

### 245 Postpartum dyslipidemia is highly prevalent in women with gestational diabetes mellitus

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**OBJECTIVE:** To determine the prevalence of dyslipidemia in postpartum women diagnosed with gestational diabetes mellitus (GDM) and to evaluate the impact of Body Mass Index (BMI) on the presence of dyslipidemia.

**STUDY DESIGN:** A prospective cohort study comprising patients diagnosed with GDM was performed. A fasting lipid profile was analyzed at 6 weeks postpartum. Dyslipidemia was defined as having at least one of the following: raised total cholesterol, raised low-density lipoprotein (LDL), decreased high-density lipoprotein (HDL) or raised triglycerides. The prevalence of dyslipidemia was compared across BMI categories.

**RESULTS:** Of 82 patients participating in the study 63.4% (52/82) had an abnormal fasting lipid profile at 6 weeks postpartum. The average age of the study population was 33.0 years. The prevalence of dyslipidemia increased significantly with increasing BMI from 50% in women with a normal BMI to 89% in those with class II-III obesity ( $p=0.03$ , OR: 1.78). Raised total cholesterol and raised LDL were the most common forms of dyslipidemia occurring in 56% and 41% of the population respectively.

**CONCLUSION:** Women diagnosed with GDM are at high risk of dyslipidemia. This risk increases with increasing BMI category. Other studies have shown that women with GDM have an increased risk of developing type II diabetes mellitus and an increased risk of developing cardiovascular disease independent of type II diabetes mellitus. Dyslipidemia, an important risk factor for cardiovascular disease, is already highly prevalent in women with GDM at a young age. Awareness of, and investigation for, this potentially modifiable risk factor is important. All patients with GDM should have a fasting lipid profile performed postnatally as well as a full assessment of cardiovascular risk.

### 246 High incidence of hypertrophic cardiomyopathy and cardiac dysfunction in fetuses of diabetic mothers

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**OBJECTIVE:** To prospectively evaluate the risk of hypertrophic cardiomyopathy (HCM) and cardiac dysfunction in fetuses of women with Type 1 and 2 diabetes mellitus (DM) and determine if elevated maternal levels of cardiac mitogen, insulin-like growth factor-I (IGF-I), confer increased risk.

**STUDY DESIGN:** Participating women with DM underwent a fetal echocardiogram at 36 weeks gestation by a pediatric cardiologist blinded to glycemic control. HCM was defined as septal or free wall thickness of > 5mm and cardiac dysfunction as a modified myocardial performance index (MPI) >.43 (Van Mieghem, 2009). Maternal serum IGF-I levels were measured with ELISA.

**RESULTS:** 32 (of 100 planned) participants underwent fetal echocardiography. The average age was 33 years, 31% were nulliparous, and 28% privately insured. On average, prenatal care was initiated at 11 weeks with an HgbA1C of 6.7% (range 5-10.5%). 72% had Type 2 DM. The cesarean delivery rate was 60%; the average gestational age at delivery was 38.6 with a mean birthweight of 3778g. 28% of infants were > 4000g. Only 12 (37%) fetuses had normal echocardiograms. 7(22%) had HCM, 9 (28%) had dysfunction and 4(13%) had both. Among normal fetuses, mean maternal IGF-I was  $0.48 \pm .26$  ng/ml compared to  $0.69 \pm .38$  ng/ml for those with HCM and  $0.77 \pm .42$  ng/ml with dysfunction and  $0.93 \pm .41$  ng/ml for those with both

(ANOVA,  $p>0.05$ ). Planned follow-up neonatal echocardiogram at 2 days of life demonstrated continued HCM in 5/13 (38%) and other cardiac anomalies (VSD, pulmonary hypertension) in 3 infants. There were no significant differences in maternal glycemic control, BMI, weight gain, birthweight, neonatal hypoglycemia, RDS or macrosomia in those with normal versus abnormal fetal echocardiograms.

**CONCLUSION:** HCM and cardiac dysfunction ascertained in the late third trimester occur frequently in fetuses of diabetic women and do not appear to correlate with maternal glycemic control. Elevated maternal IGF-I may be associated with concomitant dysfunction and hypertrophy.

### 247 Pregnancy outcomes in patients diagnosed of gestational diabetes mellitus by criteria established by Carpenter and Coustan versus that by The International Association of Diabetes and Pregnancy Study Group

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**OBJECTIVE:** To compare the pregnancy outcomes in gestational diabetic patients by criteria established by Carpenter and Coustan (Group 1) versus that by The International Association of Diabetes and Pregnancy Study Group-IADPSG (Group 2).

**STUDY DESIGN:** We performed a retrospective cohort study of pregnant patients who met criteria for GDM during the 100-g or 75-g oral glucose tolerance test (GTT). In Group 1, GDM was diagnosed using criteria established by Carpenter and Coustan with the 100-g oral GTT. Group 2 consisted of gestational diabetic patients who underwent the 75-g oral GTT and met the criteria established by IADPSG. Patients with abnormal fasting glucose were excluded.

**RESULTS:** Group 1 and 2 consisted of 205 and 142 patients respectively who delivered in a community hospital between 2010 and 2012. There was no statistical significant difference in the percent of multiparity, body mass index, and weight gain during the pregnancy. Patients in Group 2 was diagnosed of gestational diabetes mellitus (GDM) sooner at 26.9 weeks than those in Group 1 at 27.8 weeks gestation. However, there was no statistical difference in the gestational age at delivery, neonatal birthweight, and incidence of birthweight of 4,000 gm or more. There was a statistical significant difference in the method of treatment of GDM during the pregnancy. 56.1% of patients in Group 1 while 77.9 % of patients in Group 2 required diet and exercise. Medical treatment including glyburide or insulin was required in 43.9% of Group 1 patients while only 22.1% of Group 2 patients required this mode of therapy ( $P = < 0.0001$ ). There was a significant higher percent of patients in Group 1 who required cesarean delivery (49.3% vs 34%;  $P = 0.0108$ ).

**CONCLUSION:** Using a lower threshold in the diagnosis of GDM does not seem to improve the pregnancy outcome.

#### Demographics and outcome

	Group 1	Group 2	P value
Multiparous	70.2 %	70.2%	1.000
BMI	28.3	27.9	0.5910
weight gain	18.7 lb	19.2 lb	0.6617
GA (wks) delivery	39.0	38.7	0.0788
BW (gm)	3260	3253	0.7852
BW > 4000 gm (%)	4.5	4.9	0.8055
GA (wks)at diagnosis	27.8	26.9	<0.0001
Treatment-medical (%)	43.9	22.1	<0.0001

### 248 Use of a broad-based intake screen for diabetes in pregnancy

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**OBJECTIVE:** Due to high rates of obesity and limited access to primary care, our obstetric patient population is at high risk for diabetes. In

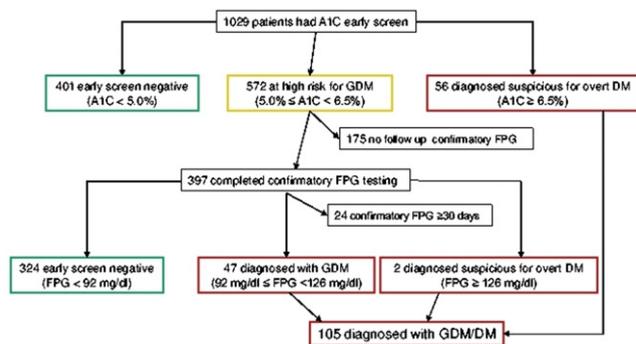
non-pregnant women, hemoglobin A1c (A1c) is a convenient screen for this disease. We implemented a broad-based intake screen for diabetes (BIS-DM) using A1c followed by a confirmatory fasting plasma glucose (FPG). The objective of this study is to examine this new protocol for early identification and differentiation of patients with GDM and GDM suspicious for overt DM (GDM/DM).

**STUDY DESIGN:** This retrospective chart review examined BIS-DM between May 2011 and June 2012. Patients underwent A1c testing with the first prenatal venipuncture. Those with an A1c  $\geq 5.0\%$  and  $< 6.5\%$  underwent confirmatory FPG testing within 30 days, where a value  $\geq 92$  mg/dl and  $< 126$  mg/dl was diagnostic of GDM. Patients with an A1c  $\geq 6.5\%$  or FPG  $\geq 126$  mg/dl were diagnosed with GDM suspicious for overt DM. Using Chi square analysis, we compared our rate of GDM/DM to published rates from North American (NA) data on conventional screening in pregnancy. BIS-DM screen negative patients underwent 2-hour glucose tolerance testing (2GTT) at 24-28 weeks gestation.

**RESULTS:** Of 830 women completing BIS-DM, 105 (12.7%) were diagnosed with GDM/DM. This rate was significantly higher than the mean NA rate of 7.4% ( $p = 0.0004$ ). Of the 105 cases, 58 were suspicious for overt DM (Figure).

**CONCLUSION:** BIS-DM is a novel approach to diagnosing and stratifying GDM/DM in early pregnancy. Our rate of 12.7% is consistent with projections from adoption of aggressive screening as suggested by the International Association of Diabetes in Pregnancy Study Group (IADPSG). The number of cases is expected to increase further once all BIS-DM screen negative patients complete 2GTT. Our study supports BIS-DM as an adequate early screen for diabetes in pregnancy.

Figure 1. Early Screening Results



**249 Have the new diagnostic criteria for gestational diabetes mellitus (GDM) impacted on perinatal maternal and fetal outcomes?**

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**OBJECTIVE:** The International Association of Diabetes and Pregnancy Study Group (IADPSG) recently adopted new criteria for the diagnosis of GDM based on the results of the Hyperglycaemia and Adverse Pregnancy Outcomes (HAPO) trial. These criteria for diagnosis were adopted by our unit in 2011. The aim of our study was to determine the difference in perinatal outcomes in 3 separate groups and to provide information on these women who are now deemed to have gestational diabetes. The patients in Group 2 and 3 received treatment in a tertiary referral unit for the management of GDM.

**STUDY DESIGN:** A prospective study of oral glucose tolerance tests (OGTTs) performed in a large tertiary referral hospital with a delivery rate of greater than 8,500 births per year. The presence of GDM and perinatal outcomes were compared in three groups. Group 1=Not

GDM. Group 2 =GDM. Group 3= Additional women diagnosed GDM based on new criteria.

**RESULTS:** 1590 patients had OGTT results and complete data recorded in 2011. The number of women with GDM using the new criteria was increased by 26.4%. The extra women had an increased BMI at booking ( $p=0.001$ ) but there was no increase in shoulder dystocia or pre-eclampsia. There was no difference in caesarean section rates (Table).

**CONCLUSION:** The new diagnostic criteria for GDM will result in an increased rate of diagnosis of GDM and therefore increased surveillance of these patients. However this treatment will not improve perinatal outcome, we may now be diagnosing and treating a group of women without sufficient evidence of clinical benefit.

Table

	Group-1 (Normal) n=1384	Group-2 (GDM) n=163	Group-3 (FPG 5.1-5.7 mmol/l) n=43	p values
Booking weight 70-99.9 kg	1252 (54.7%)	91 (55.83%)	25 (58%)	G3 vs.G1= p 0.0001 G3 vs.G2= p 0.8635
Booking BMI >30	534 (38.6%)	79 (48.47%)	33 (76%)	G3 vs.G1= p 0.0001 G3 vs.G2= p 0.0010
Gestational age > 37 weeks	1309 (94.5%)	155 (95.10%)	39 (90.6%)	G3 vs.G1= p 0.2944 G3 vs.G2= p 0.2793
Neonatal weight >4,000g	265 (19%)	23 (14.11%)	8 (18%)	G3 vs.G1= p 1.0 G3 vs.G2= p 0.4741
Macrosomia >90th percentile	23 (1.6%)	3 (1.84%)	0	G3 vs.G1= p 1.0 G3 vs.G2= p 1.0
Shoulder Dystocia	31 (2.2%)	4 (2.45%)	1 (2.3%)	G3 vs.G1= p 1.0 G3 vs.G2= p 1.0
Caesarean section	149 (13.3%)	17 (10.43%)	8 (19%)	G3 vs.G1= p 0.1311 G3 vs.G2= p 0.1855
Pre-eclampsia	44 (3.18%)	4 (2.45%)	0	G3 vs.G1= p 1.0 G3 vs.G2= p 1.0

**250 Adverse perinatal outcomes stratified by birthweight in pregnancies with and without gestational diabetes**

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**OBJECTIVE:** To study the relationship between adverse perinatal outcomes and birthweight in pregnancies with and without gestational diabetes.

**STUDY DESIGN:** This is a retrospective cohort study of outcomes associated with pregnancies with and without gestational diabetes in a sample of all singleton term deliveries without fetal anomalies in California from 1997 to 2006. Outcomes examined were IUFD, neonatal death, hypoglycemia, jaundice, respiratory distress syndrome, and shoulder dystocia. Within each cohort, outcomes were analyzed by chi-squared test in subgroups of birthweight: less than 4000g, 4000g to <4500g, 4500g to <5000g, and greater than or equal to 5000g.

**RESULTS:** The prevalence of IUFD increased across birthweight categories in both GDM and non-GDM cohorts (Table). In each birthweight group, the prevalence of IUFD was higher in the GDM cohort. Hypoglycemia, jaundice, RDS, and shoulder dystocia were all statistically increased with increasing birthweight in both cohorts. Hypoglycemia occurred in 6.7% of >5000g infants in the non-GDM cohort which was greater than the 3.2% of the >5000g infants in the GDM group ( $p<0.001$ ).

**CONCLUSION:** Above birthweights of 4000g, greater birthweights are associated with increasing adverse perinatal outcomes including IUFD, hypoglycemia, jaundice, RDS and shoulder dystocia in women with and without gestational diabetes. Prevalence of hypoglycemia in infants larger than 4500g born to women without a diagnosis of gestational diabetes may indicate a need for better identification and treatment of GDM.