

cases (13/42) of these: 4 cases of 45, XO, 4 cases of trisomy 18, 4 cases of trisomy 21, and 1 case of trisomy 13. Among fetuses with normal karyotype (n= 29), intrauterine fetal death occurred in two fetuses before 20 weeks of gestation. Major structural fetal malformations detected in 20-weeks level II sonogram were diagnosed in 11 of the remaining 27 cases (40.7%). A total of 29 chromosomally normal pregnancies gave rise to 16 live births (55.2%), with no structural abnormalities.

CONCLUSION: These data suggest that the prognosis of fetus with CH diagnosed in the first trimester is poor. Therefore, fetuses with CH requires more careful assessment of the fetus, with regard to both karyotyping and follow-up level II scan for detecting structural anomaly.

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382 Customized vs population-based approach to evaluate fetal overgrowth

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OBJECTIVE: To evaluate a customized method to estimate fetal overgrowth in mild gestational diabetes mellitus (mGDM) and normal pregnancies

STUDY DESIGN: Secondary analysis of a study with 4 cohorts: treated mGDM, untreated mGDM, positive GLT screen but normal OGTT, and normal. The 1° neonatal outcome was a composite of hypoglycemia, hyperbilirubinemia, hyperinsulinemia, trauma, or perinatal death. LGA>90th%ile was evaluated using ethnicity & gender-specific population (pop) norms (Alexander), and customized (cust) birth weight (BW) centile based also on maternal height, weight, and parity (Gardosi et al). LGAcust and LGApop were compared for their association with outcome. LGAcust was correlated with neonatal fat mass.

RESULTS: 642 (32.1%) infants developed the 1° outcome. Mean custBW centile was higher in those who developed the 1° outcome compared with those who did not (59.5±29.6 vs. 50.0±29.3, p<0.0001). Of those who had the 1° outcome 19.3% and 13.2% were LGAcust and LGApop, vs. 11.3% and 8.2% for those who did not (difference 6.1 vs. 3.1%, P=.03). Among normal women, 9.9% were LGAcust, close to expected 10%, vs. 6.8% LGA pop (p=0.03). Cust BW centile was also significantly correlated with neonatal fat mass (r=0.70, p<.0001).

CONCLUSION: A customized approach for assessment of fetal growth, instead of current population-based norms, better identifies neonates at risk for adverse outcomes related to overgrowth.

Cohort (N)	Norm	% LGA with 1° outcome	% LGA without 1° outcome
treated GDM (422)	pop	8.0	6.0
	cust	12.4	11.2
Untreated GDM (400)	pop	19.7	11.9
	cust	32.7	16.6
Pos GLT (798)	pop	13.1	9.1
	cust	15.8	11.0
Normal (381)	pop	11.2	5.7
	cust	18.4	7.4

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383 Physiological basis of the Quintero staging system

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OBJECTIVE: Twin-twin transfusion syndrome (TTTS) is thought to result from a net flow of blood from the donor to the recipient twin. The Quintero staging system (QSS) is used to classify the heterogeneity and gauge the severity of TTTS and assumes increased severity with advancing Stage. The purpose of this study was to assess the relationship between the flow in the umbilical vein (UV) of the donor twin and Stage.

STUDY DESIGN: UV flow (cc/min) was calculated as: $Q_{uv} = A_u \times V_u \times 60$, where A_u and V_u are the area and the blood flow velocity of the UV, respectively. The diameter of the UV was obtained by ultrasound in a perpendicular view of the vein, where as the velocity was obtained in a parallel view. Pulsatile V_u was assessed as the time-average velocity by trace. Measurements were obtained prior to laser surgery in all cases. Logistic regression controlled for Stage, gestational age and estimated fetal weight. Surgeries were approved by the Institutional Review Board and all patients signed informed consent.

RESULTS: Three hundred and thirty-two patients underwent pre-operative assessment. Table I shows the median UV flow values by QSS. There was a significant inverse correlation between UV flow and QSS, with a decrease in UV flow from Stage I-III and increased flow in Stage IV. The estimated fetal weight was also significantly correlated, but did not differentiate Stages I-II.

CONCLUSION: Umbilical venous flow assessment in the donor twin correlates inversely with disease severity as gauged by the QSS from Stages I-III, differentiating one Stage from another. Improved blood flow to the donor in Stage IV may be associated with increased venous pressure in the recipient twin from congestive heart failure. These hemodynamic findings support the basis of the Quintero Staging system.

Table I. Pre-operative umbilical venous flow in the donor twin by Quintero Stage

Stage (N)	UV flow (cc/min)	P value
I (64)	65	
II (95)	51	.007
III (149)	32	.0001
IV (24)	80	.0001

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384 Does fetal echocardiogram perform better than standard fetal ultrasound in obese women?

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OBJECTIVE: Only 20-35% of major congenital cardiac anomalies are detected by routine ultrasound screening. It is often suggested that patients at risk should therefore undergo a fetal echocardiogram. We examined the accuracy of fetal echocardiogram when compared to standard fetal ultrasound in detecting cardiac anomalies, stratified by maternal BMI.

STUDY DESIGN: Retrospective chart review. Neonates with discharge diagnosis of any congenital cardiac anomaly between 2003 and 2008 were included. Maternal charts were reviewed for gestational age at ultrasound, ultrasound diagnosis, echocardiogram diagnosis, and maternal BMI. Subjects were classified into BMI categories by CDC criteria: underweight and normal (control): 18.5-24.9 kg/m², overweight: 25.0-29.9 kg/m², and obese: 30 kg/m² and above. Detection rates between the two modalities were calculated and compared. Accuracy of the ultrasound and echocardiogram diagnoses defined as

true positive rate plus the true negative rate were compared and stratified by maternal weight categories.

RESULTS: 86 neonates with congenital heart disease were included. 48 of these neonates had fetal echocardiograms. Accuracy of detection of fetal heart defects was higher with echocardiograms when compared to standard fetal ultrasounds (73% vs. 48%). As maternal BMI increased, the accuracy of fetal echocardiography decreased slightly, but standard ultrasound decreased rapidly. The odds ratio for diagnosis of congenital heart disease was 2.8 for fetal echocardiogram compared with standard ultrasound ($p=0.01$). When compared to ultrasound, fetal echocardiograms were more likely to detect a cardiac anomaly in women with increasing BMI ($p=0.07$).

CONCLUSION: In patients where a fetal echocardiogram is indicated, it often provides more comprehensive results than the standard ultrasound. This suggests that obese patients may be good candidates for a routine fetal echocardiography referral. However, further work is needed to determine if fetal echocardiograms would work as well when used as a routine screening test in this population.

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385 Occupational injury is a risk to perinatal ultrasound

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OBJECTIVE: Over the past 15 years, many surveys have been conducted involving non-physician sonographers in all ultrasound (U/S) specialties. Few surveys have been conducted of physicians (sonologists) who perform U/S exams as part of their clinical practice. The largest study was collected in Italy of 2041 physician sonographers (sonologists). The objective was to determine the incidence of work-related musculoskeletal disorders (WRDSD) among sonographer and sonologists.

STUDY DESIGN: An online survey (48 questions) of SMFM members was undertaken between October 2008 - June 2009. The survey was completed by 252 of 2000 members (12.6% response). Of those, 222 were MDs and 30 were sonographers.

RESULTS: The incidence of scanning in pain/discomfort was present in 64.6% of respondents. The most common site of pain was the shoulder followed by the neck and wrist/hand and fingers. Most sonologists (78.5%) had height adjustable tables and of these 65.8% were electronically adjustable (EHA); 76.5% used scanning chairs (27.7% had lumbar support). More MDs are spending >50% of their day on a PACS or computer workstation (CWS). When asked what they would change in their work environment, the #1 answer was “the design of the CWS or PACS.” The #2 answer was tied between “buy an EHA bed” and “reduce the # of scans per day” (16.9% each).

CONCLUSION: In summary, these data confirm the significant effect on ongoing scanning on the number of WRMSD. More effective solutions to avoid these injuries must be sought.

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386 Association between pregnancy complications and small for gestational age (SGA) birthweight defined by customized versus population-based standards

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OBJECTIVE: To estimate the association between pregnancy complications and SGA defined by customized fetal growth potential (custSGA) developed for our population compared with the population-based Alexander growth chart for the US (popSGA).

STUDY DESIGN: A retrospective cohort study using our ultrasound database, with 54,287 cases with complete data on pregnancy character-

istics and outcome. SGA was defined as <10th percentile for gestational age by each growth standard. Outcome variables included: threatened preterm labor (PTL), preterm premature rupture of membranes (<37 weeks, PPRM), placental abruption (ABRPT), hypertensive disorders (HTNDZ= gestational hypertension and preeclampsia), neonatal care stay >7 days (NICU7) and stillbirth (SB).

RESULTS: 7551 (13.9%) of cases were cust SGA, of which 4063 (53.8%) were not identified as SGA by the population method. 3695 (6.8%) were popSGA, of which 207 cases (5.6%) were not SGA by the customized method. For each complication tested (Table), the cust SGA only category identified additional cases which were significantly associated with adverse outcome. In contrast, cases which were popSGA only were not associated with adverse outcome, with the exception of HTNDZ.

CONCLUSION: SGA defined by customized growth potential identifies pregnancies at the highest risk for complication by differentiating between physiologically and pathologically small fetuses.

	custSGA & popSGA (OR, 95% CI)	custSGA only (OR, 95% CI)	popSGA only (OR, 95% CI)
PTL	1.1 (1.0-1.3)	1.3 (1.2-1.4)	0.9 (0.6-1.6)
PPROM	1.4 (1.1-1.7)	2.3 (1.9-2.7)	0.2 (0.03-1.7)
ABRPT	2.3 (1.7-3.1)	2.4 (1.8-3.3)	0.8 (0.1-6.0)
HTNDZ	2.7 (2.4-2.9)	1.7 (1.6-1.9)	1.6 (1.0-2.6)
NICU7	3.5 (3.1-4.0)	3.1 (2.7-3.6)	0.8 (0.3-2.1)
SB	9.3 (7.1-12.2)	9.6 (7.4-12.3)	1.7(0.2-11.9)

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387 Prenatally diagnosed duodenal versus jejunal atresia: analysis of outcomes

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OBJECTIVE: To compare neonatal outcomes in prenatally diagnosed fetal duodenal (DA) versus jejunal atresia (JA).

STUDY DESIGN: Retrospective review of 18 cases of DA and 20 cases of JA diagnosed by prenatal ultrasonography over 6.5 years. Parameters recorded were maternal age, gestation age at delivery, parity and preterm birth (PTB). Neonatal outcomes studied were aneuploidy, birthweight (BW), median hospital stay, time to full enteral feeding (FEF) and duration of total parenteral nutrition (TPN). Data analysis included Mann-Whitney U, t, Chi-square, and Fisher's Exact.

RESULTS: There were no significant differences in maternal demographics (age, $p = 0.585$; parity, $p = 0.82$; or percentage of PTB, $p = 0.48$). Gestation age at delivery was similar (DA 35.7W, JA 35.4W, $p = 0.80$). Nearly 50% in each group had spontaneous PTB ($p = 0.48$). With cases of aneuploidy excluded DA had lower rates of PTB (DA 16%; JA 53%; $p = 0.02$). All infants were liveborn, underwent surgery and were alive at hospital discharge. There were 6 aneuploid infants with DA and one with JA (DA 33%, JA 5%; $p = 0.038$). Infants with DA had lower mean BW than infants with JA (DA 2074g, JA 2599g; $p = 0.014$). Exclusion of aneuploid infants demonstrated no significant difference in BW between groups (DA 2184g, JA 2588g; $p = 0.12$). There was a trend toward earlier FEF in infants with DA (DA 14d, JA 17d; $p = 0.096$). Length of TPN was similar (DA 16d, JA 24d; $p = 0.14$) as was median hospital stay (DA 30d, JA 37d; $p = 0.82$).

CONCLUSION: Maternal demographics are similar in cases of fetal DA or JA. PTB was common in both DA and JA. Aneuploidy plays a significant role in the birthweight of infants with DA. Euploid fetuses with DA or JA had similar outcomes.

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