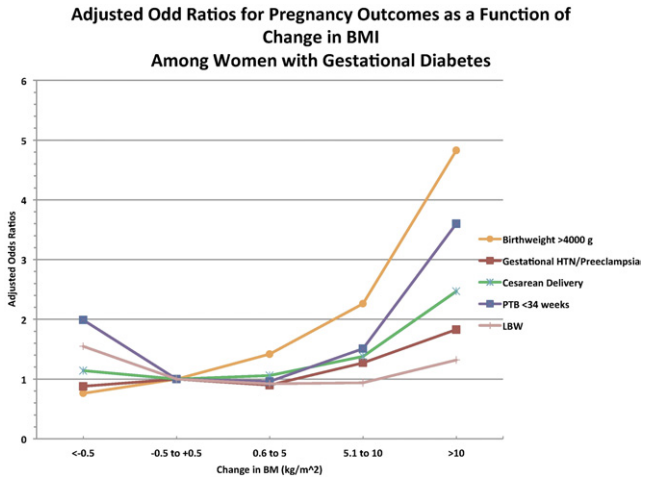

269 Delivery outcomes of large for gestational age (LGA) infants of diabetic mothers (IDMs)

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OBJECTIVE: To evaluate delivery outcomes of LGA infants of IDMs.

STUDY DESIGN: Observational study (2008-11) of all LGA infants (birthweight >90th% for GA) delivered to 144 mothers with pregestational diabetes (PGDM) and 157 mothers with GDM. Major malformations and GA <34 w pts were excluded. Primary outcome of interest was shoulder dystocia (SD) and associated morbidity.

RESULTS: A total of 301 births were identified. 104 women (34.6%) delivered via repeat cesarean delivery (CD) while 106 (35.2%) women underwent a primary CD (67 for macrosomia, 13 for FTP, 8 for breech presentation, 10 for nonreassuring fetal heart rate status, 8 other). A total of 91 women (30.2%) delivered vaginally, with 20 cases complicated by shoulder dystocia (22% of vaginal deliveries). No cases of brachial plexus injury or humeral/clavicular fracture occurred. Other neonatal morbidities included RDS/TTNB (55%), late preterm birth (35% of PGDMs and 24% of GDMs), 5 minute Apgar <6 (9 patients, 2 with severe depression), and neonatal hypoglycemia (Glc values <40 mg/dl, affected 68 pts once and 49 others at least twice). NICU admission occurred in 81% of PGDMs and 35% of GDMs, but 75% of these admissions were <48 hours in duration, usually for the indication of blood sugar monitoring.

CONCLUSION: We confirm a high frequency of SD in LGA IDMs delivered vaginally. Despite selection of a high proportion of cases for primary CD, SD occurred in 22% of all vaginal deliveries. A liberal approach to CD with suspected macrosomia in diabetic pregnancy cannot prevent all cases of SD in this high risk population.

	34-36 w	37 w	38 w	39 w	40 w	Total
Number	88	78	74	49	12	301
% GDM	43%	35%	53%	84%	100%	51%
IOL (#)	28	22	17	18	4	89 (30%)
Vag del (#)	35	18	16	17	5	91 (30%)
Primary CD (#)	29	31	29	14	3	106 (35%)
Shoulder Dystocia (#)	4	7	3	4	2	20 (22%)
Mean Birthweight (g)	3543	4062	4221	4289	4223	

270 Effects of maternal hyperglycemia on placental vascular responsiveness

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OBJECTIVE: Hyperglycemia has been shown to impact the body's ability to regulate blood supply via excess uptake of endogenously produced nitric oxide. Lacking any neural stimulus, fetal-placental vascular tone is regulated via autocrine mechanisms, specifically vascular production of nitric oxide. We sought to investigate the effects of maternal hyperglycemia on the placenta's ability to self regulate its blood flow.

STUDY DESIGN: Using the placental perfusion model, 15 unlabored placentas at term were analyzed. Vascular responsiveness, as measured by pressure change from baseline, was recorded following serial injections of L-NAME, a nitric oxide inhibitor, into the fetal circulation. Dextrose was then added to the circulatory bath at a concentration of 8×10^{-3} M, and serial injections of L-NAME were again administered; pressure change from baseline was again recorded. The pressure changes between the normoglycemic and hyperglycemic placentas were compared at each concentration of L-NAME. The data was analyzed using the Mann-Whitney U test.

RESULTS: Fetal vascular responsiveness, as measured by the change in pressure, was diminished in 10/15 placentas at an L-NAME concentration of 10^{-3} M, 7/15 at 10^{-4} M, 9/14 at 10^{-5} M, and 6/15 at 10^{-6} M. There was a significant difference in the change in pressure in the normoglycemic placenta vs. the hyperglycemic placenta after injection of L-NAME at 10^{-5} and 10^{-3} concentrations.

CONCLUSION: In an in vitro placental perfusion model, placental hyperglycemia appears to reduce the nitric oxide inhibition effects of L-NAME, reaching statistical significance at 10^{-5} and 10^{-3}.

L-NAME Concentration	Normoglycemia (median ΔmmHg)	Hyperglycemia (median ΔmmHg)	p
10^{-6}	25.0 (20.2 - 31.0)	30.0 (18.0 - 42.0)	0.23
10^{-5}	29.0 (20.6 -33.1)	24.0 (16.0 - 30.8)	0.001
10^{-4}	26.0 (18.3 -30.0)	26.0 (17.0 - 36.3)	0.57
10^{-3}	24.0 (20.0 - 30.0)	20.0 (11.2 - 26.0)	0.01

271 The effect of metformin on insulin requirements in pregnancies complicated by type 2 diabetes

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OBJECTIVE: To investigate the effect of metformin on gestational insulin requirements in pregnancies complicated by type 2 diabetes (T2DM) in obese and non-obese populations.

STUDY DESIGN: A retrospective cohort study was performed on women with singleton term pregnancies with T2DM enrolled in the U.C. San Diego Diabetes and Pregnancy program from February 2008 to October 2011. Exclusion criteria included use of sulfonylureas, delivery at outside institutions, or insufficient prenatal care. Comparisons of patients using insulin alone versus those on insulin/metformin therapy were made using the t-test for continuous variables and the chi-squared or fisher's exact tests for categorical variables.

RESULTS: A total of 69 women met inclusion criteria, 40 in the insulin-only cohort and 19 in the insulin/metformin cohort. Demographic variables, including age, ethnicity, parity, initial BMI and HbA1c were not significantly different between the two groups. 75% of patients in the insulin-only cohort and 53% in the insulin/metformin cohort were obese in the first trimester. In the obese population, patients on metformin had significantly higher total and short-acting insulin requirements at 36 weeks compared to the insulin-only cohort (table 1). In the non-obese population, there were no significant differences in insulin requirements between the metformin/insulin and insulin-only cohorts. Gestational age at delivery, infant birthweight, frequency of macrosomia, mode of delivery, and Apgar scores were similar in both groups.

CONCLUSION: Obese patients with T2DM on metformin as an adjunct to insulin required higher insulin doses in the third trimester as compared to patients on insulin only. Use of metformin did not reveal any negative effect on birth outcomes. A key mechanism of action of metformin, increasing insulin sensitivity, would purport that decreased insulin doses would be required, contrary to our conclusions. Prospective trials are needed to elucidate whether empiric metformin can truly decrease insulin needs.

Insulin requirements for the insulin-only and metformin/insulin combination therapy cohorts

Insulin Requirements (units/kg/day)	Insulin Only	Metformin + Insulin	p-value
Obese (n=40)			
Total insulin requirement			
28 weeks	0.9 ± 0.4	1.2 ± 0.7	.03
36 weeks	1.2 ± 0.3	1.6 ± 0.8	.06
NPH dose requirement			
28 weeks	0.5 ± 0.2	0.7 ± 0.3	.06
36 weeks	0.7 ± 0.2	0.8 ± 0.3	.08
Humalog dose requirement			
28 weeks	0.4 ± 0.2	0.5 ± 0.4	.14
36 weeks	0.5 ± 0.2	0.8 ± 0.5	.03
Non-obese (n=19)			
Total insulin requirement			
28 weeks	1.0 ± 0.3	1.0 ± 0.7	1.00
36 weeks	1.3 ± 0.6	1.3 ± 0.6	.91
NPH dose requirement			
28 weeks	0.6 ± 0.1	0.6 ± 0.4	.91
36 weeks	0.8 ± 0.3	0.8 ± 0.3	.79
Humalog dose requirement			
28 weeks	0.4 ± 0.2	0.4 ± 0.3	.88
36 weeks	0.5 ± 0.3	0.5 ± 0.3	.96

Data are mean ± SD.

272 Pregnancy outcomes among women with type 1 diabetes managed with continuous insulin pumps versus multiple injections: a propensity-score based analysis

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OBJECTIVE: Compare pregnancy outcomes among women with type 1 diabetes managed with a continuous subcutaneous insulin pump (pump) to women managed with multiple insulin injections (injections).

STUDY DESIGN: This was a retrospective cohort study of pregnancies among women with type 1 diabetes who delivered at UCSF since 2006. Pregnancies prior to 2006 among women who also delivered after 2006 were included. Outcomes in women who were managed with a pump were compared to women managed with injections using a propensity-score based approach. The propensity to be on a pump was based on age, age at diagnosis, parity, distance from UCSF (> 50 mi or < 50 mi) and median income of the patient's county of residence. Primary outcomes were a composite maternal outcome (vaginal delivery, no antepartum admissions or preeclampsia and peripartum hospitalization ≤ 5 days) and neonatal outcome (delivery ≥ 36 weeks, no hypoglycemia or hyperbilirubinemia, neonatal hospitalization ≤ maternal stay and care in the well-baby nursery).

RESULTS: There were 48 pregnancies included, 35 among women on a pump, 13 among women using injections. Women on pumps were more likely to be older, live closer to UCSF and have a higher median income in their home county. Optimal maternal and neonatal outcomes occurred among 22.7% and 25.7% of women on a pump versus 7.7% of women on injections ($p = 0.2$). When subjects were propensity-score matched, however, women on pumps were more likely to have both optimal maternal and neonatal outcomes ($p < 0.01$).

CONCLUSION: Using propensity-scores for matching, women on insulin pumps appear to have better pregnancy outcomes than women on multiple daily injections. Additional investigation is needed to determine if this association is a function of improved glycemic control or other factors. Although geographic and socioeconomic factors may be important barriers, consideration of initiation of an insulin pump before or even during pregnancy may be warranted.

	Insulin Pump	Multiple Insulin Injections	p
Number of Pregnancies	35	13	
Mean maternal age at delivery (years)	25	32.9	< 0.001
Mean age at diabetes diagnosis (years)	15.8	14.2	0.6
Home > 50 miles from SF (%)	22.9	61.5	0.01
Median Income in Home County ($)	73,035	58,025	0.001
Mean hemoglobin A1c during pregnancy (mg/dl)	6.5	8.3	< 0.001
Mean GA at Delivery (weeks)	36.9	37.1	0.6
Vaginal Delivery (%)	60.0	30.8	0.07
Any Antepartum Stays (%)	31.4	46.2	0.3
Preeclampsia (%)	22.9	38.5	0.3
Neonatal Hyperbilirubinemia (%)	45.7	53.9	0.6
Neonatal Hypoglycemia	40.0	53.9	0.4
Neonatal Stay > Maternal Stay (%)	17.1	38.5	0.1

	Insulin Pump	Multiple Insulin Injections	p	† Propensity Matched Treated	Propensity Matched Untreated	p
Optimal Maternal Outcome (%)	22.7	7.7	0.2	18.8	0	< 0.01
Optimal Neonatal Outcome (%)	25.7	7.7	0.2	25.0	0	< 0.01

† Propensity matching based on maternal age, age at diagnosis, parity, distance from UCSF (> 50 miles or < 50 miles) and median income of the patient's county of residence.

273 Gestational diabetes screening: do neonatal outcomes differ based on one-step or two-step methods in a high risk population?

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OBJECTIVE: Our inner city obstetrical clinic changed their routine gestational diabetes screen from the 2 step 1 hour (1H) 50 g glucose screen to the one step 2 hour (2H) 75 g screen in July 2011. We sought to determine the effect of this change on neonatal outcomes.

STUDY DESIGN: A retrospective chart review was performed for the nine months preceding the change in screening method through the first six months of the 2H one-step screen. Delivery date and results of diabetic screen were collected. We also collected infant outcomes including rates of NICU admission, small for gestation age (SGA), large for gestational age (LGA), hypoglycemia, hyperbilirubinemia, respiratory distress syndrome (RDS), intraventricular hemorrhage (IVH), culture proven sepsis, and necrotizing enterocolitis (NEC).

RESULTS: There were 837 patients who delivered during the study period. Of these patients, 501 delivered during the 1H testing period and 336 delivered during the 2H testing period. During the 2H testing period there was an increase in the diagnosis of gestational diabetes from 7% to 11.7%. Rates of NICU admission, SGA, LGA, hypoglycemia, hyperbilirubinemia, RDS, IVH, culture proven sepsis, and NEC were similar between the two groups (see figure). The rate of hypoglycemia was 35.3% during the 1H testing period and 19.2% during the 2H testing period. This was not statistically significant.

CONCLUSION: Screening for gestation diabetes using the 2 step process does not result in a change in neonatal outcomes despite a high risk population. There was a trend towards decreased rates of hypoglycemia but this was not statistically significant.