monitoring) which must be accompanied by improved access to medication and facilities where induction of labour and caesarean section can be carried out. This talk will discuss management strategies that could address pre-eclampsia associated morbidity and mortality, particularly in low and middle income countries. It will describe the evolution and implementation of the CRADLE Vital Signs Alert in a low income settings.

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An alternative to maternal intramuscular steroid injections for fetal lung maturation in women with Type 1 diabetes.

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Maternal intramuscular administration of the corticosteroid, betamethasone, frequently results in significant disruption of blood glucose in women with Type 1 diabetes. This case series describes the use of ultrasound-guided fetal intramuscular steroid injections to achieve fetal lung maturation without disruption of maternal blood glucose.

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Effectiveness of enoxaparin for prevention of Venous Thromboembolism during pregnancy and post-partum

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Background:

Low-molecular weight heparin (LMWH) is used to prevent pregnancy-associated venous thromboembolism (PA-VTE). The efficacy of this approach is unclear and may depend on dose and choice of LMWH.

Aims:

To evaluate the efficacy and rate of complications with thromboprophylaxis using enoxaparin in a cohort women at risk of PA-VTE managed between 1998 and 2014 at National Women's Hospital, a tertiary obstetric referral centre in Auckland, New Zealand (NZ).

Methods:

A retrospective, observational study of women who received thromboprophylaxis with enoxaparin for prevention of PA-VTE while under the care of the obstetric or maternal fetal medicine team at NWH from 1998 to 2014.

Results:

Two hundred and thirty pregnancies in 156 women were identified. In the majority of pregnancies (n=200; 87%), women received a single daily dose of 40mg enoxaparin. Low dose aspirin (100mg daily) was given in 84 pregnancies (n=54 women). There was one breakthrough VTE during pregnancy in the study group (0.4%). Two women suffered intracranial haemorrhages (ICH) on treatment, one of whom died. Both women had significant underlying comorbid conditions (Brain tumour, severe hypertension) as the primary cause of ICH. Postpartum haemorrhage (PPH) occurred in 20 (8.7%) of pregnancies, Blood or blood products were given in seven pregnancies (n=4 women) for either antepartum or postpartum haemorrhages. Neuroaxial analgesia/anaesthesia was used in 134 births (58%) including 75% of emergency caesarean sections.

Conclusion:

Thromboprophylaxis with enoxaparin dosed according to current local guidelines appears effective at preventing PA-VTE. The use of LMWH did not impact on the rates of epidural or spinal use for analgesia/anaesthesia. While rates of obstetric bleeding complications were similar to the local general obstetric population, serious non-obstetric bleeding occurred in two women, one of whom died as a result. We therefore do not support the use of higher doses of LMWH in this population.

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Introduction of the sFlt-1/PlGF Ratio Test for the Prediction of Preeclampsia in a Pregnancy Day Care Setting in an Australian Tertiary Perinatal Centre: A Budget Impact Assessment

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Raised blood pressure readings are frequently encountered in the antenatal clinic out-patient setting, but do not always reflect actual or impending preeclampsia (PE). To clarify the possibility of actual or impending PE, one common approach is a short stay (4 hour) admission to a Pregnancy Day Care Centre (PDCC) for blood pressure monitoring and and relevant laboratory testing. Often, significant PE is diagnosed in only a minority of women as a result of such PDCC review, in which case they are then admitted for on-going inpatient ward care. On the other hand, the majority of PDCC reviews for suspected PE often have sequential visits for blood pressure and test monitoring in order to confirm or exclude a diagnosis of PE. This approach is resource intensive, with currently available laboratory tests showing poor predictive value for the diagnosis of PE. It also burdens the woman and her family with diagnostic uncertainty and repeated hospital visits. Recent research has demonstrated the value of the sFLT-1/PlGF ratio blood test for predicting PE. An audit was therefore undertaken comparing the standard PDCC admission regimen with the use of the sFLT-1/PlGF ratio test in 197 women admitted for suspected PE to the Royal Women's Hospital PDCC over a 4 month period. As part of this audit, a budget impact assessment was performed which compared current PDCC cost/revenue figures for such admissions with an alternate model involving initial testing using the ratio, with those testing "low risk" continuing as outpatients rather than being admitted to PDCC. This analysis suggested use of the ratio test in this way would potentially reduce such admissions by 65%, generate a potential direct budgetary benefit of over $50,000 pa, and improve patient experience by reduced hospital visits and improved diagnostic certainty, without compromising clinical care standards or patient safety.

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Assessment of novel predictive biomarkers for pregnancy complications

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Efficient growth and development of the placenta is crucial to the success of a pregnancy. Conditions such as preeclampsia (PE) and intrauterine growth restriction (IUGR) are associated with abnormal placentation and as such are associated with high maternal and/or fetal morbidity and mortality. Currently, the only form of treatment for both conditions is delivery, often pre-term, which can severely impact the long-term health of the baby. Additionally, there are no screening tests available to predict at risk pregnancies before symptoms appear nor are there any that can provide guidance to clinicians with respect to timing of delivery. Therefore, the aim of our study is to identify novel predictive biomarkers that can detect pregnancies at risk of PE and IUGR. Serum samples were collected from women 26-41 weeks' gestation with known outcomes of PE, IUGR, PE/IUGR or healthy pregnancies collected prior to and at term (< or >38 weeks gestation, respectively). We used a nuclear magnetic resonance (NMR) spectroscopy based metabolomics approach to identify metabolites (small molecules) that correlated with each disease. Initial spectral analysis segregated healthy and pathological pregnancies into distinct groups. We subsequently developed predictive models based on 25 metabolites. The resulting predictive model for distinguishing PE from healthy pregnancies had 93.5% probability of correctly identifying a PE pregnancy. The same metabolite panel was proven to provide robust and accurate prediction of PE in an independent validation cohort. This suggests that metabolic screening techniques can identify a metabolite model that could potentially be developed into an early predictive test to identify at risk pregnancies and/or screening tests to aid in clinical management of identified high risk pregnancies.

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Utility of Pulse-Wave Analysis in First-trimester Prediction of Pre-eclampsia

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Introduction: Early pregnancy prediction for the development of pre-eclampsia can be improved. Currently, a number of logistic regression models are employed internationally to perform this task. Women planning to deliver within our institution undertake one such risk assessment. This is performed at $11\text{-}13^{+6}$ weeks of gestation, and is based upon the UK Fetal Medicine Foundation model. Parameters assessed include mean arterial blood pressure, uterine artery pulsatility index, serum PAPP-A and previous maternal history. However, the main issue with these models is their poor positive predictive value. In addition, markers of arterial stiffness have been found to be elevated in pre-eclamptic pregnancies compared to normal pregnancies, providing a potential means of further identifying women who go on to develop pre-eclampsia.

Objectives: To determine if cuff-based pulse-wave analysis can improve the performance of a currently employed first-trimester risk prediction model for pre-eclampsia.

Methods: A prospective cohort study of all women undertaking first-trimester assessment also had their pulse-wave analysis performed using a cuff-based device.

Results: 1,793 women underwent first-trimester screening at Royal Prince Alfred Hospital, between June 2013 to May 2014. Central systolic and diastolic blood pressure (CSP, CDP) was higher in women who developed pre-eclampsia (CSP 109.5mmHg vs 102.5mmHg, $p<0.01$; CDP 79.9mmHg vs 74.4mmHg, $p<0.01$). There was no significant difference in augmentation pressure (AP) or heart-rate adjusted augmentation index (AIx75) in women who developed pre-eclampsia versus those who did not (AP 4.2 vs 4.3, $p=0.76$; AIx75 18.6 vs 18.3, $p=0.88$). When attempting to determine if an elevated AP or AIx75 improved the model, we found that the addition of either did not improve the positive predictive value of the current model (PPV ranged from 0-11.4%).

Conclusions: Cuff-based pulse-wave analysis does not appear to improve the ability of the current model to identify women who will go on to develop pre-eclampsia.

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Acute Kidney Injury in Pregnancy and the Puerperium

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Background

Acute kidney injury (AKI) either during pregnancy or postpartum is associated with significant maternal and neonatal morbidity. Past population-based studies (1999-2011) in US and Canada suggest the incidence may be increasing, with contributing factors including increasing rates of hypertensive disorders of pregnancy (HDP) and CKD. We aim to determine recent developments in this apparent trend in a local population.

Methods

All public hospital admissions with pregnancy >20 weeks gestation in Victoria, Australia (2006-2016) were identified by ICD-10 diagnostic codes from a validated administrative database. Analysis included 560,778 antenatal and postpartum admissions, of which 533,876 included delivery. Trends in AKI incidence and associated risk factors were examined, and multivariate logistic regression determined whether changes in risk factors explained observed temporal changes.

Results

The incidence of AKI per 10,000 deliveries rose from 2.37 in 2006 to 11.59 in 2016, p<0.001. Of the 499 AKI cases, 228 (45.6%) also had CKD, 22 (4.4%) required renal replacement therapy, and 3 (0.6%) died. The strongest risks factors associated with AKI (unadjusted OR, 95% CI) were: CKD (473.8, 318.1-578.3), chronic hypertension (49.8, 28.2-88.0), HDP (16.1, 11.3-22.9), pre-existing diabetes (43.4, 29.2-64.4), and critical care admission (153.4, 95.9-245.4). Other risk factors included: year of admission, maternal age, sepsis, postpartum haemorrhage, Caesarian delivery, and premature delivery. After adjustment (adjusted OR, 95% CI), the temporal relationship for AKI risk was maintained (1.11, 1.07-1.14), with strongest risk factors being: CKD (37.5, 23.6-59.6), HDP (12.32, 9.63-15.76), and sepsis (7.32, 5.32-10.08), p<0.005 for all variables.

Conclusion

The incidence of obstetric-related AKI continues to rise. This trend persists after adjusting for factors such as HDP, CKD and maternal age. Other, as yet unidentified or unmeasured factors may be implicated, such as greater awareness and reporting of AKI and increasing complexity of maternal comorbidities. Long-term risks of obstetric-related AKI remain to be determined.

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Predictors of lower vitamin D status in pregnant women with asthma and its association with preeclampsia

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Circulating 25-hydroxy-vitamin D [25(OH)D] <75nmol/L is common in pregnant women with asthma and associated with worse infant respiratory outcomes. In women with asthma, who are at increased risk of adverse perinatal outcomes, this study aimed to: (i) examine the determinants of 25(OH)D levels during pregnancy; and (ii) examine whether low vitamin D is associated with poor perinatal outcomes. In 103 pregnant women with asthma, recruited from the John Hunter Hospital NSW Australia, serum 25(OH)D was measured at 17 and 36 weeks gestation, using enzyme-linked immunosorbent assay. Body mass index (BMI), gestational weight gain (GWG), asthma outcomes, and perinatal outcomes were recorded. Women were split into two groups: 25(OH)D <75nmol/L at both time-points vs. ≥75nmol/L at one or both time-points. Backward stepwise regression modelled determinants of baseline and change (Δ) in 25(OH)D. Controlling for season, obesity (β=-12.9, p=0.008) was a significant determinant of baseline 25(OH)D (Adj-R^2=0.12, p=0.005); ICS use was not (β=7.4, p=0.09). Baseline obesity (β=9.1, p=0.047), GWG above recommendations (β=-8.0, p=0.04), and season (Winter β=14.2, p=0.004; Spring β=17.4, p=0.002) were significant predictors of Δ25(OH)D (Adj-R^2=0.39, p<0.001), controlling for ethnicity; exacerbations during pregnancy were not (β=-4.9, p=0.18). Fifty-eight women (56%) had 25(OH)D levels <75nmol/L at both time-points. The incidence of preeclampsia was significantly greater in the persistently <75nmol/L group vs. those with higher vitamin D status: 8.6% (n=5) vs. 0%, p=0.04. Infant perinatal outcomes tended to be higher in the <75nmol/L group, but weren't statistically significant: NICU admission (10.5% vs. 4.4%, p=0.26) and respiratory distress (10.5% vs. 2.2%, p=0.10). In women with asthma, obesity and excessive GWG were significant modifiable determinants of baseline 25(OH)D and Δ25(OH)D during pregnancy. Importantly, vitamin D status may influence preeclampsia, a major complication in pregnancy. These data highlight the need for nutritional management in prenatal and antenatal care and requires further investigation in a larger cohort.

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Effect of placental growth factor on trophoblast integration into endothelial cell networks in the presence of inflammation

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Introduction: Invasion of maternal spiral arterioles by trophoblast cells is fundamental to normal placental development. Abnormal spiral arteriole remodelling is often present in pregnancies affected by preeclampsia. Placental growth factor (PlGF) is produced by the placenta and this molecule is decreased during early pregnancy of women with preeclamptic pregnancy as compared to unaffected women. The influence of PlGF on the processes of early placentation is not known. Objectives: To observe the effect of supplemental PlGF upon capillary-like uterine endothelial cell networks and a first trimester human trophoblast cell line in the presence or absence of inflammation induced by exogenous tumour necrosis factor-alpha. Methods: 24-well tissue culture plates were coated with 300 uL of undiluted Matrigel and allowed to gelatinise at 37^{o}C for 30 minutes. Fluorescent labelled uterine myometrial microvascular endothelial cells and HTR8/SVNeo cells were co-cultured (1 X 10^5 per well) for 20 hours treated with PlGF (10 ng/mL) and /or TNF-alpha (0.5 ng/mL). Images were captured by fluorescence microscopy and analysed using ImageJ. Experiments were repeated 8 times, data was analysed using SPSS v24.

Results: TNF alpha reduced trophoblast cell integration into endothelial networks (Control vs TNF p = 0.03) but this was not ameliorated by addition of PlGF (TNF vs TNF + PLGF p = 0.51). Furthermore, PlGF supplementation itself did not improve cell integration (Control vs PlGF p = 0.48). Conclusions: Placental growth factor does not improve trophoblast cell integration into endothelial cell networks nor reverse the inhibitory effect of TNF alpha.

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Primary hyperparathyroidism in pregnancy: a retrospective review of management and maternofetal outcomes at the Royal Brisbane and Women's Hospital 2000 to 2015.

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Objectives: Primary hyperparathyroidism (PHPT) in pregnancy has historically been associated with significant maternofetal morbidity and mortality. This study reviewed maternofetal outcomes of medically and surgically managed patients at the Royal Brisbane and Women's Hospital between 1/1/00 and 31/12/15 inclusive.

Methods: Charts for 23 patients, amongst whom there were 28 pregnancies (2 that ended in early miscarriage), were reviewed. Details of conservative and/or surgical treatment were recorded. Pregnancy outcomes assessed included gestation at delivery, indication for and mode of delivery, and the development of complications attributable to PHPT (miscarriage, pregnancy-induced hypertension or pre-eclampsia, urinary tract infections, nephrolithiasis, pancreatitis and hypercalcaemic crisis). Neonatal outcomes assessed included birth weight, Apgar scores at 5 minutes, admission to the neonatal intensive care unit (NICU) and neonatal hypocalcaemia (with or without tetany or seizures).

Results: Twenty-two pregnancies were managed conservatively, whilst 6 patients underwent parathyroidectomy in pregnancy (5 in trimester 2, and 1 at $K32^4$). Most patients managed conservatively either had a corrected serum calcium concentration less than 2.85 mmol/L in early pregnancy or were diagnosed in trimester 3. Of viable conservatively managed pregnancies, 30% were complicated by pre-eclampsia, and pre-term delivery occurred in 50% of this group. All pre-term neonates required admission to NICU for complications related to prematurity. All surgically managed patients were delivered at term, and there were no complications of parathyroid surgery. There was 1 case of transient neonatal hypocalcaemia that did not require treatment, and no cases of neonatal tetany or seizures.

Conclusions: Maternofetal complications attributable to primary hyperathyroidism in pregnancy appear to have improved relative to that in early medical literature in both conservatively and surgically managed patients. However, conservative management was associated with an increased risk of pre-eclampsia. Surgery in trimester 2 appears to be safe. More information on surgery in trimester 3 is required.

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Pregnancy outcomes in women with a history of stroke

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Background: Little is known about the pregnancy outcomes of women who have had a stroke prior to a first pregnancy.

Aim: To identify a cohort of nulliparous women giving birth to a single baby and compare the pregnancy outcomes of those with a pre-pregnancy stroke hospitalisation record to those without a stroke hospitalisation record.

Method: Data linkage study of all nulliparous women aged 15–44 years with singleton pregnancies birthing in New South Wales from 2003–2015. Stroke was identified from 2001–2015 hospital data using ICD10-AM codes I60–64. Women whose first hospital record of stroke was during pregnancy or <42 days after birth were excluded. Outcomes included any diabetes or hypertension during pregnancy, mode of delivery, postpartum haemorrhage, severe maternal morbidity (validated composite outcome indicator), gestational age at birth, 5 minute Apgar score and health service utilisation.

Results: Of 487,767 women with a first pregnancy, 124 (2.5/10,000) had a hospital record which included a pre-pregnancy stroke diagnosis. Women with a stroke history were more likely to have a caesarean without labour (31% vs. 11%, P<0.0001) but no more likely to have a caesarean after the onset of labour (20% in each group). There were no significant differences in other maternal or neonatal outcomes.

Conclusion: This is the largest reported study of pregnancy and birth outcomes for women with a history of stroke. With the exception of pre-labour caesareans, there were no differences in pregnancy outcomes for women with a history of stroke compared with women with no history of stroke. These results should reassure women with a history of stroke who are pregnant or considering a pregnancy and assist in pre-conception counselling and future fertility planning.

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GDM implications for the offspring

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Fetal environment may influence a range of health outcomes. Maternal type 1 and type 2 diabetes exert a clear influence on children's risk of glucose intolerance and hypertension. I will consider the relation of gestational diabetes to health outcomes in children and how these might influence diagnosis and management.

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Managing a mix of complex medical problems during pregnancy

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At the core of Obstetric Medicine is the art of collaboration and communication. This is never more true than with the management of a complex medical conundrum in a pregnant woman. Our case describes a young woman with severe lupus, quiescent preconception on a monoclonal antibody, presenting with worsening hypertension and proteinuria at a pre-viable gestation. Uncertainty surrounding the diagnosis, exacerbation of her complex regional pain syndrome, steroid-induced diabetes and significant radiation exposure were only some of the complexities complicating her 70-day admission. Her emotional and mental health, already borderline, was severely impacted. Underpinning all of this was a true multidisciplinary team of physicians, obstetricians, psychiatrists, nursing, midwifery and diabetes staff aiming to work collaboratively to safely prolong the pregnancy and ensure the best possible outcomes for mother and child.

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A patient with type 1 diabetes and complications

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A 32 year woman with type 1 diabetes from the age of 10 years and a past history of Graves' disease is referred to your clinic from the country for optimisation of her care. She and her partner are keen to start a family. She has established diabetic microvascular complications. The issues that arose pre-pregnancy, during pregnancy and after pregnancy for this woman and her partner will be presented for discussion.

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Introduction to the NHMRC Lactoferrin Evaluation in Anaemia of Pregnancy (LEAP1) Trial

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Iron deficiency - the world's commonest nutritional disorder - affects over 2 billion people. Women and children are at greatest risk. No RCTs have assessed the effects of treatment on fetal growth (measured as birthweight for gestational age) and child development. Oral iron may increase maternal IL-6 concentration, upregulating hepcidin activity, downregulating ferroportin and trapping iron in enterocytes, hepatocytes and macrophages, leading to hypoferraemia and potentially influencing risk of preterm birth. Oral lactoferrin may reduce these effects. Although IV iron is increasingly used, no RCTs have tested its effects on maternal IL-6 concentration, fetal growth or child development. The NHMRC LEAP1 trial will compare oral iron and oral lactoferrin in women with or at risk of iron deficiency anaemia who present in the second trimester. Women will be randomly assigned to 80 mg oral elemental iron daily or 200 mg oral lactoferrin, in identical capsules in a blinded two arm study. IV iron will be reserved for women who do not respond by 36 weeks gestation. The co-primary outcomes are (i) fetal growth (birth weight for gestational age) and the proportion of women who receive IV iron infusion by standard protocol or whose Hb closest to delivery (but after 34 weeks gestation) is less than 110 g/L. All are welcome to learn more about this important first step in answering the question "Is oral lactoferrin more effective and better tolerated in treating iron deficiency anaemia in pregnancy than oral iron?"

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Establishing the ADIPS Diabetes in Pregnancy Clinical Audit Programme

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Both pre-existing diabetes (PDM) and gestational diabetes mellitus (GDM) are associated with adverse pregnancy outcomes. Although modern care is effective, pregnancies complicated by diabetes remain 'high risk'. Diabetes in pregnancy outcomes in Australia could be enhanced through improvements in access and quality of care. One of the approaches to improve

quality of care is through audit and benchmarking. ADIPS previously successfully piloted an Australasian Diabetes in Pregnancy Audit Programme (Simmons D, Cheung NW, Lagstrom J, Flack JR, McIntyre HD, Bond D, Johnson E, Wolmarans L, Wein P, Sinha AK for the ADIPS National Diabetes in Pregnancy Audit Project team. The ADIPS Pilot National Diabetes in Pregnancy Audit Project. Aust NZ J Obs Gynae 2007;47:198-206) and this stimulated ongoing internal audits across Australia and New Zealand. Since this project, other centres have commenced their own audits as part of a quality improvement process. In the UK and elsewhere, national audit and benchmarking programmes have been associated with improvements in care. The ADIPS Board have now agreed to recommence a national programme, inviting members onto a working group with defined Terms of Reference. Issues to be addressed are agreement over the data items and their definition, information governance (including security, privacy, consent and ethical issues), reporting and benchmarking processes, handling overlap with other data collection programmes, and approaches to maximize participation across Australasia. The goal of the process is to support diabetes in pregnancy services to optimize and maintain standards of care, to support local and national funding applications and to continuously improve the pregnancy outcomes of women with diabetes in pregnancy.

POSTER PRESENTATION

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21-YEAR-OLD PREGNANT WOMAN WITH MATURE ONSET DIABETES OF THE YOUNG-5

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The term 'Maturity-Onset Diabetes of the young' (MODY) was first described in 1976 and is currently referred to as monogenic diabetes. There are 10 known entities accounting for 1–2% of diabetes and are frequently misdiagnosed as either type 1 or 2 diabetes. Correct diagnosis of monogenic diabetes has implications on managing patients and their families. MODY-5 is an entity that is associated with genitourinary malformations and should be considered by obstetricians in pregnant women with a family history of diabetes, genitourinary malformations fetal renal anomalies and a screen positive for diabetes. We are reporting a case of a 21-year-old pregnant patient with a bicornuate uterus, high HbA1c at antenatal screening and fetal renal anomalies that were suggestive of a MODY 5 diabetes.

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Predicting risk of spontaneous preterm birth in women with and without prophylactic intervention in situ: the QUiPP app is safe and generalisable

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Introduction

The QUiPP app is a clinical risk-prediction tool that we developed and validated (Kuhrt et al.) for the prediction of spontaneous preterm birth (sPTB). The algorithm combines results from predictive tests (quantitative fetal fibronectin and cervical length) with clinical risk factors to generate a predicted risk value for delivery <30, <34 and <37 weeks' gestation, and within 7 or 14 days.

The app was created using an asymptomatic cohort of women at high risk of sPTB, some of whom had received prophylactic intervention (cerclage / progesterone). Our objective was to establish whether the app accurately predicts risk, or underestimates risk for women who do not receive intervention, secondary to the treatment paradox.

Methods

We performed a retrospective sub-analysis of women who did not receive intervention, at two time points (the first visit between 18^{+0}-21^{+6} and 22^{+0}–27^{+6} weeks'). Risk of delivery before 34 weeks' was calculated with the algorithm, and using a clinically important threshold of 5% (<5% represented 'low-risk' and >5% 'high-risk'). Predicted event rates were compared with actual rates of sPTB (%).

Results

All women who delivered early in our 'high-risk' group (risk >5%) were appropriately identified [early gestation: 14.2 v 6.0% (22/367), p=0.000001; late gestation 13.4 v 7.6% (29/383), p=0004]. The number of women who delivered before 34 weeks' gestation (actual event rate) was lower than that predicted by the app. The event rate in the 'low-risk' group (risk <5%) was the same or lower than predicted [early gestation: 2.5 v 0.8% (4/473), p=0.01; late gestation: 2.2 v 1.7% (13/788), p=0.39].

Conclusion

The QUiPP app is a safe and accurate risk-prediction tool in women with and without intervention. If anything, it slightly overestimates risk of sPTB. The treatment paradox does not influence accuracy, and it can be relied upon to safely target care.

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The Neutrophil-to-Lymphocyte Ratio and its relationship to placental inflammation and infection in late miscarriage and preterm birth

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Objectives

The Neutrophil-to-Lymphocyte Ratio (NLR) is a recognised marker of inflammation and infection, but evidence regarding its role in pregnancy is limited. Placental inflammation and infection is frequently implicated in spontaneous preterm birth (sPTB), particularly in the early preterm period when neonatal outcomes are poorest. Our aim was to characterise NLR levels from routine booking bloods and prior to late miscarriage or early sPTB. We evaluated its relationship to placental histology, investigating its role as a simple, low-cost marker of inflammation.

Methods

This was a planned sub-analysis of a larger prospective cohort study investigating markers of sPTB. Our cohort was comprised of asymptomatic high-risk women attending a Prematurity Surveillance Clinic between 2002-2015, with late miscarriage or sPTB, available placental histology and timely blood results. Placental histology was categorised as either inflammatory (e.g.

chorioamnionitis) or non-inflammatory (reflecting normal or vascular pathology). NLR was calculated from routine full blood count (FBC) at booking and prior to delivery. Receiver Operating Characteristic (ROC) curves were plotted and Area Under the Curve (AUC) calculated for predicting inflammation.

Results

NLR was significantly raised at delivery compared to antenatal booking bloods (n=156, NLR 8.8 versus 3.69, p<0.0001, 95% CI 4.1 to 6.2). 70% (109/156) of women had inflammatory placental lesions. Mean delivery NLR was significantly raised compared to those with normal or vascular placentas (9.81 versus 6.53 p = 0.0021, 95% CI -5.35 to -1.21). Delivery NLR had AUC of 0.67 for predicting inflammation (SE 0.048, 95% CI 0.58 – 0.77)

Conclusion

In high-risk women, NLR is raised at early delivery, compared to booking. Delivery NLR is significantly higher in women with placental inflammation, compared to those with normal or vascular placental findings. NLR, calculated from routine FBC may inform prognosis and management for women in threatened preterm labour.

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Review of Stillbirths from Diabetic and Gestational Diabetic Mothers at Westmead Hospital, Sydney

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The incidence of pre-existing diabetes in women of reproductive age is rising worldwide. This is particularly alarming, as the complications of a diabetic pregnancy are well recognised and may result in stillbirth or neonatal death. This audit aims to review the maternal and diabetic characteristics of diabetic stillbirths at a major tertiary centre in order to determine the cause of death and possibly reduce the incidence of future stillbirths. All stillbirths of diabetic mothers at Westmead Hospital during 2006-2017 were retrospectively identified through an obstetric database. Paper medical records and the local clinical database were then utilised to obtain data pertaining to maternal, obstetric and diabetic characteristics, antenatal screening and autopsy results. Stillbirths were categorised into common causes. Of the 22 women included in the audit, 5 had Type 1 diabetes (T1DM), 8 had Type 2 diabetes (T2DM) and 9 had gestational diabetes (GDM), with a total of 23 stillbirths. Major congenital malformations were identified as the most common cause of stillbirth in 5 cases, followed by obstetric factors and intra-uterine growth restriction (IUGR) in 4 subjects each. Malformations were predominantly cardiovascular (n=3) , central nervous (n=3) and musculoskeletal (n=3), consistent with known diabetic anomalies. Amongst the stillbirths, there was no difference in malformations between the T1DM or T2DM groups (p=0.16). Suboptimal glycaemic control defined as HbA1c >6% was present in all 5 T1DM subjects, 6 out of 8 T2DM subjects and 1 out of 7 GDM subjects at some stage during the pregnancy. In the crucial first trimester, 3 out of 3 T1DM subjects and 3 out of 5 T2DM subjects had inadequate glycaemic control. Our study has illustrated the need for more aggressive management of diabetic pregnancies, particularly of pre-existing diabetes prior to pregnancy, in order to reduce the risk of stillbirth.

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Outcomes of Dilated Cardiomyopathy in Pregnant Women from an Australian Tertiary Centre for Maternal Medicine

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Background: Peripartum cardiomyopathy is associated with significant risks of decline in left ventricular function and adverse maternal and foetal outcome in subsequent pregnancies. The risks of pregnancy in women with pre-existing dilated cardiomyopathy are less well defined. We aimed to assess the outcome of pregnancies in women with dilated cardiomyopathy seen at our tertiary institution for maternal medicine in Queensland, Australia. Methods: We conducted a retrospective audit of medical records and transthoracic echocardiography images reviewing the outcomes of 14 pregnancies to 12 women with dilated cardiomyopathy. Results: There were no cardiac events in the pregnancy women during pregnancy and no decline in left ventricular function during pregnancy was observed. There was a high rate of prematurity and subsequent adverse foetal outcome, including 4 neonatal deaths. Conclusion: Maternal outcomes in this small series were satisfactory though only three women had moderate-severe left ventricular dysfunction as defined by echocardiography at baseline. There was a high rate of premature delivery and adverse neonatal outcome associated with this.

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Urinary PlGF in preeclampsia and intrauterine fetal growth restriction - an alternative to circulating biomarkers

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Preeclampsia is a pregnancy specific complication associated with alterations in angiogenic factors placental growth factor (PIGF) and soluble fms-like tyrosine kinase 1 (sFlt-1). Most studies of preeclampsia have assessed the value of serum, but not urinary, measurements of sFlt-1 and PIGF. Apart from proteinuria/albuminuria, urinary biomarkers of preeclampsia and intrauterine fetal growth restriction (IUGR) are lacking. The objective of this study was to investigate whether urinary PIGF and sFlt-1 are suitable as markers in preeclampsia and IUGR. We also aimed to compare test characteristics of these biomarkers and compare these to circulating markers. A cross-sectional case control study was conducted on 50 pregnant women between 24-40 weeks of gestation recruited and classified into four groups: normal pregnancy (N), preeclampsia (PE), preeclampsia plus IUGR (PE+IUGR), and IUGR respectively. Urine and blood were collected from the subjects (n = 20 N, n = 18 PE and PE+ IUGR, n = 12 IUGR) at term. ELISA was used to measure plasma and urinary PlGF and sFlt-1. There was a significant correlation between plasma PlGF and urine PlGF normalized to creatinine in preeclampsia and normal controls. We found reduced urinary PlGF (p-value <0.001) and increased sFlt-1 (p-value <0.05), as well as increased sFlt-1 to PlGF ratio (p-value <0.05) in groups with PE, PE+IUGR, and IUGR only compared to normal controls. There is no difference of urinary PIGF and sFlt-1 between the PE, PE+IUGR and IUGR groups. The results of our study suggest that urinary PIGF/Creatinine can differentiate between normal and pregnancy complications of preeclampsia and IUGR. Measurement of urinary PIGF may be an alternative to measurement of plasma biomarkers in assessing for preeclampsia. We suggest a future prospective longitudinal study to examine the value of urinary PIGF in predicting development and severity of preeclampsia and IUGR.

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Interventions designed to reduce gestational weight gain can reduce the incidence of gestational diabetes: a systematic review and meta-analysis

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Excessive gestational weight gain (GWG) increases the risk of gestational diabetes mellitus (GDM). Many interventions have been designed to reduced GWG. However, the effect on GDM is still unknown. This systematic review (SLR) aimed to (i) evaluate the impact of interventions designed to prevent excessive GWG on the incidence of GDM, and (ii) examine if effects differ by geographical region and body mass index (BMI). A SLR of randomised controlled trials (RCTs) was conducted without date limits using seven international databases and three Chinese databases. RCTs that reported a primary/secondary aim to reduce excessive GWG and the incidence of GDM were considered. Two authors independently identified and assessed the included studies. Meta-analysis data are reported as risk ratio (RR) for GDM incidence with interventions covering diet, physical activity (PA) and lifestyle (diet plus PA).Of 20,517 manuscripts screened, 45 were included and 37 were included in the meta-analysis (n=12,942). Diet interventions reduced the risk of GDM by 44% (RR: 0.56, 95% CI: 0.36-0.87, p=0.009), while PA interventions reduced the risk by 38% (RR: 0.62, 95% CI: 0.50-0.78). Both lifestyle interventions and BMI did not significantly alter the risk. PA interventions from Southern Europe reduced GDM risk by 37% (RR: 0.63, 95% CI: 0.50, 0.80). Both diet and lifestyle interventions conducted in Asia resulted in a 62% (RR: 0.38, 95% CI: 0.24, 0.59) and 32% (RR: 0.68, 95% CI: 0.54, 0.86) reduction in GDM, respectively. Interventions designed to prevent excessive GWG can reduce the risk of GDM. Regional differences indicate that other factors possibly physiological and/or behavioural responses to intervention type must be taken into consideration when planning GDM prevention strategies, certainly, the one size fits all approach is not supported.

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Elastography: a novel evaluation of abdominal subcutaneous fat in pregnancy

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Introduction: Adipose tissue(AT) fibrosis is a result of chronic inflammation, attributed to excessive extracellular matrix proteins providing mechanical support in AT(1). An increasing degree of fibrosis in adipose tissue is associated with Body mass index(BMI) and insulin resistance(2). Real-time Ultrasound Elastography(RTE) is a useful tool in assessing fibrosis in liver disease(3) but has not been previously used to assess adipose tissue fibrosis. The variance of abdominal subcutaneous tissue(AST) density was assessed using RTE. Secondarily to correlate fat thickness and BMI and fat density.

Method: Women(n=210)recruited in early pregnancy. AST was imaged, utilising two anatomical layers, superficial subcutaneous fat(SSAT) and deep subcutaneous fat(DSAT). Density of adipose tissue was assessed using RTE. Quantitative measures were achieved using two methods, strain values (SV) and ImageJ software to calculate the percentage colour pixels in the Elastography image. Density measures were correlated with BMI and fat thickness.

Results:adipose tissue demonstrated a variance of density; range of SSAT SV(0.04 – 0.49) mean(SD) was 0.2(0.08) DSAT SV range(0.05 – 0.9) mean 0.25(0.1), SV ratio range(0.0 – 2.0) mean 0.84(0.29). Density calculated from colour pixel percent for SSAT range for soft fat was(0.0 - 0.69), mean 0.12(0.13), medium fat, range (0.0 – 0.99), mean 0.59(0.18) and hard fat (0.0 – 1.0), mean 0.29(0.2). DSAT:soft fat range (0.0 - 0.93), mean 0.26(0.21), medium fat, range (0.0 – 0.99), mean 0.59(0.17) and hard fat range (0.0 – 0.92), mean 0.21(0.21). SSAT layer was denser than DSAT. There was poor correlation of tissue density measures with BMI: R^2 (0.00 - 0.07) and adipose tissue thickness: R^2 (0.01 - 0.02).

Conclusion: Elastography demonstrated density differences in adipose tissue. Overall SSAT was denser than DSAT. There was poor correlation of density with BMI/fat thickness. Elastography analysis correlated with insulin resistance and histology may provide new insights, establishing fundamental information on obesity related disease in pregnancy.

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Tocolytic Induced Acute Pulmonary oedema - A case report

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Introduction

Acute pulmonary oedema in pregnancy is associated with increased maternal and foetal morbidity. Cardiac disease and preeclampsia are recognised causes of acute pulmonary oedema. Nifidpine induced acute pulmonary oedema in pregnancy is uncommon and under recognised in clinical practice. There are many case reports of acute pulmonary oedema associated with intravenous Nicardipine and beta 2 agonist. We report a case of acute pulmonary oedema associated with standard dose of oral Nifidipine possibly confounded by concurrent intravenous steroids and fluids.

Case report:

28 year old female, G2P1, presented with antepartum haemorrhage at 32 weeks of gestation to a regional hospital. She was previously well with no significant surgical or medical history. She was treated for preterm labour with Betamethasone 11mg and Nifedipine 20mg, 6 hourly. After 12 hours of the second dose of betamethasone she developed palpitation and shortness of breath. The heart rate was 144 beats per minute regular with an oxygen saturation of 93% in room air with rest of the observations within normal range. Examination was unremarkable apart from bibasal fine crackles in the lungs. Chest Xray showed evidence of pulmonary oedema, CT pulmonary angiogram was negative for acute thromboembolic disease and echocardiogram was normal. Septic and pre eclampsia screen were negative. The Brain natriuretic peptide and troponin were elevated to 880 and 0.046 respectively. A diagnosis of acute pulmonary was made on the basis of clinical and radiological findings. She was treated with intravenous frusemide 40mg daily for 24 hours. After 24 hours her heart rate reduced to 90 beats per minute and oxygen saturation improved to normal. Nifedipine and intravenous fluids were stopped at the same time. A diagnosis of Nifedipine induced acute pulmonary oedema was established after excluding other causes for shortness of breath.

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The validity of cutoff ≥ 130 mg/dl in 50g-Oral glucose challenge tolerance test for gestational diabetes mellitus screening

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BACKGROUND: The aim of this study was to evaluate the screening for gestational diabetes identify the validation of 50g-Oral glucose challenge test, a cutoff of >130 mg/dl is better for GDM screening.

METHODS: A total 1,279 pregnant women were delivered at our facility during 2015 to 2016, 436 cases were excluded. Finally, 843 pregnant women underwent 50-g oral glucose-tolerance testing for gestational diabetes mellitus at 18 to 24 weeks of gestation. Gestational diabetes mellitus (GDM) diagnosed on the International Diabetes in Pregnancy Consensus Group (IADPSG) criteria. The screening glucose challenge test for gestational diabetes mellitus involves drinking a solution containing 50 grams of glucose, and measuring blood sugar levels 1 hour later. Most of institutes accept the cut-off point > 140mg/dl. We set the cut-off point at 130 mg/dl for strictly screening. Forty-five cases of negative results of 50g-GCT include the 8 cases of GDM.

RESULTS: A casual blood glucose test (>100mg/dl) is insufficient screening for GDM. The morbidity of GDM is 18% between 130-139mg/dl blood glucose level . The morbidity of GDM is 24% between 140-149mg/dl blood glucose level . There is no difference between both groups. For GDM, 50g-Oral glucose challenge test, a cutoff of >130 mg/dl is better than 140 mg/dl for screening.

CONCLUSION: We propose GDM screening should be strictly (**cutoff of >130 mg/dl**) in accordance with changes of diagnostic criteria.

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Not so sweet - Diabetes in Pregnancy - The Central Australian Experience

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Alice Springs Hospital has a catchment area of approximately 1.5 million kilometres. This area crosses the state boundaries of South Australia and Western Australia. Our region is notable for its high Aboriginal population, its remoteness and its social disadvantage, with 74% of Aboriginal people assessed as living in the most disadvantaged quartile (1).

A retrospective audit of 794 pregnant women who birthed at the Alice Springs Hospital over a 12 month period from July 2014 to June 2015 was performed. Of the 594 women with analysable data the following results were obtained:-

• 2.8 % of women had Diabetes Mellitus first diagnosed in Pregnancy (DMIP),

• 11.9% had Gestational Diabetes Mellitus (GDM). The adoption of the new GDM criteria (2) had minimal impact on our referral numbers with only two extra women identified over 12 months.

• 6.7% had previously diagnosed Type 2 Diabetes Mellitus (T2DM) and 40% of those had a HbA1c of 8% or greater.

In summary 21.5% of our birthing cohort had some form of DIP - all categories of which were significantly higher than reported national levels (3), especially pre-existing T2DM which was 22 times more common! 95% of those with T2DM were of Aboriginal descent. Of concern was that 22.5% of women had no record of testing for DIP in their pregnancy and that only 17% of high risk Aboriginal women received the recommended early 75G OGGT. Logistically challenging for our clinic is the fact that the women with more severely deranged glycaemia (T2DM and DMIP) were more likely to be very remote dwelling Aboriginal women.

This study allowed our team to quantify our workload and assess our level of resourcing and models of care required to address the needs of our birthing women.

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Primary hyperaldosteronism presenting with Early Severe Preeclampsia : Case report

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Background:

Primary hyperaldosteronism is the most common cause of secondary hypertension. However very few cases are diagnosed during pregnancy due to physiological changes in the renin–angiotensin–aldosterone axis, leading to false negative results on screening, resulting in delayed appropriate treatment and high foetal and maternal morbidity and mortality.

Case discussion:

38 year old female with normal previous pregnancy, was noted to be hypertensive since first trimester and started on methydopa. Her blood pressure gradually worsened from 21 weeks of gestation despite up titrating antihypertensives (methydopa,labetalol and nifedipine LA) requiring admission for closer monitoring. She had persistent hypokalaemia with hypomagnesaemia and developed Severe Preeclampsia with proteinuria (2.5gm/day)anemia, hemolysis, thrombocytopenia and intrauterine growth retardation resulting in urgent caesarean section at 24 weeks gestation(Birth Weight:730gm). Investigations for Secondary Hypertension showed normal renal artery doppler, marginally raised urinary catecholamines due to methydopa use, high serum aldosterone:1466.9 pmol/L (97.3 - 834.0) (< 4 times upper limit of normal for pregnancy) and plasma renin activity: 0.75ng/ml/hr (0.66 - 3.08). Postpartum she had persistent hypokalaemia and hypertension. Serum aldosterone was 874pmol/L with plasma renin activity <0.13ng/ml/hr with confirmatory saline suppression test. The CT Scan of Adrenals was normal and patient declined Adrenal vein sampling.She is on medical therapy with spironolactone and potassium replacement.

Discussion:

Secondary causes of hypertension are estimated to complicate approximately 0.24% of pregnancies. Screening for secondary causes of hypertension should be considered in patients with early new onset or resistant hypertension keeping in mind the physiological changes and effect of medications. Persistent hypokalaemia and a plasma renin level of <4ng/ml/hr is an important clue to the diagnosis of primary hyperaldosteronism in pregnancy. Case reports of treatment with amiloride or eplerenone in patients with resistant hypertension during the second and third trimesters followed by spironolactone postpartum is considered a safe approach in pregnancy.

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Therapeutic heparin during the peri partum period – challenges associated with safe use.

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BACKGROUND: Expert opinion varies on the use of therapeutic unfractionated heparin during the peripartum period. While dosing guidelines have been suggested, their transition to clinical practice is lagging.

AIM: To evaluate the protocols employed, adherence to these protocols, and monitoring of therapeutic unfractionated heparin in obstetric patients during the peripartum period in a quaternary teaching hospital.

METHODS: This retrospective study investigated all women who received therapeutic heparin during the peripartum period between June 2014 and June 2016. The peripartum period was defined as 28 days prior to and post-delivery. Prescribing and administration information was obtained from the state-wide heparin infusion order form. Medical notes were studied to document the heparin infusion protocols utilised.

RESULTS: A variety of dosing approaches were used in the 20 patients studied. Heparin bolus dosing was correctly determined in 46% of results. Heparin infusion rate change was correctly determined in 64% of results. The APTT was correctly ordered by the medical officer in 230 results (66%), incorrectly ordered in 68 results (20%) and unable to make an interpretation in 48 results (14%). There were no cases of rethrombosis reported. Post-partum bleeding occurred in 2 patients. The APTT at the time of these bleeding events was noted to be subtherapeutic.

CONCLUSION: This study highlights the variability in therapeutic heparin protocols utilised during the peripartum period. The desire by clinicians to target a low APTT range during the postnatal peripartum period to balance bleeding risk has also been identified in this study.

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Microalbuminuria as an early predictor of preeclampsia in the pre-gestational diabetic population

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Preeclampsia complicates 2-8% of all pregnancies and is a major cause of maternal and perinatal morbidity and mortality worldwide. At present, spot urinary protein to creatinine ratio (uPCR) forms part of the diagnostic criteria of preeclampsia and aids clinicians in the stratification of perinatal risk, guiding management decisions. Women with pregestational diabetes are at increased risk of preeclampsia and other adverse pregnancy outcomes. We hypothesize that in these women, many cases of nephropathy are missed if uPCR alone is used, and that mild diabetic nephropathy, as assessed by those with elevated urinary albumin to creatinine ratio (uACR), is associated with worse pregnancy outcome. This study aimed to establish whether uPCR and uACR can be used as independent predictive markers for preeclampsia and adverse outcomes, and compare their respective prognostic ability. A prospective cohort study of 158 women with pre-gestational diabetes was conducted between 2013-2016, over three tertiary centres in Western Sydney. Urine was sampled in each trimester. The rate of preeclampsia within this cohort was found to be 17.1%. We found that both uPCR and uACR correlated with preeclampsia in trimester 3 (p-value 0.005, 0.012 respectively). While not statistically significant, there was a doubling in cases of preeclampsia in the microalbuminuric cohort compared to those with no albuminuria. This trend was not present with increasing uPCR levels in trimester 1. Subanalysis of the 113 patients with normal pregnancy uPCR (<30mg/mmol) in trimester 1 demonstrated that microalbuminuria was predictive of preeclampsia (p-value 0.01) and need for operative delivery (p-value 0.03). We conclude that in this high-risk obstetric cohort,

both uPCR and uACR have similar diagnostic ability, but microalbuminuria appears to have prognostic ability at a much earlier gestation. Therefore we suggest that assessing microalbuminuria rather than overt proteinuria in the 1st trimester provides prognostically useful information in women with pregestational diabetes.

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Ethical Issues Surrounding Midtrimester Preterm Premature Rupture of the Membranes

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Introduction: Midtrimester Premature Rupture of the Membranes (PPROM) can have devastating effects on fetal and maternal wellbeing. Management decisions can be difficult and present ethical challenges, particularly regarding termination of the pregnancy. This report aims to review these ethical issues and considerations to assist clinicians and patients with future management decisions.

Methods: Current literature related to the outcomes, management, prognosis and ethics of early PPROM was reviewed**.** Ethical considerations were examined in the context of a case of a 29-year-old woman who suffered from PPROM at 20+5 weeks, who then progressed to an emergency caesarean at 36 weeks gestation at a NSW district hospital with a level 2 special care nursery.

Results: Existing literature suggests that early PPROM is rare, however when it occurs, it is associated with increased neonatal and maternal morbidity. Complications for surviving neonates can include respiratory distress syndrome, pulmonary hypoplasia, intraventricular haemorrhage and limb contractures. If there is any evidence of maternal sepsis, termination of pregnancy is often recommended due to the significant risk of mortality or morbidity. Conversely, if the mother remains systemically well, she is presented with the difficult decision to continue or terminate the pregnancy, considering the poor prognosis for the foetus.

Discussion: It is not possible to accurately predict the foetal outcome, as this depends on numerous factors including the degree of oligohydramnios, the progression to chorioamnionitis and sepsis, and the gestational age at delivery. Therefore, counselling and management can be extremely difficult and requires sensitivity, reflection and careful consideration.

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A Retrospective Audit of the Efficacy and Impact of New Glycaemic Targets in the Treatment of Gestational Diabetes Mellitus on the Sunshine Coast

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The aim of the audit was to assess the effect on maternal and fetal outcomes of new treatment targets for Gestational Diabetes Mellitus (GDM), as recommended in the 2013 Australian Diabetes in Pregnancy Society (ADIPS) consensus guidelines (1). These new treatment targets were fully implemented in the Sunshine Coast Hospital and Health Service district by December 2016. Further data was collected regarding the subsequent impact on mode of delivery, outpatient resources, and overall healthcare service provision cost. Medical records of 286 patients with GDM diagnosed in our health service district from December 2016 until May 2017 were retrospectively audited and compared to patients diagnosed between January 2015 and June 2015. We excluded women diagnosed prior to a 24-28 week oral glucose tolerance test and patients who delivered at another facility from statistical analysis. Data collection is ongoing at time of writing with auditing of 241 charts completed. Preliminary data comparing the 2015 and 2016/17 cohorts shows an increased proportion of patients requiring treatment for GDM from 20.5% (n=15) to 24.7% (n=25) with metformin, insulin or both. There has been an increase in induction of labour from 27.4% (n=20) to 50.5% (n=50). The incidence of large for gestational age was 9.5% (n=7) vs. 12.1% (n=12) and neonatal hypoglycaemia was 12% (n=9) vs. 14.1% (n=14). Admission to the special care nursery (SCN) was 27% (n=20) vs. 24.2% (n=24) suggestive of slight decrease in admission rate, and there was a corresponding reduction in the median SCN length of stay from 3 days (range 1-15 days) to 2 days (range 1-12 days). This suggests the new treatment targets may increase induction of labour and perinatal morbidity with limited benefit. A subgroup analysis, cost analysis and discussion regarding contributors and confounders of the observed change in outcomes in our service will be presented.

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Home Blood Pressure Measurement in Women with Pregnancy-related Hypertensive Disorders

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Introduction: Home blood pressure measurement (HBPM) is being increasingly used in the general adult population for the diagnosis and management of hypertension. This is a result of HBPM being better correlated to clinical outcomes compared to

clinic blood pressure (BP) measurement, and the increasing availability of automated BP measuring devices. However, its use in pregnancy is unclear, and current clinical practice is still based upon hospital or clinic assessment of the women's blood pressure. Currently there is no evidence available that assesses the reliability or utility of HBPM.

Objective: To determine if HBPM provides comparable results to clinic BP measurement.

Methods: A prospective, single-centre study of 46 pregnant and early post-partum women with a hypertensive pregnancy or at high-risk of developing a hypertensive pregnancy. Study participants were asked to perform HBPM for a minimum period of one week. This was subsequently compared to clinic BP measurement both before and after the period of home measurement.

Results: The HBPM was found to be comparable to clinic measurements [for the systolic blood pressure (SBP), the mean home reading was 125.0mmHg (95% CI: 123.5-126.5mmHg) versus 123.9mmHg (95% CI: 121.3-126.5mmHg) for the clinic reading (p=0.37); for the diastolic blood pressure (DBP) the mean home reading was 82.2mmHg (95% CI: 81.0-83.3mmHg) versus 84.4mmHg (95% CI: 82.6-86.2mmHg) for the clinic (p<0.01)]. There were no reported issues associated with the use of HBPM, and it did lead to 5 women contacting health care professionals for management of their BP between clinic visits.

Conclusions: HBPM provides comparable results to the clinic BP measurement. It is also an acceptable technique for pregnant and early post-partum women. However, it cannot at this present stage replace clinic visits or clinic BP measurement.

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Neonatal body composition PEAPOD outcomes in young onset type 2 diabetes pregnancies: a comparison with type 1 diabetes

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There is increasing evidence that in-utero exposure to hyperglycaemia and excess weight impacts adversely on offspring metabolic risk. As young onset type 2 diabetes (YT2DM) is more prevalent we compared the impact of YT2DM on pregnancy outcomes and neonatal body composition to type 1 diabetes (T1DM). Clinical and PEAPOD body composition data were available from 27 T1DM (n=13) and YT2DM (n=14) pregnancies at RPAH. The majority of T1DM were Anglo-Celtic (62%), whereas 36% YT2DM were Asian, 29% Pacific Islander and 21% African. Maternal age was similar (34 yrs ± 5 YT2DM and 32± 4.7, T1DM). YT2DM was characterized by shorter duration of disease (2 yrs [0.8-2.9] vs 15[9-21]), higher pre-pregnancy BMI (28.9 vs 23.8 kg/m^2), and lower folate supplementation (7.1% vs 69%), p≤0.001 for all. HbA1c pre-conceptually and by trimester were similar (YT2DM 7.01%, 6.93%, 5.98%, 5.87%,T1DM 7.03%, 6.88%, 6.29%, 6.0%) however YT2DM had significantly higher insulin requirements (136 vs 74units/day) and higher prevalence of excessive gestational weight gain (71% vs 54%). Despite these differences, higher birthweight (3.6kg vs 3.1kg p=0.03) and greater neonatal fat-free mass (3.0 vs 2.8kg p=0.04) were seen in T1DM. There were no differences in % fat or % fat free mass. Diabetes type was not independently associated with % fat on multivariate analysis. Notably, IUGR frequency was 28.6% vs 0% (p=0.1) for YT2DM vs T1DM. There were no differences between T1DM and T2DM in delivery gestation (36.9 vs 37.3 weeks p=0.6), preterm delivery (15.4 vs 14.3% p=1.0), pre-eclampsia (7.7% vs 7.1% p=1.0), or primary caesarean rate (33% vs. 56%). Overall in YT2DM, in the context of comparable glycaemic control but higher pre-pregnancy weight and weight-gain, neonatal % body fat were not increased compared to T1DM and support the need for further study. The higher frequency of IUGR and low pre-conceptual folate use are concerning.

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Validation of clinical practice guidelines for predicting pre-eclampsia and tailoring aspirin prophylaxis: individual participant data meta-analysis

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Introduction

The Society of Obstetric Medicine of Australia and New Zealand (SOMANZ) considers low-dose aspirin for preventing pre-eclampsia in pregnant women at elevated risk. Doppler ultrasound and serum biomarkers have demonstrated very good accuracy for identifying high-risk women, but are not widely available. The National Institute for Health and Care Excellence (NICE) and United States Preventive Services Task Force (USPSTF) provide guidelines to identify high-risk women using routinely collected maternal risk factors, but these require clinical validation.

Objective

To assess the accuracy of NICE and USPSTF guidelines for predicting pre-eclampsia.

Methods

We conducted an individual-participant data meta-analysis using the Perinatal Antiplatelet Review of International Studies (PARIS) dataset. Randomised controlled trials were eligible if they enrolled pregnant women before 28 weeks' gestation, reported risk factors, and assessed pre-eclampsia. Women assigned to no antiplatelet therapy were included. Both guidelines recommend aspirin if ≥1 high-risk factors or ≥2 moderate-risk factors. Two moderate-risk factors (body mass index and pregnancy interval) were unavailable. For each guideline, we assessed sensitivity, specificity, positive (PPV) and negative (NPV) predictive value for predicting pre-eclampsia, and the number-needed-to-screen (NNS) to prevent one pre-eclampsia event.

Results

Eleven trials (n=10,659 women) had sufficient data to assess the guidelines. The pooled prevalence of pre-eclampsia was 8·3%. NICE sensitivity was 57·1% (95%CI 53·8–60·3%), specificity 72·4% (71·5–73·2%), PPV 15·7% (14·5–17·0%), NPV 94·9% (94·4–95·4%), NNS 211. USPSTF sensitivity was 58·7% (55·4–61·9%), specificity 69·8% (68·8–70·7%). For nulliparous women, NICE sensitivity was 25·4% (21·3–30·0%), specificity 91·4%(90·6–92·1%), PPV 16·7% (13·9–19·9%) and NPV 94·7% (94·1–95·3%), NNS 616.

Conclusion

NICE and USPSTF guidelines offer a simple and specific approach for identifying women at high-risk of pre-eclampsia where more advanced screening methods are not available. These findings can inform the development of Australian and international guidelines, and patient counselling for aspirin prophylaxis.

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De novo ANCA-Vasculitis in pregnancy

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Antineutrophil cytoplasm antibody (ANCA)-associated vasculitides are rare small vessel vasculitis. In pregnancy, they are associated with significant morbidity and higher risk of adverse pregnancy outcomes [1]. The management of *de novo* vasculitis in pregnancy is difficult as traditional medications – high dose steroids, Rituximab or cyclophosphamide may have implications for the fetus. We report a case of a 33-year-old female who presented with renal impairment at 12-weeks gestation (G2P1), on a background of Reynaud's disease, superficial thrombophlebitis, and a recent presentation of olecranon bursitis. MPO-ANCA titres were elevated. A renal biopsy indicated crescentic glomerulonephritis (60% crescents) with negative immonuperoxidase staining. Successful induction of remission for ANCA-associated glomerulonephritis was achieved with prednisolone and rituximab, complicated by maternal neutropenia. A healthy boy was delivered at 36-weeks gestation, with no evidence of pathogenic transplacental-transfer of anti-MPO antibodies [2]. There was no neonatal neutropenia, and B-cells were present (6% of lymphocytes), with normal CD20 expression. At 3-months post-partum, the patient remains on a weaning dose prednisolone with no steroid-sparing maintenance agent. There are a few case reports of de novo vasculitis during pregnancy with various treatments and outcomes, ranging from vasculitis not requiring any treatment [3], to effective treatment with prednisolone and IVIG [4], and another with prednisolone and cyclophosphamide [5]. The safety data on B-cell depleting therapies in pregnancy are lacking [6]. Studies of cynomolgus monkeys exposed during pregnancy to therapeutic doses of rituximab showed no evidence of teratogenic effects, however B-cells were temporarily reduced in the offspring [7]. A few case reports have demonstrated healthy pregnancy outcomes following maternal use for conditions such as lymphoma and rheumatoid arthritis [8], however congenital malformations (clubfoot) has been reported [9]. This is the first known case report of *de novo* ANCA vasculitis presenting during pregnancy successfully treated with rituximab, with nil adverse neonatal outcomes.

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Visualising the placental microbiota: can we see the bacteria?

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Background. Bacterial DNA has been detected in the placenta in healthy term pregnancies as well as in pregnancy complications. We recently demonstrated that the composition of the placental microbiota closely resembles that of the maternal oral microbiota at higher taxonomic levels but that the overlap decreases substantially at family and genus level. Bacterial DNA is however no conclusive evidence for the presence of bacteria in the placenta. The aim of this study is to study the presence of bacteria in placental tissue from healthy pregnancies and pregnancy complications.

Methods. Human placental samples selected from a cohort of women with and without pregnancy complications were stained for bacteria with a Gram tissue stain. DNA was isolated from the placental biopsies and the presence of 16S rRNA was examined with PCR and Q-PCR.

Results. Gram-positive and Gram-negative bacteria were detected in all placentas independent of clinical status. Bacteria were present in villous tissue and membranes. The bacteria were localized to the syncytiotrophoblasts, the villous parenchyma and blood vessels. Only a small number of placental samples were stained (n=5 healthy controls, n=5 late-onset pre-eclampsia and n=4 gestational diabetes), and no differences in the number or pattern of bacteria were detected. Bacterial 16S rRNA expression was detected in all placental samples and did not differ between the groups.

Conclusion. The placenta is colonised by bacteria in both villi and the membranes. All placentas showed presence of bacteria. The number and pattern of bacterial colonisation was not substantially altered by pregnancy complications but could differ in bacterial species type.

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The Use of Blood Transfusion in Severe Antenatal Anaemia

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Introduction: Anaemia is extremely common in pregnancy and has serious implications on maternal and fetal health. In cases of severe anaemia where haemoglobin is less than 70g/L, red blood cell transfusion may be required, however there is no universally accepted standard for transfusion in pregnancy. Therefore the decision to transfuse is currently made after consideration of clinical and haematological markers. The aim of this report is to review the literature regarding antenatal blood transfusion for severe antenatal anaemia.

Methods: Current literature related to the outcomes and management of severe antenatal anaemia was reviewed in the context of a 35-year-old woman who was referred to our district hospital at 36+4 weeks gestation with a haemoglobin of 47g/L, on a background of polysubstance abuse and minimal prior antenatal care.

Results: 56.4 million pregnant women (41.8%) worldwide suffer from anaemia. Fetal impacts can be significant, including impaired psychomotor or mental development, low birth weight, premature birth and increased neonatal morbidity. Maternal consequences include fatigue, dyspnoea, decreased immune function and greater morbidity following post partum haemorrhage. When managing severe antenatal anaemia, the current National Blood Authority Patient Blood Management Guidelines suggest the consideration of transfusion if haemoglobin is below 70g/L or the patient is symptomatic. Upon review of the literature, there were no studies that examined the maternal or perinatal outcomes of blood transfusion for the treatment of antenatal anaemia.

Discussion: Without concrete evidence to guide current practice for the management of severe antenatal anaemia, clinicians must use their best judgment in deciding the suitability of blood transfusion, whilst weighing the risks and benefits to the mother and fetus. We recommend the consideration of antenatal blood transfusion if haemoglobin is less than 70g/L (particularly if less than 60 g/L) and there is ongoing haemorrhage, hypovolemia, severe symptoms or evidence of cardiac decompensation.

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Recurrent fever in pregnancy

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A 36 year old Asian woman presented at 29 weeks gestation with fever, chills and rigors. The fevers were cyclical, with temperatures up to 38 degrees. In between episodes of pyrexia she felt well. She denied constitutional symptoms, recent travel, animal contact and illicit drug use. At 31 weeks she was admitted to hospital with intractable fevers. She looked washed out, with a temperature of 38.3 degrees. There was no lymphadenopathy, rash or arthritis. She had normal heart sounds, clear chest and normal abdominal examination. A full septic screen was unremarkable. The fevers were partially controlled with paracetamol taken at the onset of rigors. From 34 weeks gestation her fevers were lasting up to 5 hours daily and were no longer controlled by paracetamol. A course of penicillin was given without symptomatic improvement. At 36 +2 weeks gestation she presented in established labour and delivered a 2.33kg female. Cord blood pH was 7.9, apgars 9,9. Placental histology showed diffuse villitis, chorioamnionitis, chorionic and umbilical vasculitis with intervillositis and villous abscesses. No infectious aetiology was found. Her fevers settled immediately postpartum. At her 6 week postnatal review she was well. Interestingly she had similar pyrexia from 29 weeks gestation in her first pregnancy in California in 2012 and was admitted to hospital several times. Despite extensive investigations, no underlying infectious or autoimmune aetiology was detected. She was given courses of penicillin at 32, 34, 35 and 38 weeks gestation without effect. She was induced at 38 weeks gestation and delivered a healthy 3.33kg female. Pyrexia resolved immediately postpartum. Published cases of antenatal maternal pyrexia are mainly due to infections (either maternal or placental), with autoimmune and malignant aetiologies less commonly responsible. This represents a unique case of recurrent idiopathic fever in pregnancy, most likely due to primary placental pathology.

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Anorexia nervosa in pregnancy. A patient with assisted conception and a twin pregnancy managed at our hospital.

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we present a case of a 32 year old woman with history of anorexia nervosa who was managed at our hospital. She had treatment in italy in her early twenties and had long term sequel of osteopenia. she was treated with the contraceptive pill accordingly. since she was underweight and amenhorric she was advsied to gain weight to a minimum of 55 kg. She had ovarian stimulation and transfer of two embryos with assisted conception resulting in a DCDA twin pregnancy. She was initially seen for a medical consult at 27 weeks. She had gained minimal weight in this time. she had nutritional supplements and regular dietician review with a weight gain of about 8 kg at 35 weeks. She had a diagnosis of intrahepatic cholestatsis and IUGRwith growth of both twins around the 30 th percentile. She had an induced vaginal delivery of twins with weights of 2.4 and 2.3 KG and the babies spent two days in NICU. breast feeding was established with on going supportive nutritional treatment. This case highlights the need for multidisciplinary care of patients such as our patient. We aim to discuss complications that can be encountered in these patients in pregnancy.

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The emerging role of metformin in Gestational Diabetes Mellitus:- Study of collaboration between prescribing practitioners and allied health professionals in the care of women with hyperglycaemia in pregnancy.

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In Australia, metformin use for hyperglycaemia in pregnancy (HGiP) has increased; and is emerging as a potential co- or alternative treatment to insulin. However, use remains controversial in the community, with disparity between guidelines and accepted practice. Literature review provides evidence for efficacy and safety, in the short term, of metformin in HGiP (gestational diabetes mellitus and diabetes in pregnancy), with logistical benefits over insulin, the current gold standard.[1] Health professional product information (PI), Consumer Medicines Information (CMI) and the Therapeutic Guidelines recognise pregnancy as an 'off label' indication and advocate caution in this vulnerable population.[1] Diabex 500mg PI states *"When the patient plans to become pregnant and during pregnancy, it is recommended that diabetes should* ***not*** *be treated with metformin but insulin should be used….."*. The companion CMI also provides unfavourable information *"Do not take this medicine if you are pregnant or plan to become pregnant. The safety of Diabex in pregnant women has not been established. Insulin is more suitable …. Your doctor will replace Diabex with insulin … Do not take."* This is a concern for women prescribed metformin. As health professionals' duty of care is to 'first do no harm'; it is not surprising there is anecdotal evidence of hesitancy by some GPs to prescribe and pharmacists to dispense metformin for this indication. Research highlights that beliefs and attitudes expressed by women with

HGiP are strongly associated with the health care model and attitudes of the healthcare professionals they encounter.[2] Absence of effective collaboration, conflicting knowledge, practices and attitudes between professional groups could contribute to uncertainty or poor adherence in these women. As the first step in problem resolution is problem identification, we have explored the scale of the problem, information and other barriers to the quality use of metformin in HGiP.

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Mid-pregnancy Prediction of Preeclampsia using Placental Biomarkers

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AIM Placental biomarkers soluble Fms-like tyrosine kinase-1 (sFLt1) and placental growth factor (PlGF), when tested at mid-pregnancy, may predict preeclampsia. We aimed to determine whether PlGF and/or the sFLt1/PlGF ratio can predict preeclampsia when tested at mid-pregnancy in our patient population, and which of these biomarkers displays the greatest clinical utility in this setting.

METHODS This prospective study in singleton pregnancies included women attending their first antenatal visit at 19-22 weeks gestation. Maternal characteristics and medical history were recorded. Maternal blood was tested for sFlt-1, PlGF and the sFlt-1/PlGF ratio using the **cobas**®**e** 411 analyser (Roche Diagnostics, GmbH). Preeclampsia was the outcome measured. Biomarker results were converted to multiples of the median (MoM). Mean values were compared between patients with preeclampsia and unaffected pregnancies, and screening performance of sFlt-1, PlGF and the sFlt-1/PlGF ratio evaluated using receiver operating characteristic (ROC) curves.

RESULTS 512 patients were included. PlGF MoM values were significantly reduced in patients with preterm (<37 weeks) preeclampsia ($p<0.05$). Sensitivity, specificity, negative predictive value (NPV) and positive predictive value (PPV) for prediction of preterm preeclampsia were 62.5%, 84.6%, 99.3% and 6.3%, respectively, with AUC 0.783. sFlt1 and sFLt1/PlGF ratio values were not significantly different between patients with preterm preeclampsia and unaffected pregnancies, and sFlt1 did not further enhance prediction rates. Patients with term (≥37 weeks) preeclampsia displayed no significant difference in sFLt1, PlGF or the sFLt1/PlGF ratio compared with unaffected pregnancies.

CONCLUSION PlGF MoM values appear to effectively predict preterm preeclampsia at mid-pregnancy in asymptomatic women. PPV, and hence clinical utility, could be improved by reserving screening for high risk populations, or identifying high risk individuals based on clinical factors prior to screening. The addition of our PlGF values to a multivariate prediction model may further enhance the clinical utility of screening for preterm preeclampsia in our patient population.

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The Healthcare Experience for Women with Gestational Diabetes from Culturally and Linguistically Diverse Backgrounds

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Introduction: Women from culturally and linguistically diverse (CALD) backgrounds are at high risk of developing gestational diabetes mellitus (GDM). While the cornerstone of GDM management comprises dietary and lifestyle advice, it is unclear whether current GDM education is appropriate and relevant for CALD women.

Objectives: The aim of this study was to compare the healthcare experiences of women with GDM of Chinese, Indian and Korean ethnicity (identified as the leading GDM-CALD groups in our Local Health District) with the experiences of Caucasian Australian-born women with GDM who were attending antenatal clinics at Royal North Shore, Manly and Hornsby Hospitals for GDM management.

Methods: Women were invited to complete a questionnaire between 32-36 weeks' gestation on GDM self-management, cultural aspects of diet, and experience with the healthcare system.

Results: 75 women participated, 40 from CALD backgrounds (19 women from China, 16 from India and 5 from Korea) and 35 from Australian backgrounds. The mean ± SD maternal age was 34 ± 5 years, gestational age at GDM diagnosis was 24.9 ± 6 weeks and gestational age at questionnaire completion was 33.6 ± 2.5 weeks. Compared to Australian-born women, significantly more CALD women reported self-identity with culturally representative food ($p < 0.0001$), and a desire for more information on relevant foods appropriate to eat during pregnancy ($p < 0.0001$). In addition, fewer CALD women felt confident in asking healthcare providers about their GDM treatment ($p = 0.002$), to repeat information ($p = 0.001$) or in stating that they did not understand information provided to them ($p = 0.009$).

Conclusions: The healthcare experience for women with GDM from CALD backgrounds is less optimal than for Australian-born counterparts. Provision of culturally relevant and appropriate diabetes education and dietary information may improve the experiences of women with GDM from CALD backgrounds.

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Management of women with gestational diabetes by Obstetricians in "Home Teams"

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The implementation of new diagnostic processes and criteria for the diagnosis of gestational diabetes (GDM) contributed to a dramatic rise in the number of women diagnosed with GDM at RWH, with an increase of 83% between 2014 (414 women) and 2016 (792 women). Traditionally at RWH women with GDM were managed in the Diabetes Clinic. To cope with the dramatically increased workload, management of low risk women with GDM was devolved to Obstetricians in "home teams". High risk women continued to be managed in multidisciplinary diabetes clinics. To prepare them for their new role, Obstetricians were upskilled in GDM management in small group training sessions conducted by an Endocrinologist, Diabetes Educator (DNE) and dietician. An on-line training programme was also formulated and uploaded. The aims of this study were to determine whether the training of Obstetricians met their learning needs, and importantly to guide improvements in ongoing or future training. A brief 12-point questionnaire was given to 20 Obstetricians and 2 Registrars, with a 100% response rate. Only 2 doctors (9%) of those currently treating GDM attended initial face-to-face GDM training and no doctors were aware of the online training modules. The majority, despite lack of training, were confident in identifying women who needed to commence insulin therapy, but 50% felt the need to refer to the team DNE for titration of insulin doses. Most Obstetricians (78%) believed they had adequate time to address GDM-related issues. Furthermore, all felt they were adequately supported by DNEs, endocrinologists and dieticians. Most expressed a need for an update in GDM management. Very significant deficiencies in initial and ongoing training of Obstetricians who manage GDM were identified; further, they were unaware of online training resources. It is vital to provide ongoing education and support for Obstetricians who manage women with GDM at RWH.

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The impact of the IADPSG guideline for Gestational Diabetes Mellitus on a Secondary Hospital population

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Background: The Australian criterion for diagnosing gestational diabetes mellitus (GDM) was changed in 2015 to mirror the internationally applied IADPSG criterion. Research has predicted this would increase the incidence of GDM due to the lower fasting threshold and a new 1-hour diagnostic value.

Aims: To quantify the impact of the IADPSG guideline on the incidence of GDM at a secondary hospital in Australia. It was hypothesised that the incidence would increase with no associated difference in maternal or foetal outcomes.

Materials and Methods: This secondary hospital only cares for women with diet controlled GDM, with those requiring insulin or BMI ≥45kg/m^2 being referred to a tertiary hospital. The IADPSG criterion was introduced locally in September 2015. All births between January and June in 2015 (n=899) and 2016 (n=925) were included in the study. There were 71 women with GDM in 2015 and 56 in 2016. Blood glucose results and several pregnancy outcome data were analysed.

Results: Following the introduction of the IADPSG criteria, the incidence of GDM decreased from 7.90% to 6.05%. This 23% reduction was not statistically significant. There was no significant difference in maternal or foetal outcomes between the two cohorts. However, receiving tertiary hospital had a significantly higher (23%) incidence of GDM ($p<0.01$) in the 2017 period, under the new guideline. This is one of the highest recorded incidences in literature so far.

Conclusion: In a secondary hospital, the IADPSG criterion did not increase the incidence of GDM as expected but the incidence was markedly higher at the receiving tertiary hospital. More data is required to quantify the effect of the IADPSG criterion in Australia.

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Dysregulation of circulating lipids in patients with gestational diabetes

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Lipidomic analysis has provided candidate lipid biomarkers for early diagnosis of type 2 diabetes and cardiovascular disease. While it is known that hyperlipidaemia (particularly hypertriglyceridaemia) is associated with gestational diabetes (GDM), few studies have investigated the association between specific lipid species and GDM. This study aimed to investigate whether changes in serum lipid species are associated with GDM. Serum samples at fasting, 1-hour and 2-hour post-glucose load, of 175 pregnant women (mean age 29.6±4.7 years) were collected at 26-28 weeks' gestation during oral glucose tolerance tests. 17 women in this cohort developed GDM according to the ADIPS 1998 criteria. Lipidomic analysis of 305 individual lipid species was performed on fasting serum samples, using liquid chromatography electrospray ionisation-tandem mass spectrometry and MultiQuant 2.1.1. Insulin was measured by ELISA. Mixed effects models and Spearman's rank correlations were used to analyse the data. Two controls for each GDM patient were selected from the cohort, matched for age, ethnicity, vitamin D supplementation dose and pre-pregnancy BMI for comparison with the GDM. Across the whole cohort, there were significant positive associations between fasting insulin and most triacylglycerols, diacyglycerols, and phosphatidylethanolamines (FDR adjusted $p<0.05$). Insulin also correlated with certain ceramides, sphingomyelins, and cholesterol esters. There were negative associations between insulin and di- and tri-hexosylceramides, lysoalkylphosphatidylcholines, and GM3 gangliosides. Associations were not found between lipid species and fasting glucose or HbA1c. When compared to the matched controls, women with GDM had significantly lower circulating phosphatidylcholines (PC(34:0); PC(35:2); PC(36:0); PC 36:4 (a)), alkylphosphatidylcholines (PC(O-34:2); PC(O-38:4)), ceramides (Cer(d18:1/16:0)), di- and tri-hexosylceramides (Hex2Cer(d18:1/16:0); Hex2Cer(d18:1/18:0); Hex2Cer(d18:1/20:0); Hex2Cer(d18:1/22:0); Hex2Cer(d18:1/24:0); Hex3Cer(d18:1/18:0)), alkylphosphatidylethanolamines (PE(P-18:1/18:2); PE(P-18:1/22:4)), and sphingomyelins (SM(36:3); SM(38:2)) ($p<0.01$). Results from this study demonstrate that in pregnant women, fasting insulin is associated with certain lipid species, especially triacylglycerols, diacyglycerols, and phosphatidylethanolamines and that GDM patients show dysregulation of lipid metabolism.

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Evaluation of an Obstetric Subcutaneous Insulin Order and Blood Glucose Chart in Women with Gestational Diabetes at Fiona Stanley Hospital

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Background

The adult subcutaneous insulin chart used at our site did not meet escalation requirements for blood glucose level (BGL) or blood ketone monitoring during pregnancy necessitating the development of a specific obstetric chart.

Objectives

To create and implement an obstetric specific subcutaneous insulin chart with safety features embedded within, consistent with the National Subcutaneous Insulin Chart. Additionally to assess the management of women with Gestational Diabetes (GDM) admitted for delivery pre and post implementation of our Obstetric Subcutaneous Insulin Chart.

Method

A retrospective review was performed of 103 medical records of women with GDM admitted for delivery to our service between February 2015 and March 2016. Variables audited included blood glucose level (BGL) and blood ketone monitoring, frequency and safety of insulin prescribing, frequency of hypoglycaemic and hyperglycaemic events. Continuous variables were compared using t-tests and categorical variables were compared using Fisher's Exact tests.

Results

An increase in chart usage was observed post implementation of the obstetric chart (76.5% vs 98.6%; $p<0.001$). Documentation of admission BGL (50.0% vs 80.9%; $p=0.004$) and blood ketone levels (15.4% vs 47.1%; $p=0.005$) improved post chart implementation. There was a low rate of intrapartum hyperglycaemia with no significant difference in patients experiencing BGL ≥7.1 mmol/L. No change in incidence of hypoglycaemia was noted with chart implementation (23.1% vs 30.9%; $p=0.611$). Intrapartum insulin prescribing increased with chart implementation (7.7% vs 29.4%; $p=0.030$) and overall prescribing of insulin was deemed safe and appropriate.

Conclusion

Introduction of an obstetric subcutaneous insulin chart was associated with increased chart usage and insulin prescription. Documentation of admission BGL and ketones improved, however remained suboptimal. Further education and evaluation is required to ensure optimal use of the chart.

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Gestational Diabetes at Fiona Stanley Hospital: An audit of our first year of service

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Background
Fiona Stanley Hospital (FSH) opened to the public in 2015 and for the first time care of women with Gestational Diabetes (GDM) requiring insulin was provided to women in Perth outside of the state's sole tertiary maternity site.

Objective
The aim of this audit was to characterize the women with GDM delivering at FSH and to determine the prevalence of early GDM and overt diabetes in pregnancy.

Methods
A retrospective audit was conducted of all women with GDM delivering at FSH (n=348) between January 2015 to January 2016. Prevalence was calculated in percentage using the total number of observed values for the particular variable being studied.

Results
Of all women delivering at FSH, 16% (n=348) had GDM with 7% (n=26) diagnosed with early GDM and 7% (n=23) with overt diabetes in pregnancy. Insulin use was common in the antenatal period (n=125, 43%). Women had significant risk factors for GDM with 28 % (n=91) of women aged ≥35 years, 49% (n=130) of women were overweight or obese, 49% (n=142) had a family history of type 2 diabetes and only 45% (n=135) were Caucasian with significant ethnic diversity in remainder of cohort. Induction of labour was performed in 41% (n=108) of women with GDM and 39% (n=135) of women with GDM required delivery by Caesarean Section. The average birth weight was 3202± 556g and no infants had a birth weight >4500gms with 6% (n=16) weighing >4000g. Most infants were exclusively breastfed on discharge (n= 193, 79%).

Conclusion
Standard GDM and associated risk factors are highly prevalent in pregnant women delivering at FSH. Insulin use in the antenatal period is common while the rate of infants with macrosomia is low. This study will assist with local and state-wide planning of diabetes in pregnancy services.

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Gestational Diabetes Mellitus Investigations and Outcomes

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Gestational Diabetes Mellitus (GDM) is a frequently noted complication of pregnancy with potential for adverse effects on the mother and foetus, particularly around delivery. It is not clear if additional investigations are helpful in predicting complications such as macrosomia, shoulder dystocia and post partum haemorrhage. A comprehensive audit was undertaken at a level 2 hospital of all patients diagnosed with GDM between year 2016 and 2017. Women with GDM at this hospital were routinely screened with HbA1c, TSH, Urate and Urine PCR. We recorded maternal gestation at diagnosis, weight at booking in visit and at 36 weeks gestation, as well as type of GDM (diet-controlled, metformin, insulin). Outcomes reviewed were maternal mode of delivery, estimated blood loss and shoulder dystocia. We also collected neonatal data on birth weight. Statistical analysis was performed to evaluate the relationship between biochemical markers and study outcomes. Statistical analysis is being undertaken and results are pending. We aim to present the relationship between these screening tests and the study outcomes and comment on the usefulness of these tests as part of antenatal care. The results of this investigation will help to inform whether the use of these baseline markers have a relationship to maternal and foetal outcomes associated with GDM.

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A Case of Splenic Vessel Torsion and Rupture in Pregnancy.

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Splenic rupture is an extremely rare but fatal complication in pregnancy.

A previously healthy 21 year old multigravida with a viable 8-weeks intrauterine gestation presented to the Ipswich Emergency Department with 2-day history of worsening left hypogastric pain and feeling unwell. There was no history of traumatic injury to abdomen. On arrival, she was hypotensive with BP 88/50 and was locally peritonitic over the left hypogastrium and suprapubic region. A formal ultrasound demonstrated a splenomegaly, moderate free fluid in the upper abdomen and pelvis. A lab test revealed a significant drop of 40g/L in her haemoglobin level from the day prior. A decision for emergency laparotomy was made after consultation with the general surgeons. Intraoperatively, a 2.8 litre haemoperitoneum and an enlarged spleen were identified. A grade 5 splenic parenchyma rupture secondary to a 720 degree volvulus of splenic vessels was discovered and a splenectomy was performed. The patient was subsequently admitted to the Intensive Care Unit for 4 days for inotropic support. She received a total of 6 units blood transfusion and 4 units of fresh frozen plasma perioperatively and was put on prophylactic intravenous broad spectrum antibiotics. She made an uneventful recovery and was discharged back to the community a week later. Histology of the spleen did not reveal any evidence of malignancy or infective lesions. At follow up, patient reported having terminated the pregnancy.

The mortality associated with splenic rupture in pregnancy is as high as 26% (Denehy et al, 1988). This is likely a result of delay in diagnosis and the rapid development of haemorrhagic shock in splenic rupture. Management is by emergency exploratory laparotomy and splenectomy. We recommend that splenic torsion and/or rupture should be considered when a pregnant patient presents in shock with an acute abdomen.

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Non-fasting triglycerides correlate with birthweight in women with Gestational Diabetes

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Introduction:

In addition to maternal hyperglycaemia, obesity and gestational weight gain, fasting hypertriglyceridemia has been identified as a risk factor for macrosomia in pregnancies complicated by gestational diabetes (1, 2). However, fasting lipids are not routinely measured in pregnancy (3). In the non-pregnant literature, postprandial hypertriglyceridaemia is recognized as a stronger predictor of atherosclerosis than fasting measures (4).

Aim:

To identify whether non-fasting lipids contribute independently to birthweight in offspring born to women diagnosed with gestational diabetes mellitus.

Methods:

We conducted a retrospective audit of 300 singleton pregnancies in women attending the gestational diabetes clinic at a regional tertiary hospital between January 2015 and December 2016. Singleton pregnancies were included if delivery was at term. At their initial diabetes education session, non-fasting serum was collected to measure total cholesterol (TC), low density lipoprotein cholesterol (LDLc), high-density lipoprotein cholesterol (HDLc), triglycerides (TG) and HbA1c. A chart audit examined their pregnancy and perinatal outcomes. Regression analysis models were used to evaluate the associations with infant birthweight.

Results:

Of the 300 mothers analysed, 243 (81%) were overweight/obese and 17 babies (6%) weighed >4000g. The mean values for BMI, gestational weight gain and birthweight were 31.9kg (95% CI 31.1-32.8), 6.2kg (95% CI 5.4 â€“ 7.0) and 3332g (95% CI 3283 â€“ 3380g) respectively. Overall, we found a significant association between non-fasting measures of TC (r = 0.12, p=0.016) and TG (r=0.158, p=0.003) with higher birthweight. We found no significant association between fasting glucose or post-load glucose levels, HbA1c or gestational weight gain and birthweight.

Conclusion: In this overweight cohort, we found significant associations between booking BMI, non-fasting TG and TC levels and birthweight, while there was no association for the glucose levels obtained on OGTT, HbA1c or gestational weight gain.

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Accuracy of ultrasound estimation of birthweight in women with type 1 diabetes compared to type 2 diabetes

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Estimation of fetal weight (EFW) in women with prepregnancy diabetes is an important element of care. It is less accurate women with type 1 diabetes than in women without diabetes. Type 2 diabetes is increasingly common among women of reproductive age and accurate knowledge of fetal weight enables better care of the woman and her baby. We aimed to demonstrate differences in accuracy in ultrasound determined EFW between women with type 1 diabetes and type 2 diabetes. A retrospective cohort study was completed over a six year period comparing the accuracy of EFW and birthweight in women with type 1 diabetes to type 2 diabetes, adjusted for maternal body mass index, birthweight centile and time from scan until delivery. Of the 108 pregnancies included, 58 (53.7%) of the infants were born to women with type 1 diabetes and 50 (46.3%) to women with type 2 diabetes. Ultrasound EFW was more accurate in women with type 2 diabetes compared to women with type 1 diabetes when compared using absolute difference (224 grams, p<0.001, 95% CI 104-343) or percentage difference (5.8%, p<0.001, 95% CI 2.3-9.3) after adjustment for maternal and clinical factors. This was also reflected in the accuracy of ultrasound in predicting birthweight >4000gm, with a sensitivity of 57.1% in women with type 2 diabetes as compared to 13.3% in women with type 1 diabetes. Clinicians may be able to use this information to make clinical decisions incorporating EFW in women with type 2 diabetes with more confidence.

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Trends in pregnancy outcomes for women with gestational diabetes in Sweden 1998-2012: a nationwide cohort study

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Introduction: The St Vincent declaration stated that pregnancy outcomes in women with diabetes should approximate those of women without diabetes. We investigated in this study if this goal has been reached in Sweden.

Methods: Register based cohort study using the Swedish Medical Birth Register including data on all births 1998-2012 in Sweden. The time period was divided into 5 section comprising 3 years each, with 1998-2000 as the reference period. GDM was diagnosed using national criteria (75g oral glucose tolerance test, fasting glucose≥6.1 mmol/l and/or 2 hour glucose≥9 mmol/l: some regional differences), following screening if risk factors were present or a random glucose was >9 mmol/l. Logistic regression was performed to evaluate trends both for women with and without GDM. Women with pre-existing diabetes were excluded. Outcomes studied were pregnancy induced hypertension, preeclampsia, cesarean section, large for gestational age (LGA), small for gestational age (SGA), perinatal mortality, Erb's palsy, birth trauma and hypoglycemia.

Results: We included 1,178,187 women in the study, of whom 14,833 were diagnosed with GDM (1%). There was no statistically significant difference in trends in outcomes for women with and without GDM. Rates of LGA and birth trauma decreased over the time period. In women with GDM, the rate of LGA decreased from 27.0% to 23.8%, OR per year 0.983(0.973-0.993). Birth trauma decreased from 2.0% to 0.9%, OR per year 0.926(0.894-0.959). Hypoglycemia in the offspring and SGA increased.

Conclusions: While some pregnancy outcomes have improved over time across all women, the gap between women with and without GDM remained relatively unchanged over 15 years. There was no difference in trend in outcomes for women with GDM and the background population. New ways are needed to improve GDM outcomes to achieve the St Vincents goals (eg earlier diagnosis, 'tighter' weight/glucose management)

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Neonatal outcomes after Antenatal Corticosteroids In Women With Gestational Diabetes

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Aims:

The prevalence of gestational diabetes (GDM) is increasing due to a combination of factors that include revised diagnostic criteria, increasing prevalence of obesity and advanced maternal age of pregnant women. Women with gestational diabetes at risk of threatened preterm delivery or planned for elective preterm delivery are given antenatal steroids (ANS) to avoid respiratory distress syndrome (RDS). Maternal diabetes mellitus is an independent risk factor for RDS and the need for ANS therapy is thought to be greater in women with diabetes. However, ANS can cause maternal hyperglycaemia and in the peripartum period, this may be associated with fetal complications including neonatal hypoglycaemia. Our audit was designed to explore the obstetric and neonatal outcomes in women with gestational diabetes (GDM) receiving ANS in Flinders Medical Centre (FMC).

Methods:

Case notes of all women with GDM who received ACS and delivered at FMC between 1/1/2015 and 1/1/2016 were analysed

Results:

47 women with GDM received ACS during this period. Maternal hyperglycemia was noted in a significant proportion of patients. 39% of the mothers had a peak BSL ≥10 mmol/L. Neonatal hypoglycaemia was observed in 40% of babies born to these mothers. 30% of babies needed admission to the neonatal intensive care unit and 14% of babies received antibiotic therapy for neonatal sepsis. 32% of babies born to these mothers developed neonatal jaundice.

Conclusions:

ANS treatment is associated with a significant risk of maternal hyperglycaemia and neonatal consequences in women with GDM, even among those who are on non-pharmacological management with diet and exercise. A clear protocol for monitoring and managing anticipated maternal hyperglycemia is needed in this group of patients.

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Birth trauma in babies born to women with and without type 1 diabetes in Sweden 1998-2012: relationship with maternal and baby weight

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Introduction: We compared birth trauma rates in pregnancies among women with and without type 1 diabetes (T1DM) and tested the relationship with maternal body mass index (BMI) and large for gestational age (LGA) as risk factors.

Methods: This is a population-based cohort study 1998-2012 using the Swedish Medical Birth Registry which includes 99% of Swedish pregnancies. All pregnancies up until gestational week 41 were included. We excluded mothers with other types of diabetes, duplex pregnancies and all pregnancies ending with a caesarean section (51.1%/16.5% in women with/without T1DM respectively). The incidence of birth trauma was adjusted for BMI, maternal age, parity, Nordic/non-Nordic origin, smoking, chronic hypertensive disease, LGA and baby gender using logistic regression.

Results: There were 2,758 and 783,412 births with complete data among T1DM and control mothers respectively. The mean BMI, maternal age and gestational age at birth in full weeks were 25.6 (SD 4.5), 30.0 (SD 5.1) and 37.9 (SD 1.9) respectively among women with T1DM and 24.2 (SD 4.3), 29.7 (SD 5.1) and 38.9 (SD 1.5) respectively among controls. Birth trauma did not vary significantly with increasing BMI compared with the reference (18.50-24.9 kg/m^2) among women with T1DM (odds ratios (OR) with increasing BMI (<18.49, 25.0-29.9, 30.0-34.9, >35.0 kg/m^2) were 1.9 (95%CI 0.2-15.7), 1.0 (95%CI 0.7-1.5), 0.5 (95%CI 0.2-1.0), 1.1 (95%CI 0.5-2.4) respectively). Conversely, among controls, the OR for birth trauma increased with increasing BMI: 0.7 (95%CI 0.6-0.9), 1.4 (95%CI 1.3-1.5), 1.8 (95%CI 1.6-2.0), and 2.2 (95%CI 1.9-2.4) respectively. However, birth trauma was 3.9 (95%CI 2.7-5.7) and 7.0 (95%CI 6.5-7.5) fold more common after adjustment with LGA among women with and without T1DM respectively.

Conclusions: Birth trauma rates are associated with LGA with comparatively greater impact among women without, than with, T1DM, possibly due to greater monitoring and earlier planned delivery.

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A Case of Lactation Ketoacidosis following a Low Carbohydrate (Ketogenic) diet.

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Lactation ketoacidosis is a rarely described form of elevated anion gap metabolic acidosis precipitated by the large glucose requirement incurred during lactation. When available body glucose stores are inadequate to meet the energy requirements of metabolism whilst lactating (such as in low carbohydrate diets), water soluble ketone bodies are derived from fat stores to be utilised as fuel. This occurs in a low-insulin, high-glucagon environment, where lipoprotein lipase stimulates hepatocyte mitochondrial conversion of fatty acids to acetyl-coA, to enter the ketogenic pathway and form acetoacetate, beta-hydroxybutyrate and acetone. We describe a case of a woman, 5 months post-partum and breastfeeding twins, following a ketogenic very low carbohydrate diet designed to regain her pre-pregnancy weight, who presented unwell, with a pH of 7.065, bicarbonate 6.8mmol/L, serum ketones 7.1mmol/L, and an anion gap of 25mmol/L. Lactate was 1.04mmol/L. Diabetic and alcoholic ketoacidosis were excluded, as was ingestion of salicylate and other organic acids. A dietary history revealed a very-low carbohydrate, hypocaloric diet of approximately 35g of carbohydrate, and 1000 calories daily. The diagnosis of lactation ketoacidosis was made. Management included intravenous dextrose and adequate caloric intake, and her biochemistry normalised within 48 hours. Dietician review and education formed the cornerstone of her admission. There are only 5 cases of lactation ketoacidosis described in the literature, and of these, 2 occurred secondary to very low carbohydrate diets designed to promoted ketosis and weight loss. With the increasing popularity of ketogenic diets to regain pre-pregnancy weight, women who are breastfeeding should be educated about this concerning complication during lactation. Adequate caloric intake to support lactation should be encouraged.

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Audit of the Urgent Management of Severe Hypertension over a 12-month period at the Royal Hospital for Women, Randwick

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Hypertensive disorders are the most commonly encountered medical complications of pregnancy, and can result in significant maternal and perinatal morbidity and mortality, ranging from maternal end organ damage to iatrogenic prematurity.[1,2] Worldwide, hypertensive disorders affect 10% of pregnancies, with approximately 1% pre-existing hypertension, 5-6% gestational hypertension without proteinuria, and 1-2% pre-eclampsia.[3] Severe hypertension requiring urgent management, is present if the systolic blood pressure is greater than or equal to 170mmHg, with or without a diastolic blood pressure greater than or equal to 110mmHg.[4,5] We undertook an audit to review our current established clinical guidelines around the management of severe, urgent hypertension, identify areas of compliance and strengths within our treatment protocol, as well as areas in which improvements need to be implemented. A total of 3949 women were delivered at the Royal Hospital for Women, Randwick during the 12-month review. A diagnosis of pre-eclampsia was made in 2.8%, and there were 56 episodes of severe hypertension requiring urgent management. The gestation at which the episodes occurred ranged from 23+3 days to 4 days postpartum, with

53% of these occurring pre-term. Antenatally, 84% received appropriate medication according to the local policy, either IV hydralazine or oral nifedipine. A concurrent oral long-acting medication was administered in 46% of all episodes. 11% received a magnesium sulphate infusion for maternal seizure prophylaxis. Correct administration of an intravenous bolus of normal saline was administered in 80% of antenatal women and appropriate 5-minute BP measurements were taken in 72% of women. Eleven percent of women required commencement of an intravenous hydralazine infusion. To reduce the risk of maternal and fetal morbidity, local operating procedures which follow established guidelines should be implemented. To ensure ongoing effectiveness, compliance with these procedures should be regularly audited, and the findings discussed with medical, nursing and midwifery staff.

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Vitamin B12 and Holotranscobalamin in Pregnancy

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Introduction:

Total vitamin B12 assays (B12) normally show a drop in B12 during pregnancy. Various factors that may be responsible for this include hemodilution, transfer of B12 to the foetus, renal losses secondary to increased glomerular filtration rate, changes in B12-binding proteins and true B12 deficiency. This often makes it difficult to differentiate between a low B12 level and true B12 deficiency. B12 is required for neurological development and deficiency has been linked with neural tube defects, early delivery and intra uterine growth retardation. B12 exists in 2 forms - attached to transcobalamin II (holotranscobalamin) and haptocorrin . Holotranscobalamin is the only way B12 can enter cells. Holotranscobalamin levels have been studied in pregnancy in all three trimesters. The levels tend to fall early and then plateau with a possible increase in the late third trimester. Holotranscobalamin levels are thought to be a more sensitive marker of B12 deficiency.

Objectives

To explore the relationship between total B12 levels and Holotranscobalamin, and determine whether there is a linear relationship between total B12 and Holotranscobalamin.

Methods.

Deidentified retrospective data for 112 pregnant women at Mercy Hospital for Women who had both B12 and Holotranscobalamin assays was analysed between June 2014 to June 2017. Linear regression analysis was used to determine the relationship between these levels. Indications for analysis were not recorded. Our laboratory has a policy that holotranscobalamin levels will only be performed if the total B12 level is less than 200. Normal values B12 156- 658 pmol/L and holotranscobalamin 23- 100 pmpl/L.

Results

There was no correlation B12 levels less than 200 and holotranscobalamin level.

Conclusion

There is no correlation low B12 levels and holotranscobalamin levels this raises the question of the utility of total B12 levels in pregnancy.

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Development of an integrated, district-wide approach to pre-pregnancy management for women with pre-existing diabetes in a multi-ethnic population

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Abstract

Background: Poor diabetes management prior to pregnancy results in increased risk of adverse pregnancy outcomes, such as congenital malformation and stillbirth. The purpose of this study is to develop an integrated, population-based, pre-pregnancy programme to improve pregnancy outcomes in women of reproductive age with diabetes in South Western Sydney.

Methods: The strategy comprised (i) a systematic literature review of pre-pregnancy programmes for women with diabetes; (ii) a chart review of pregnancy outcomes (e.g. congenital malformations, stillbirths and caesarean sections) in with type 1 diabetes (T1D) and type 2 diabetes (T2D) (n = 74) between 2010 and 2015; (iii) surveys of local healthcare professionals (n = 12) and women with diabetes who had a pregnancy (n = 15); (iv) two focus groups – one including women with T1D, and another of women with T2D from cultural and linguistically different backgrounds- and (v) two meetings, one comprising primary health care professionals, followed by a Delphi-group meeting of multidisciplinary inter-sectoral professionals.

Results: Our literature review showed that multifaceted programmes were a better approach to significantly increase contraception uptake, and to reduce adverse outcomes (i.e. malformation, stillbirth, or neonatal mortality). Our chart-review showed that the rates of pregnancy outcomes were similar in women with T1D and T2D (e.g. major congenital malformations [18.2% vs 13.5%] and emergency caesarean sections [21.9% vs 23.1%] respectively). Lack of knowledge of contraception options and poor pregnancy outcomes, as well as limited access to pre-pregnancy care were barriers in women with diabetes. The meetings led to a consensus to develop: a) a structured approach to identification and management/self-management of women of childbearing age with diabetes and; b) a multi-faceted district-wide educational programme for healthcare professionals and women with diabetes.

Conclusion: Sufficient evidence exists for consensus on a district-wide strategy to improve pre-pregnancy management among women with pre-existing diabetes.

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Awareness and use of iodine supplementation amongst women attending a low risk pregnancy clinic.

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Background: The Australian National Health and Medical Research Council recommends women take a supplement containing 150 mcg iodine/day to meet the increased iodine needed prior to and during pregnancy and lactation.

Objective: The present study was undertaken to explore women's understanding and use of iodine supplementation associated pregnancy.

Methods: Women attending a public antenatal clinic for low-risk pregnancy in metropolitan Melbourne were invited to participate in a questionnaire–based study .

Results: 235 women agreed to participate and 190 of these provided evaluable data. At completion of the questionnaire their mean age was 33.4 years (range 24.9 to 47.2) and the average gestation was 32 weeks (range 14 to 41). 174 (91.6%), women reported taking a multivitamin at some point during pregnancy and 142 of these (81.6%) reported taking their multivitamin at the clinic visit, with most (127 women, 73%) taking it daily.

71 women (37.4%) reported taking an iodine-containing supplement for a period that exceeded the duration of their pregnancy. 82 of the 181 women who answered questions about knowledge of iodine (45.3%) reported they were aware of the recommendation to take an iodine supplement from preconception until the completion of breastfeeding. Of these, only 30 (36.6%) reported having commenced iodine prior to conception.

Conclusions: This study indicates that there is sub-optimal awareness of the importance of taking an iodine supplement from pre-conception through completion of breastfeeding. Furthermore, it indicates that adherence to the recommendation to take iodine from pre-conception is low, even amongst those who report being aware of this recommendation. Additional community education is required to achieve optimal reproductive iodine supplementation.

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Effect of early use of low-dose aspirin therapy on late-onset pre-eclampsia

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Introduction: Low-dose aspirin is commonly used as a therapeutic tool for preventing the development of pre-eclampsia. However, this appears to be most effective at reducing the development of early-onset pre-eclampsia (delivery before 34 weeks' gestation) compared to late-onset disease (delivery after 34 weeks' gestation), especially in women considered as being at high-risk of developing pre-eclampsia. Despite having no apparent effect on the prevalence of late-onset disease, the effect of low-dose aspirin on the clinical profile of late-onset pre-eclampsia is not known.

Objective: To determine if low-dose aspirin therapy from early in pregnancy modifies the clinical severity of late-onset pre-eclampsia.

Methods: A retrospective analysis of all women screened for risk of developing early-onset pre-eclampsia at 11 to 13^{+6} weeks' gestation between April 2012 to October 2014 and who subsequently developed late-onset pre-eclampsia.

Results: Women found to be at high risk of developing pre-eclampsia at 11 to 13^{+6} weeks' were prescribed low-dose aspirin for the duration of their pregnancy. Women in this cohort who developed late-onset pre-eclampsia were compared to those who developed late-onset pre-eclampsia and had not been prescribed low-dose aspirin. The use of low-dose aspirin was associated with earlier delivery at 38.0 (37.5-38.5) weeks' gestation vs 39.0 (38.7-39.4) weeks' gestation for the non-aspirin group ($p<0.01$).

Aspirin use was also associated with lower absolute birth weight 2851 (2646-3055)-grams vs. 3215 (3068-3362)-grams in the non-aspirin group (p<0.01). No other significant difference was noted including the use of intravenous antihypertensive therapy, magnesium sulfate, presence of symptoms at time of presentation, length of hospitalisation and serum laboratory parameters between the two cohorts. In addition, aspirin use was not found to be associated with significant adverse clinical outcomes.

Conclusion: The use of low-dose aspirin from early in pregnancy did not have a clinical impact on the severity of late-onset pre-eclampsia.

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Gestational weight monitoring: pregnant women expect it and believe it to be beneficial

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The implications of excessive gestational weight gain for both mother and offspring are increasingly recognised (1). This highlights the importance of gestational weight monitoring (GWM), plus encouragement of strategies to achieve healthy weight gain. However, the attitudes of pregnant women towards GWM are poorly understood. A cross-sectional observational study was undertaken to assess the attitudes of pregnant women towards GWM. Participants were English-speaking adult women with singleton pregnancies, of varying gestation, and of any pre-pregnancy BMI category, who attended the Royal Women's Hospital (RWH) for antenatal care. Women with and without diabetes were included, as were women with other obstetric complications. Participants completed an 11 question Likert-style questionnaire, plus had the opportunity to write 'free text' to describe their attitudes towards regular GWM. Subsequent thematic analysis examined the concepts presented via the 'free text'. A total of 340 pregnant women completed the questionnaire. A subset of 74 women (22%) additionally described their attitudes using 'free text'. Thematic analysis revealed main themes of: i) *surprise* that GWM is not part of routine antenatal care, plus an expectation that it should be done; ii) *belief in the benefits* of regular GWM to assist with an overall focus on a healthy diet and lifestyle. Gestational weight monitoring is currently not part of routine antenatal care at RWH. This may gradually change if the recently reviewed Department of Health Routine Antenatal Care guidelines are implemented (1). The draft guidelines propose that at each antenatal appointment, women should be offered the opportunity to be weighed and to discuss their weight gain, diet and physical activity levels. The present study indicates that pregnant women accessing antenatal care at RWH expect regular weight monitoring, with many also believing it to be beneficial.

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The old and new diagnostic criteria for gestational diabetes: a comparison of the maternal clinical profiles and pregnancy outcomes

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The previous Australasian Diabetes in Pregnancy Society (ADIPS) guidelines for the diagnosis of gestational diabetes mellitus (GDM) were formulated in 1991. These guidelines were revised in 2014 in accordance with the World Health Organization (WHO) recommendations. It was speculated that the new diagnostic criteria would increase the prevalence of GDM in Australia, but it is unclear whether pregnancy outcomes would also be different. Liverpool Hospital (in south-western Sydney) adopted the new WHO diagnostic criteria in February 2016. The aim of this study was to assess the difference in baseline characteristics and outcomes of women with GDM diagnosed with the new and old criteria. We present a retrospective study of women with GDM seen at our clinic between 2014 and 2016. There were 1029 women diagnosed with GDM using the old criteria (2014-2016) and 653 women diagnosed using the new criteria (2016-2017). Between the two groups there was no difference in ethnicity, previous GDM and gestational week when GDM was diagnosed. There was significant difference in the need for insulin therapy with a higher rate of insulin use (both basal as well as bolus) in women diagnosed with the old criteria (basal: 31.9 vs 24.8%, p=0.002; bolus: 32.9 vs 19.4%, p<0.001). As for pregnancy outcomes, there was no difference in mode of delivery, macrosomia, pre-maturity or peri-natal death. However, neonatal hypoglycaemia was more commonly observed with the old criteria (15.7% vs 5.5%). In conclusion, it appears that the significant differences between the two groups are related to treatment options and the occurrence of neonatal hypoglycaemia. This is likely related to the increased number of women being diagnosed with GDM at a lower threshold. The lower rate of insulin requirement among women diagnosed with the new criteria suggested that many of these women may have milder degree of maternal dysglycaemia.

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Beware Catastrophic Antiphospholipid Syndrome (CAPS) about

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Introduction

Antiphospholipid syndrome (APS) presents several obstetric challenges through all stages of pregnancy and postpartum with catastrophic APS (CAPS) a rare but life-threatening subset. CAPS involves rapidly progressive and widespread small vessel thrombosis with high rates of feto-maternal morbidity. Triggers for CAPS have been suggested to include pregnancy itself being

a pro-coagulable state and related events such as infection, trauma, surgery and anticoagulation withdrawal. [1,2] Close maternal followup is essential to monitor for rapid transformation of CAPS.

Case Report

We present the case of a 26 year old whose previous pregnancy ended with termination at 21 weeks due to severe HELLP syndrome and then was subsequently diagnosed with APS. Aspirin and prophylactic enoxaparin was commenced early in this pregnancy. At 33 weeks she was symptomatic with headache and routine monthly pre-eclampsia toxemia (PET) screen was deranged. She was admitted, steroid covered and enoxaparin ceased with immediate delivery by Caesarean section of live baby. Mother was discharged day 5 postoperative then readmitted the day after with abdominal pain, vomiting and fevers; initially treated for sepsis. She was transferred to ICU, subsequently developing digital ischemia, acute kidney and liver injury and severe cardiogenic shock requiring intra-aortic balloon pump. She underwent plasma exchange, intravenous immunoglobulin, heparin infusion, and high dose steroids. She discharged day 81 post delivery with close outpatient followup.

Discussion

Patients with APS who develop HELLP should have stringent postpartum followup. This case highlights the need for a high index of suspicion for CAPS as the early stages can often mimic other pathologies such as sepsis.[1,2] Microangiopathic coagulopathy may lead to multi-organ failure including postpartum cardiopulmonary syndrome, hepatic and renal failure.[1] Multidisciplinary management considerations of CAPS are vital with input from obstetric medicine, renal, vascular and intensive care teams. Counselling for future pregnancies with pre-conceptual advice is essential.

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Pseudomonas Aeruginosa Sepsis secondary to Cervical Cerclage

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Introduction

Pseudomonas aeruginosa (PA) is reported in literature as the most common gram-negative bacteria associated with severe hospital acquired infections particularly in the intensive care setting[1]. The incidence of PA sepsis in feto-maternal cases is less characterised in literature but clinically important being linked to early onset neonatal sepsis. Furthermore significant contributory factors to obstetric septic shock are cervical cerclage and fetal death in utero (FDIU). Thus there are several obstetric medicine considerations to be balanced in management of cervical shortening.

Case Report

We present the case of a 26 year old singular parity with previous preterm normal vaginal delivery at 35 weeks gestation. Morphology scan in the current pregnancy showed bulging membranes. She had a transvaginal rescue cervical cerclage inserted. She presented 10 days later at 20 weeks gestation with abdominal pain, urge to push and febrile. The peripheral hospital team were unable to remove the cervical cerclage due to difficult speculum examination. She was transferred to a tertiary centre with FDIU and early features of chorioamnionitis. Two hours after transfer stillborn infant delivered vaginally through the cervical cerclage. Maternal clinical deterioration occurred soon after and she was transferred to ICU requiring ionotropic support. In consultation with infectious disease and obstetric medicine teams she was treated for septic shower. She improved after 7 day course of cefepime and metronidazole and counseled for subsequent pregnancies.

Discussion

In pregnancies with cervical incompetence there is inconclusive evidence in literature for cerclage compared to conservative management. [2,3] Cerclage is associated with potential severe fetomaternal consequences including sepsis. Risk factors for PA sepsis have been suggested to include prior treatment with antibiotics, in particular broad-spectrum and prolonged hospitalization. [1] There are varying post-cerclage management practices including both the aforementioned factors. Early recognition of sepsis and close obstetric care post cerclage is essential.

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Pre-conception care in Type 1 diabetic women

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Pregnancy in women with Type 1 Diabetes Mellitus (T1DM) is associated with increased incidence of adverse maternal and fetal outcomes compared to the non-diabetic population. One of the well-established strategies to avoid these adverse outcomes is to optimise diabetes management prior to conception, termed as pre-conception care. We performed a retrospective audit of pregnant women with Type 1 Diabetes with the aim to investigate the proportion of women who have received optimal preconception care and to study the neonatal and obstetric outcomes of these women. Case notes of all pregnant women with Type 1 diabetes who attended the Flinders Medical Centre (FMC) high-risk pregnancy clinic or delivered at FMC between 1/1/2014 and 1/1/2015 were reviewed. Data on pre-conception care and pregnancy outcomes was collected and compared to the pre-conception guidelines set out in the South Australian Perinatal Practice Guidelines (SA PPG), and Australian Diabetes in Pregnancy Society (ADIPS) guidelines and the South Australian pregnancy outcomes for 2014. The major proportion of women had no pre-conception care with only six presenting for pre-conception visits. A total of 67% of women had a HbA1c performed in the 3 months prior to conception and of those, only 14% had a recommended HbA1c of < 6%. There was an increased rate of maternal and neonatal complications compared to the general population. Our audit results show that pre-conception care is sub-optimal and there is an increased incidence of adverse maternal and neonatal outcomes in women with type 1 diabetes, which can potentially be avoided by ensuring optimization of diabetes management prior to conception. There is a need to develop effective strategies to facilitate optimal preconception care.

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Expectations versus reality - Clinical experiences during the Obstetric Medicine rotation at Auckland City Hospital: A comparison with the SOMANZ Obstetric Medicine Curriculum.

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Since 2013 National Women's Health (NWH), Auckland City Hospital has been accredited for 12 months training for the Society of Obstetric Medicine of Australia and New Zealand (SOMANZ) Obstetric Medicine Certificate and has recently expanded to two trainees: an advanced trainee registrar and a fellow. This training experience is supported by the SOMANZ curriculum "Recommended training experiences for Advanced Trainees with an interest in obstetric medicine"[1]. We sought to determine if the rotation offers learners the broad range of clinical experiences required to address the curriculum objectives. A retrospective review of all inpatient and outpatient clinical encounters experienced by the trainees was conducted over a 6 month period. These encounters were matched with the Obstetric Medicine Curriculum to identify any gaps in the training experience. Five hundred and seven unique patient encounters were experienced in a range of Obstetric Medicine settings including inpatient (46%) and outpatient clinics (54%). Clinic exposures included general obstetric medicine (22%) , high risk (46%) and maternity diabetes (32%). Preconception consultations, and post partum followup occurred, alongside consultations in pregnant women. Trainees experienced 93% of clinical encounters recommended by the curriculum. The most frequent inpatient consultations were: diabetes, cardiac disease, and hypertensive disorders and for outpatients: diabetes, thyroid disease, cardiac disease and thrombotic disorders. Identified gaps in experience included medical complications of tocolytic therapy and exposure to gynaecologic, menopause and male preconception referrals. The obstetric medicine rotation at NWH offers a broad range of clinical experiences and settings enabling a robust and comprehensive training experience. Notable strengths include the volume of exposure to women with congenital and acquired cardiac disease as well as diabetes. Identified gaps will be addressed by targeting clinical experiences and developing case-based teaching scenarios. Next steps will include formal curriculum mapping and the development of a competency based Obstetric Medicine curriculum.

1. RACP (2013). "Specialist Advisory Committee in General and Acute Care Medicine: Recommended training experiences for Advanced Trainees with an interest in obstetric medicine." http://www.racp.edu.au/page/specialty/general-medicine.

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Acute Fatty Liver of Pregnancy - a possible extra-intestinal manifestation of inflammatory bowel disease?

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A variety of hepatobiliary disorders may complicate inflammatory bowel disease (IBD). Intrahepatic cholestasis of pregnancy (ICP) is associated with an increased risk of the subsequent development of IBD in population cohort studies. Our maternity facility manages 10000 births per annum and we present a retrospective audit of 17 women with acute fatty liver of pregnancy (AFLP) from 2000-2017. Five cases were associated with pre-existing IBD, one woman developed AFLP following presumed influenza hepatitis, and another following ICP. Two previous reports have described AFLP in women with ICP but there is no published relationship between AFLP and IBD. Increased levels of inflammatory cytokines including TNF-alpha have been demonstrated in IBD and ICP. Elevated levels of TNF-alpha have been shown to impair mitochondrial fatty acid beta-oxidation in

Reye's syndrome, another hepatic micro-vesicular steatosis disorder which shares clinical and histological features with AFLP. Potential mechanisms linking IBD, ICP and AFLP are discussed.

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A multidisciplinary team survey of current practices for managing Gestational Diabetes Mellitus in Australia

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In 2014 the Australasian Diabetes in Pregnancy Society (ADIPS) endorsed the 2013 World Health Organization criteria for diagnosing Gestational Diabetes Mellitus (GDM). The updated ADIPS consensus guidelines also included other management recommendations. However, there is no recent literature on how GDM is managed in Australia. The aim of this study was to examine the current practices of the GDM multidisciplinary team in Australia. A 64-item electronic questionnaire was sent to all Queensland Health facilities between May and June 2017, and was available nationally through the Endocrine Society of Australia, Dietitians Association of Australia and Australian Diabetes Educators Association. Most respondents (*n*=182) were Diabetes Educators (DE) (30%) or Dietitians (28%), followed by Endocrinologists (14%), Midwives (13%) and Obstetricians (9%). For diagnosing GDM, the ADIPS guidelines were used by most (82%). There was less consistency on guideline use for the management of GDM with less than 20% of respondents (*n*=32) using the ADIPS guidelines. According to 83% of clinicians, blood glucose levels (BGLs) are the best indicator of whether a woman with GDM should commence pharmacotherapy and fewer (75%) agreed that BGLs should be considered alongside fetal growth and maternal weight gain before deciding on pharmacotherapy. Eighty-nine percent agreed that Medical Nutrition Therapy should be the first line treatment in managing GDM, however, dietitians were less likely to see women for initial education than DEs (83% vs 93%). While the results of this national survey indicated there is good consensus on how women are diagnosed with GDM, there appears to be variation to how women are managed. It is unclear if this reflects a lack of clarity in the evidence-base for managing GDM or relates to health professional attitudes. The results of this research will guide the development of a novel, nutrition-focused model of care to be trialled in Queensland in 2018.

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Women with Gestational Diabetes and neonatal outcomes in the Northern Beaches after three years

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Introduction: Women attending public antenatal clinics in the Northern Beaches who are diagnosed with GDM during pregnancy, are managed at the Manly Hospital GDM Clinic.

Objective: To compare the demographics and neonatal outcomes of women with GDM seen at Manly Hospital in 2012 to 2015.

Results: Between January 2012 and December 2012, 109 women were seen with GDM at Manly Hospital. Between January 2015 and December 2015, the number of women seen with GDM increased to 160. The mean±SD maternal age of women attending the Clinic in 2012 was 34.9±4.7 years, which was similar to 34.7±7.0 years in 2015 (p=0.73). In 2012, 63% of women attending the Clinic were non-Australian born which was similar to 62% in 2015 (p=0.90). There was no difference in weight at booking in (p=0.63) or insulin use (p=0.69) between 2012 and 2015. Metformin therapy was not used for the management of GDM in 2012. In 2015, six women were managed with metformin therapy for GDM, which was ceased at 35 weeks gestation.

There was no difference in neonatal birthweight (p=0.79), the incidence of neonatal macrosomia (p=1.00) or the incidence of shoulder dystocia (p=1.0) between 2012 and 2015. Hypoglycaemia occurred in more neonates in 2012 (27%) compared to 2015 (5%), p<0.001.

Conclusion: The age, weight and country of birth of women attending the GDM Clinic at Manly Hospital did not change significantly between 2012 and 2015. Metformin was used in the management of GDM in 2015, but not in 2012. The proportion of women managed with insulin for GDM did not change between 2012 and 2015. Neonatal birthweight, macrosomia and shoulder dystocia did not change between 2012 and 2015; however the incidence of neonatal hypoglycaemia decreased.

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The Management of Severe Antenatal Constipation

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Introduction: Constipation commonly occurs in pregnancy, affecting 11-44% of pregnant women. It can have severe consequences on maternal and foetal wellbeing. The management of antenatal constipation is often difficult due to the

physiological changes of pregnancy and safety concerns with certain aperients. This report aims to review the literature surrounding management of severe antenatal constipation and to assist clinicians with future management decisions.
Methods: Current literature related to the management of severe constipation in pregnancy was reviewed**,** in the context of a case of a 30-year-old woman at 24 weeks gestation with severe constipation despite three weeks of oral aperients and enemas.
Results: Current literature suggests that stimulant laxatives are more likely to improve constipation than bulk-forming laxatives, but cause increased side effects including abdominal discomfort. Fibre supplementation in pregnancy has been shown to improve stool consistency and increase the frequency of passage compared to no intervention. There is no concrete evidence comparing other types of laxatives such as osmotic or lubricant laxatives, stool softeners, enemas and suppositories. Many aperients (including Psyllium, Lactulose, Paraffin, Glycerol and Sodium Picosulfate) have not been categorised by the Therapeutic Goods Administration in regards to safety in pregnancy, despite their common use. Docusate, Coloxyl, Bisacodyl and Senna have been listed as category A, with no links to congenital abnormalities, however many health guidelines recommend avoiding stimulant laxatives, particularly if there is a history of preterm labour.

Discussion: There is insufficient evidence to guide treatment of constipation during pregnancy and further randomised control trials are required to examine a broader use of aperients. We therefore recommend a multidisciplinary approach, including both non-pharmaceutical and pharmaceutical measures tailored to the patient's specific bowel habits and needs. A stepwise approach is suggested, beginning with lifestyle modifications, then introducing bulk forming aperients, osmotic laxatives and lastly stimulant laxatives as required.

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Anaemia clinical practice improvement project, Telephone audit

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Aim: Iron deficiency anaemia is a common medical problem in pregnancy. In women delivering their babies at the Women's and Children's Hospital in 2015 only 3.2% or non-anaemia patients needed a blood transfusion whereas anaemic women had a six times higher change of needing blood. The rate of anaemia at delivery (12.3%) was higher than peer hospitals. A clinical practice improvement (CPI) project was initiated in order to maximise haemoglobin and iron levels during pregnancy. This project involved implementation of haemoglobin assessment and optimisation flowcharts as well as a patient information handout on oral iron preparations and doses. A component of the project involved a telephone audit to assess whether the patient information handout was being used and if it was helpful.

Methods: 30 patients with iron deficiency seen in antenatal clinic between January and April 2017 were contacted by telephone and asked a series of questions. Health practitioners using the handout in antenatal clinic were also asked for feedback.

Results: Only 44% of patients audited reported having received the handout, however of those that did receive the handout 82% found it helpful and a majority of them purchased iron tablets and continued treatment.

Conclusions: Adaptation of the oral iron preparation handout was found to be very useful by both health practitioners and patients and can help overcome barriers to oral iron supplementation in pregnancy.

1. Women's and Children's Hospital 2015 data across all deliveries

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Acute Ischemic stroke in Pregnancy with Gestational Diabetes

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31 YRS OLD Gravida 3 Para 2 presented with confusion and unable to feel foetal movements at 36 weeks gestation. Urgent MRI of head demonstrated hyper acute infarct in the posterior limb of the left internal capsule.

INTRODUCTION

Ischemic stroke is a rare occurrence in pregnancy and Physicians can be faced with difficult therapeutic decisions.

Background:

HW had been attending ANC for gestational diabetes treated with Insulin and Metformin. Antenatal creening normal; morphology scan was normal. BMI 42 at booking. She was normotensive throughout pregnancy and during current episode. Previous pregnancies complicated with GDM - diet controlled, both delivered vaginally at 42 weeks (9 and 10 lbs); No symptoms prior to this admission. No drug allergies and not a lifetime smoker. Patient was admitted to HDU and later to stroke unit managed by MDT - Physician, Obstetric Physician, Obstetrician, Anaesthetist, Physio – Occupational therapist, social worker. Started on Aspirin 100 mgm OD Clopidogrel 75 mgm PO OD and Atorvastatin 10mgm PO OD. Patient received Clopidogrel until 1 week before IOL with Foleys catheter followed by AROM / syntocinon. Received epidural and delivered vaginally Live female infant of 4130 grams. No neonatal concerns. MDT care by stroke team. Discharged home on aspirin, atorvastatin and regular follow up by stroke team.

Discussion:

Clopidogrel has not been proven to be safe in pregnancy- it does cross the placenta. But our patient stabilised and improved well on this treatment and did not have any bleeding episodes during delivery or post partum when it was stopped 1 week before induction of labour. Baby did not have any undue bleeding incident. Pregnancy is still considered a relative contraindication to thrombolytic treatment although there are no reports on rTPA (recombinant tissue plasminogen activator) being able to cross human placenta.

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Diabetes in Pregnancy: A visual resource to support Aboriginal women and health providers

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Aboriginal and Torres Strait Islander women who give birth are three times more likely to have pre-existing diabetes, almost two times more likely to develop gestational diabetes, and more likely to experience complications in their pregnancy than non-Indigenous women. To address this, Diabetes Victoria and the Victorian Aboriginal Community Controlled Health Organisation (VACCHO) developed the Feltmum add-on in 2015, to enhance the existing Feltman diabetes resource. Stakeholder consultations identified limited culturally appropriate consumer resources about diabetes in pregnancy for Aboriginal women with pre-existing type 1 or type 2 diabetes. Diabetes Victoria subsequently established an expert working group with representatives from the Koori Maternity Services, VACCHO and Mercy Health to develop a specific resource to help Aboriginal women stay healthy during their pregnancy and have a healthy baby. The collaborative approach has been a key contributor to the acceptability of this resource to the Victorian Aboriginal community. The Diabetes in pregnancy pictorial guide was developed using evidence-based health literacy principles that other Diabetes Victoria pictorial guides have been based on. The content of the pictorial guide is positive, action based, realistic and instructive, and is written from a consumer perspective. The guide has clear messages for women with pre-existing diabetes and those with gestational diabetes. It has minimal text, and contains a range of images of Victorian Aboriginal woman to illustrate desired behaviours to promote diabetes self-efficacy. The new resource supports Aboriginal woman with diabetes encouraging pre-pregnancy planning. It provides guidelines for women during their pregnancy, and includes information about staying healthy after the birth of their baby. This resource has been designed to provide general health information, encouraging Aboriginal women with diabetes to seek support from health care professionals.

The Diabetes in pregnancy pictorial guide has already proven popular, with 110 copies purchased within the first two months of publication

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THE IMPACT OF DIETARY EDUCATION SETTINGS ON GESTATIONAL DIABETES MELLITUS OUTCOMES IN WOMEN DIAGNOSED ACCORDING TO THE NEW AUSTRALASIAN DIABETES IN PREGNANCY CRITERIA

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Background: There is limited evidence on the effectiveness and outcomes of group versus individual education for women with Gestational Diabetes Mellitus (GDM), especially for those diagnosed by new Australasian Diabetes in Pregnancy Society (ADIPS) 2014 criteria.

Aim: To compare group versus individual GDM education modes of care outcomes, since new diagnostic criteria implementation.

Methods: Our Diabetes Centre adopted ADIPS 2014 criteria on 1-Mar-2016 (Fasting ≥5.1mmol/L, 1 hour ≥10mmol/L, 2 hour ≥8.5mmol/L). Outcomes of women who received group education were compared to women who received individual education with dietitian and diabetes educator Mar-2016-June-2017. The same information was provided in both settings however modes of delivery differed. Group sessions included English speaking PowerPoint presentation and interactive activities. Individual sessions involved predominately women requiring an interpreter and tailored advice based on an individual clinical assessment. Data collected were: insulin requirement, maternal weight gain (total and in excess of Institute Of Medicine recommendations), caesarean section, infant weight and percentile, SGA and LGA. Data were compared by *t*-test or Chi-squared test. Statistical significance was $p<0.05$.

Results: Of 522 women, (356 group versus 166 individual), there was, respectively, no significant difference in baseline characteristics for: age (30.9±5.2 vs 31.4±5.3), pre-pregnancy Body Mass Index (26.8±5.5 vs 25.9±5.8), HbA1c (5.2±0.4 vs 5.1±0.4), OGTT fasting (5.1±0.6 vs 5.1±0.6) or 2 hour BGL (7.4±1.8 vs 7.8±1.8), and weeks gestation at diagnosis (24.4±5.3 vs 23.2±6.2). However, a greater percentage of women from Middle Eastern (28.9% vs 18.8%), South East Asian (30.7% vs 14.9%), African (10.8% vs 3.1%) and Pacific Islander (2.5% vs 1.8%) backgrounds, received individual education. There were no significant differences in treatment or pregnancy outcomes between group and individual education (see Table).

Parameters/Outcomes	Group (n = 356)	Individual (n = 166)	P-value
Insulin n= (%)	130 (36.5)	62 (37.3)	0.92
Basal Bolus n= (%)	34 (9.6)	22 (13.3)	0.51
Basal Only n= (%)	62 (17.4)	23 (13.9)	0.51
Bolus Only n= (%)	35 (9.8)	17 (10.2)	0.51
Total Weight Gain (kg)	12.6 ± 7.0	12.7 ± 6.4	0.93
Excessive maternal weight gain n= (%)	152 (42.7)	62 (37.3)	0.25
Caesarean section n= (%)	121 (34.0)	52 (31.3)	0.62
Mean Infant weight (grams)	3340 ± 504	3303 ± 519	0.44
Mean Infant Percentile	52.2 ± 28.3	53.0 ± 28.9	0.75
SGA n= (%)	28 (7.9)	16 (9.6)	0.50
LGA n= (%)	40 (11.2)	18 (10.8)	1.00

Conclusions: In our high-risk cohort of women diagnosed with GDM according to ADIPS 2014 criteria, both group and individual education resulted in similar treatment and birth outcomes.

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MACROSOMIA- is it Diabetes or genes

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24 yrs old Samoan ,G2 P1 booked with LMC @ 12/40- BMI 41.8. Type II diabetes on Metformin and Gliclazide. Low risk MSS1, HbA1c - 50. El-LSCS 2010 for LFD 5220g. Commenced on Insulin and metformin; attended regular ANC; persistent macrosomia>95th centile. At 34 weeks BMI 52, EFW 5921gms, normal dopplers ; HBA1C 47 . Planned -biweekly CTG and steroids. At 36 weeks EFW 6692g, AFI 42, normal dopplers. Weight 150kg (up from 118kg at booking) EL/LSCS under spinal anaesthesia (37+4) – live male baby 7390g. Apgars 9/1, 9/5, 10/10; Lactates A: 1.3, V: 1.1. Initial BSL 1.8 mmol/L , admitted to NICU for CPAP and BSL correction and monitoring. CPAP discontinued after 16 hrs, nil further respiratory support. Initial BSL corrected with IV dextrose, no ongoing issues EBM/AF from day two. ECHO = Hypertrophic but structurally normal heart. Genetics review: No dysmorphic features noted, assessed as symmetrically LGA baby, not assessed as 'overgrowth' syndrome.

Discussion:

Fetal overgrowth can be defined as a birth weight greater than the 90th percentile, corrected for gestational age. The causes of macrosomia include both genetic and environmental factors. The offspring of mothers with diabetes have greater risks of adverse metabolic sequelae in childhood and later life and risks appear to be additional to genetic predisposition. Obese women are more likely to develop offspring macrosomia, with 1.7-fold risk increase compared to normal weight women but excessive gestational weight gain has been extensively proven to be an important risk factor for the development of macrosomia. Measurement of postprandial plasma FFA might be the best, clinically obtainable predictor of infant birth weight in this population, but this needs further study. The relationship between GDM and macrosomia is probably more complex than generally appreciated

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An evaluation of an eLearning Series to improve clinician's knowledge of Gestational Diabetes Mellitus (GDM)

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Introduction

Diabetes in Pregnancy has become a key point of treatment in the antenatal journey and prevalence has increased worldwide. In response to this, a review of GDM services in Queensland provided information on; incidence of GDM diagnoses, appropriate services available, and care practices and management. Concerns raised included lack of available education to clinicians to increase knowledge of GDM.

Objectives

The objective of the evaluation was to gauge the increase of knowledge related to GDM following engagement with the eLearning series.

Methods

A pre/post survey was embedded in the series and included clinical knowledge of each of the 12 modules. The post survey also included comments about the relevance and understanding of the course content.

Results

As at December 2016, 242 (97%) completed the pre-course survey, 43 completed the post test survey, with further results to be analysed. There was a significant difference between the pre and post-course results (p=0.003). Key areas of knowledge that improved ; timing of Blood Glucose Levels (BGL) following diagnoses of GDM, recommended weight gain during pregnancy, length of needle recommended for insulin administration , and optimal timing of screening tests for women.

Conclusion

The development and evaluation of this on-line module may have a positive impact on the confidence of the clinician providing antenatal care. This eLearning platform may provide an effective means of delivering further education to clinicians regarding other maternal conditions.

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Audit of Data Collected on GDM Population in the Australian Capital Territory

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Audit of Data Collected on GDM Population in the Australian Capital Territory

Trish Ryan [1], Alison Lancaster[1], Jiali Wang [2], Teresa Neeman [2]

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2. Statisticians, ANU Statistical Consulting Unit

Background: In July 2014, the ACT Health Diabetes Service added a new GDM data collection tab to the patient management system (ACTPAS). This is the first audit of the data collected and our aim was to describe the population and identify gaps in the data.

Method: Client GDM data entry into ACTPAS commenced on 1 July 2014. Quarterly reports from this date until 30 June 2017 were run and analysed using SPSS.

Results: **Client numbers** last half of 2014 (266), 2015 (686), 2016 (743) and first half of 2017 (382). **Time between diagnosis and intervention** ≤ 14 days (70.9%), >14 and ≤30 days (22.7%), >30 and ≤ 60days 5.3% **Age Range** 18-54yrs(mean 32.45yrs). **Pre pregnancy BMI**underweight 1.8%, normal 39.3%, overweight 27.7%, obese 30.8%. **Gestational age at diagnosis** ≤12/40 (2.8%), 13-24/40 (21.4%), ≥25/40 (75.8%). **Family History of diabetes** (53.8%). **Prior GDM** 13.1% (70.2% managed with diet; 26.8% required insulin). **OGTT - point of first abnormal result:** fasting BGL (49%), 1 hr (27%), 2 hr (24%).

Conclusion: The GDM tab data is easier to access and analyse, rather than the more time consuming process of reviewing individual patient files as was needed with previous attempts to describe our GDM population. Time between diagnosis and intervention is a potential KPI and gestational age at diagnosis has implications for resourcing. Problems identified with GDM tab : inconsistency in the definition of family history used by staff; ethnicity and stage of gestation at commencement of insulin are not on GDM tab but documented elsewhere. Ethnicity is needed for interpretation of BMI results and planning of culturally relevant educational strategies.

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The effect of body mass index on diagnosis of gestational diabetes among Australian Aboriginal pregnant women

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Introduction

Health disparities between Aboriginal and non-Aboriginal Australians have been attributed to chronic disease, with obesity and diabetes significant contributors. Obesity in pregnancy is associated with increased risk of gestational diabetes (GDM), hypertensive disorders and high infant birthweight. High birthweights increases the risk of infants developing childhood obesity and subsequently adult-onset chronic disease. Ethnicity is linked with differences in insulin sensitivity. Studies of Aboriginal female body types have found preferential central fat deposition relative to their overall weight. Body mass index (BMI) is thought to underestimate obesity in Aboriginal women.

Objectives

To determine whether Aboriginal pregnant women have higher rates of obesity and GDM than non-Aboriginal pregnant women, and whether Aboriginal women a have higher incidence of GDM at lower BMIs.

Methods

Included in this study are 229 Aboriginal and 37538 non-Aboriginal pregnant women who gave birth at Royal Women's Hospital between 1st January 2010 and 1st June 2015. Aboriginal status was determined by the mother identifying herself and her baby as Aboriginal or Torres Strait Islander. Obesity levels were compared using an independent-samples t-test and incidence of GDM with an odds ratio.

Results

There was a significant difference in BMI scores for Aboriginal women (mean=27.65, SD 7.24) and non-Aboriginal women (mean=25.00, SD 5.48); t=5.11, p-value <0.01.

Aboriginal women were 1.6 times more likely to be diagnosed with GDM during pregnancy than non-Aboriginal women (9.1% vs 6.1%; p-value 0.05). There was no significant difference in the percentage of Aboriginal women being diagnosed with GDM at BMI <25 (2.6% vs 4.4%, OR 0.59, p-value 0.46) or BMI 25-29 (8.9% vs 6.6%, OR 1.38, p-value 0.5) compared to non-Aboriginal women.

Conclusions

Aboriginal women were found to suffer higher rates of obesity and GDM during pregnancy than non-Aboriginal women. Ethnicity did not affect rates of GDM found in normal weight and overweight women.

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The impact of adapting to the new diagnostic criteria for gestational diabetes

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Gestational diabetes mellitus (GDM) is defined as the onset of abnormal glucose tolerance during pregnancy. Diagnostic criteria for GDM, as guided by the Australasian Diabetes in Pregnancy Society, were updated in 2012 to mirror those of the International Association of Diabetes and Pregnancy Study Group (now endorsed by WHO). Lower diagnostic thresholds were recommended based on the correlation between maternal hyperglycaemia and adverse perinatal outcomes[1]. Since the change in criteria, GDM rates have increased worldwide by 20-62%[2-4]although some centres have not experienced the increase predicted[5].

We aimed to describe the change in GDM incidence since our transition to the new diagnostic criteria in January 2015. Of note, we moved from the glucose challenge to the pregnancy oral glucose tolerance test (pOGTT) in April 2013. We performed a single-centre retrospective observational study at a multiethnic metropolitan maternity hospital, documenting the number of GDM diagnoses between 2012 and 2016. The absolute number of new GDM diagnoses increased from 121 in 2014 to 167 in 2015, a rise of 38% as compared to 3.4% from 2013 to 2014. We noted a 29.7% increase in our incidence of GDM over the first year after transitioning to the new criteria (from 2014 to 2015) and a 41.7% increase over the first two years. Of interest, there was a 6% increase from 2013 to 2014 corresponding to the switch to the pOGTT.

This absolute increase in GDM and incidence overall is consistent with other reports[2-4]. The consequential demand on medical, dietetic, and nursing educator services, has necessitated the implementation of compensatory measures such as doubling medical staff numbers and modifying our model of care. Our presentation will summarise these measures and estimate their economic impact. These increasing demands highlight the need for strategic restructuring of resources to maintain a high standard of care.

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CHARACTERISTICS OF WOMEN WITH SMALL FOR GESTATIONAL AGE INFANTS DIAGNOSED BY IADPSG GESTATIONAL DIABETES CRITERIA

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Background: There is controversy surrounding adoption of the IADPSG 2010 gestational diabetes (GDM) diagnostic criteria, due to the paucity of treatment and outcome data. Of concern, some studies have emerged showing increased small for gestational age (SGA).

Aim: To identify the predictors of SGA in women diagnosed with GDM according to IADPSG 2010 criteria.

Methods: We reviewed prospectively collected data on women who were treated for GDM diagnosed by ADIPS 2014 (IADPSG 2010 criteria) at Bankstown-Lidcombe Hospital from March 2016 to July 2017. SGA (<10th percentile) was calculated by reference to customised percentile charts (www.gestation.net Bulk Centile Calculator V6.7.3-13). Variables analysed were: pre-gestational BMI (based on self-reported pre-pregnancy weight), ethnicity, family history of diabetes, maternal age, parity, smoking status, oral glucose tolerance(OGTT) results, Hba1c on GDM diagnosis, gestational weight gain(GWG) as a continuous variable and as a categorical variable (based on insufficient, appropriate and excessive GWG according to the Institute of Medicine weight gain in pregnancy target ranges per BMI category), use of insulin in pregnancy, and prematurity <37weeks gestation. Data are expressed as Odds Ratios(OR) with 95% confidence intervals(95%CI) and median values with interquartile ranges(IQR). Significance is $p<0.05$.

Results: Of 522 women, 44 (8.4%) had a SGA baby. On univariate analysis, an increased rate of SGA was associated with: lower GWG as a continuous variable ($p<0.05$), Southeast Asian ethnicity (OR=2.53, 95%CI 1.31–4.89, $p<0.01$), prematurity (OR=6.21, 95%CI 2.62–14.74, $p<0.001$). Median maternal fasting glucose levels were lower in the SGA group compared to infants of appropriate gestational birthweight, 4.95mmol/L(IQR 4.4 – 5.4) vs 5.20mmol/L(IQR 4.8 – 5.4), respectively; $p<0.05$. Smoking and insufficient GWG analysed as a categorical variable were not associated with SGA. On multivariable analysis, Southeast Asian ethnicity and preterm delivery remained significant predictors.

Conclusions: Predictors of SGA in women in this cohort were Southeast Asian ethnicity and preterm delivery.

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The Case of a Spontaneous Uterine Rupture at Term

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Introduction

Uterine rupture during the gestational period can have dire consequences for both the woman and the newborn. There is a limited number of studies which have clearly documented spontaneous uterine rupture. Most data suggests that the risk is highest when inducing labour in a previous scar; not prior to the commencement of labour.

Aims A retrospective case study review of a documented spontaneous uterine rupture at term in a multiparous woman who had been admitted for an elective repeat caesarean section. She had a complex antenatal history of placenta praevia and suspected placenta accreta at 38weeks gestation.

Results This patient was admitted prior to her caesarean section for steroid loading when she had sudden onset of acute abdominal pain. This resulted in a category one alert caesarean section for a suspected uterine rupture when the cardiotocograph showed a fetal bradycardia. A good outcome was achieved and both the patient and newborn were discharged home post-operative day four.

Conclusion It is almost certain, had this patient not been admitted to hospital prior to her operation, a different outcome may have manifested. The early admission was the key factor in the survival of both parties.

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A Retrospective Audit of Gestational Diabetes Mellitus: A Preliminary Analysis of the Royal North Shore Experience

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Introduction:

The adoption of altered GDM diagnostic criteria, along with concomitant rising rates of advanced maternal age and obesity, have changed the demography of women with gestational diabetes mellitus (GDM) in the antenatal clinic. Furthermore, the use of metformin has become routine and at the discretion of the attending clinicians. As part of a large retrospective audit of women managed at RNSH between 2010 to the present, we reviewed the therapeutic choices for glycaemic management in the first 91 patients included.

Results:

Ninety one patients, age 32.5±4 years, parity 1.7±0.9, BMI 25.5±5.0kg/m2 and HbA1c 5.2±0.6% form the basis of the current report. Forty-one patients (45%) were managed with diet and lifestyle measures alone, 9 (9.8%) with metformin alone, 33 (36.3 %) with insulin and 8 (7.2%) with combination metformin/insulin. Women who were taking insulin ($p<0.005$) had higher HbA1c at the diagnosis ($p<0.005$) and were older ($p<0.005$); however, after adjusting for BMI these relationships was no longer significant. Analysis of the metformin versus metformin in combination with insulin groups found that metformin/insulin women were older than those on metformin alone (35.3 vs.31.1years, $p<0.005$) and women with higher HbA1c at diagnosis were more likely to require combination metformin/insulin as compared to those on metformin alone ($p<0.001$). There was a greater rate of caesarean sections in women taking metformin/insulin versus those on metformin alone ($p<0.005$).

Implications:

Preliminary data suggests that women who were prescribed metformin in combination with insulin were older and had a higher BMI and HbA1c at GDM diagnosis. This audit provides valuable insight into the characteristics of the current GDM population in a large tertiary referral hospital and the use of metformin in this population.

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Acute Kidney Injury in pregnancy-related ICU admission: are we missing mild AKI?

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Background

Acute kidney injury(AKI) during pregnancy or postpartum is associated with significant maternal and neonatal morbidity. It is increasingly recognised that AKI may remain unidentified due to lack of established pregnancy-specific reference ranges for serum creatinine, poor reliability of eGFR in pregnancy, and previously unmeasured baseline renal function. We aimed to determine the theoretical proportion of 'missed' AKI based on serum creatinine reported to the ANZICS data registry.

Methods

Data relating to women of child-bearing age(15-49 yrs) admitted to ICU was obtained from the ANZICS CORE registry(2006-2015). AKI prevalence and severity was determined using: (1)the highest serum creatinine(Cr) in the first 24hrs of ICU admission, (2)validated classification systems (RIFLE/AKIN/KDIGO), and (3)published population estimates of baseline serum creatinine in pregnancy (median Cr=53 umol/L) and non-pregnant women 15-49yrs(median Cr=74 umol/L). Definitions of AKI severity: Mild =1.5-1.9 x estimated baseline Cr, Moderate/Severe =>2 x estimated baseline Cr.

Results

143,484 eligible patient episodes were identified, of which 11,176 were during pregnancy or postpartum. AKI prevalence using non-pregnant baseline Cr was 6.7% (n=749) in the pregnancy group and 8.5% (n=11,492) in non-pregnant age-matched controls, p<0.0001. Adjusting for pregnancy (AKI=Cr >80 umol/L) increased prevalence to 17.1% (n=1,911) in the pregnancy group. Moderate/Severe AKI prevalence was 7.7% (n=860) in pregnancy, and 5.3% (n=12,609) in the non-pregnant group, p<0.0001. Leading ICU admission diagnoses in the pregnancy group with AKI were hypertensive disorders of pregnancy and complications associated with emergency Caesarian section. AKI was an independent risk factor for mortality, with a rate of 0.4% in the pregnancy group vs 1.5% in non-pregnant group, p<0.0001.

Conclusion

Using this model, 60% of pregnancy-related AKI may be missed if serum creatinine-based definitions are used without adjusting for pregnancy. This observation reinforces the need for greater awareness in identifying and reporting AKI, and developing improved techniques for measuring renal function in pregnancy.

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Educating Midwives in the Management of Women with Diet treated Gestational Diabetes Mellitus

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Antenatal care at The Royal Women's Hospital Melbourne, is provided through a 'TeamCare' approach, supporting continuity of care with midwives, doctors and allied health professionals throughout a woman's pregnancy. Historically, the antenatal care of a woman with Gestational Diabetes Mellitus (GDM) has been provided through specialist Diabetes clinics. Recent research data indicate women with diet treated GDM (DT-GDM) have similar outcomes to the non-GDM population [1]. With the aim of maintaining continuity of care and delivering best practice for women with GDM, midwives have been educated in the antenatal management of women with DT-GDM. This current study aims to evaluate the effectiveness of this education in meeting the learning needs of midwives for the management of women with DT-GDM. An education session was facilitated by a Diabetes Educator, Dietitian and Endocrinologist or Obstetrician, covering the topics of; introduction to GDM, interpretation of blood glucose monitoring, basics of dietary management, common clinical scenarios in the management of women with DT-GDM. This session was evaluated with a questionnaire, assessing knowledge and confidence regarding DT-GDM management. 30 midwives have attended the education session to date. Preliminary evaluation indicates all midwives felt the information provided in the session has sufficiently prepared them for the management of women with DT-GDM, with confidence levels in clinical management increasing. Following the success of the education session and the introduction of an ongoing online competency module, the antenatal management of women with DT-GDM is now being led by midwives, supporting continuity of care throughout a woman's pregnancy. Further research needs to be undertaken to evaluate the obstetric outcomes of midwifery led care of women with diet DT-GDM.

[1] F. Vally, J. Presneill and T. Cade, Macrosomia rates in women with diet controlled gestational diabetes: a retrospective study. Journal of Pregnancy. https://www.hindawi.com (accessed 8th August 2017)

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Are there differing patterns of dysglycaemia in women diagnosed with GDM according to new versus old ADIPS criteria?

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Background: The new Australasian Diabetes in Pregnancy Society (ADIPS) 2014 diagnostic criteria includes a lower fasting 75g oral Glucose Tolerance Test (oGTT) cut-point of ≥5.1 mmol/L and a higher 2-hour cut-point of ≥8.5 mmol/L. The change in criteria may impact on the patterns of dysglycaemia in Gestational Diabetes Mellitus (GDM) clinic populations. Conventional Medical Nutrition Therapy (MNT) focuses on mealtime carbohydrate intake to reduce post prandial blood glucose levels.

Aim: Compare the proportion of women diagnosed with GDM by glucose measure (fasting and 2-hour values) in the oGTT according to the ADIPS 2014 versus ADIPS 1998 criteria.

Methods: The oGTT results were extracted from the Sydney South West Pathology Service database for singleton pregnancies from 2011-2015. These results were from women who had an oGTT because they either failed a Glucose Challenge Test or proceeded directly to an oGTT if at high risk of GDM. Analyses of the proportion of fasting and 2-hour GDM diagnoses were undertaken according either ADIPS 2014 criteria or ADIPS 1998 criteria. Statistical significance was assessed using Chi-squared analyses.

Results: Of 10,967 pregnancies, 3687 pregnancies had complete oGTT data. There were 1330 vs 1304 women (36.2%vs35.4%) diagnosed with GDM according to the 2014 versus 1998 criteria. Compared to 1998 ADIPS, those classified as GDM according to new criteria: significantly more were diagnosed by the fasting value only (598 or 45.0% vs 207 or 15.9% p<0.0001), significantly

fewer by the 2-hour value only (487 or 36.6% vs 928 or 71.2% p<0.0001) and significantly more were diagnosed by both values (245 or 18.4% vs 169 or 13.0% p<0.05).

Conclusions: Elevated fasting glycaemia is generally considered to be less amenable to conventional MNT. However, given a possible increase in impaired fasting glycaemia in GDM clinics with the new criteria, further MNT research in this area is warranted.

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Identifying women at risk of GDM: are lifestyle interventions occurring early enough?

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The change in diagnostic criteria for gestational diabetes mellitus (GDM) has led to increased rates of diagnoses, prompting more women than ever before to consider, and ideally to improve, their diet and lifestyle. Concurrently, large international interventions have been conducted that aim to reduce risk of GDM in women who are at high risk, with mixed results. A critical aspect for an intervention's success is to conduct it early in pregnancy, and, therefore, to identify high-risk women as soon as possible. As a high body mass index (BMI > 35), is a GDM risk factor, as stated in ADIPS consensus guidelines, it seems logical to identify and refer these women for dietetic assessment. One of the earliest opportunities for identification and referral is from the midwife's initial antenatal assessment, usually conducted at 16 weeks gestation. Dietetic intervention can thus occur earlier in pregnancy than at GDM diagnosis, potentially improving obstetric and fetal outcomes. An audit was conducted to investigate the number of women with GDM in a singleton pregnancy and a BMI ≥ 35 who attended a dietetic consultation prior to GDM diagnosis, in 2016. Data were sourced from RWH electronic databases for 770 women with GDM in a singleton pregnancy during 2016. Of these, 12% (n=89) had a BMI ≥ 35 measured at the midwife assessment prior to GDM diagnosis. Of these 89 women, only 12% (n=11) women attended a dietetics consultation for assessment and support regarding their high BMI. This audit could not identify the number offered a referral but declined. Improvements in diet and lifestyle can optimise obstetric and fetal outcomes, but early adoption of these patterns is ideal. Timely assessment and referral is imperative. The reasons for poor referral rates by midwives, or uptake by women, are unknown and warrant further investigation.

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Progressive deep vein thrombosis in pregnancy: does LGA with polyhydramnios play a role?

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Our case study describes a 28-year-old female (G2P1) with a large for gestational age fetus and polyhydramnios in the setting of Type 1 Diabetes Mellitus. She presented initially at 29 weeks' gestation with right lower leg swelling, significant chest pain and breathlessness. Ultrasound of her lower limbs identified a thrombus in the right popliteal vein, as well as slow venous flow within the right common femoral and superficial femoral veins. She was discharged home on therapeutic enoxaparin, with factor Xa levels being in appropriate range. Five days post discharge, she represented with contractions and was diagnosed with threatened pre-term labour in the setting of a previous caesarean section. At the time, a repeat ultrasound scan showed progression of the deep vein thrombosis into the common femoral vein, despite therapeutic anticoagulation. V/Q scan did not show any ventilation perfusion mismatch, but echocardiogram showed evidence of right ventricular strain. She was managed with intravenous heparin and a supra-renal IVC filter was inserted with view to reduce peri-operative mortality in the setting of caesarean section. A progress scan post delivery revealed complete dissipation of the clot and the IVC filter was removed six weeks post partum. The management of progressive deep vein thrombosis despite therapeutic anticoagulation in the setting of threatened pre-term labour in a high risk pregnancy is challenging and requires a multidisciplinary approach.

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Impact of new diagnostic and treatment criteria for gestational diabetes: a cohort study

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Gestational diabetes mellitus (GDM) is associated with adverse maternal and neonatal outcomes. In 2013, the Australasian Diabetes in Pregnancy Society endorsed new diagnostic and treatment guidelines for GDM in Australia. Eastern Health adopted the new guidelines in 2015. The aim of this study was to compare two annual cohorts of women and their neonates, before and after the implementation of the new guidelines. Sociodemographic and clinical characteristics, treatment burden and maternal and neonatal outcomes were compared. In additional, maternal characteristics associated with adverse maternal and neonatal outcomes were examined. A total of 1,335 pregnancies affected by GDM were studied. Sociodemographic characteristics were generally similar between the cohorts. There was no significant difference between the proportion of each cohort diagnosed with GDM with introduction of the new guidelines (13.9% in 2014 compared to 14.7% in 2015). There was a significant reduction in the number of patients with gestational diabetes treated with diet alone (65.42% compared to 44.73%), and a significant increase in the number of patients treated with insulin (32.09% compared to 53.1%). The adverse outcomes of gestational hypertension, neonatal hypoglycemia and neonatal jaundice were significantly reduced following introduction of the new guidelines. There was no difference in in rates of induction, caesarean section, or admission to special care nursery. The introduction of new diagnostic and treatment criteria have increased the number of patients requiring insulin. This has had minimal impact on obstetric and neonatal services, however workload for the diabetes and endocrinology department has been increased.

Portal hypertension and pregnancy: concealed perils

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Bleeding from oesophageal varices has been reported in 50 % of pregnant women with portal hypertension.[1] Variceal bleeding during pregnancy is associated with a mortality rate of 18-50% in women with cirrhosis, though pregnant women with non-cirrhotic portal hypertension (NCPH) have much lower mortality rates between 2 and 6%.[2] Pregnant women with cirrhosis are at risk of hepatic decompensation/encephalopathy, ascites and postpartum haemorrhage. Pregnancy in women with portal hypertension is also associated with the risk of splenic artery aneurysm (SAA) rupture and of pulmonary hypertension. The prevalence of SAA varies from an estimated 0.1-0.2% in the general population to 7.1 % in autopsies on persons with cirrhotic portal hypertension.[3] SAA occurs 4 times more often in women compared with men, is associated with pregnancy and risk increases with increasing parity.[4] More than 400 cases of SAA rupture have been reported with approximately 30 % of these being during pregnancy.[5] SAA rupture is associated with maternal and fetal mortality rates of 70 % and 90 % respectively.[6] There is an estimated 25 % risk of rupture in pregnancy in women with an existing SAA. The appropriate management of SAA during pregnancy is unclear. While current recommendations advise management with SAA greater than 2 cm in diameter, more than half of SSAs which rupture during pregnancy are smaller in size, leading some authors to recommend treatment of all SAA regardless of size in women of childbearing age.[7] A prospective study of patients hospitalised with portal hypertension detected pulmonary hypertension in 2 per cent.[8] Pulmonary hypertension complicating pregnancy is associated with significant maternal mortality of between 12 % and 33 %.[9] A case of SAA in a woman with NCPH is presented. Health professionals caring for women with portal hypertension in pregnancy should be aware of the risks of SAA and pulmonary hypertension.