

Anatomic Survey in Context of Maternal Obesity: Maternal and Fetal Factors Influencing Completion of the Fetal Survey

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Objective

To determine what factors most influence ability to evaluate fetal structures in obese gravidas.

Study Design

Retrospective cohort study. Obese women were identified by BMI upon entry to care. Maternal-fetal data were entered into secure RedCap database. Univariate and multivariate analysis were used where appropriate.

Results

589 maternal-fetal pairs evaluated. Obese gravidas exhibited mean BMI 41.2 (SD 7.6; range 30-71.9), median gravidity 3 (IQR 2-5), median parity 1 (IQR 0-3) and mixed racial backgrounds (Caucasian 43.6%, African American 40.1%, Hispanic 15.9%). Relevant comorbidities included smoking 23.6%, GDM 13.1%, DM 22.3%, OSA 13.2%, and excessive gestational weight gain (GWG) 58.2%. Co-morbid DM ($p=0.04$) and intake BMI ($p=0.001$) were most influential in limiting ability to complete anatomic survey. Variable presentation at anatomic survey reduced incomplete scans (OR 0.49); these trends remained when controlling for BMI, DM, GWG, OSA, smoking, and race; **Table 1**. 412 (70%) had adequate images to complete initial fetal survey, leaving 177 (30%) inadequately evaluated. Follow up attempts reduced incomplete scans to 8% (47/589). Significant differences existed amongst specific fetal anatomic structures not well visualized on initial scan (ANOVA $p<0.01$); **Figure 1**. Our cohort demonstrated an 8.4% (47/589) rate of structural defects, highlighting the importance of fetal survey in obese women, noting no structural defects were missed upon review of neonatal records.

Conclusion

Increasing BMI and DM limit ability to evaluate fetal morphology and increase number of ultrasounds required to clear anatomy. Cardiac arches and outflow tracts proved to be most difficult to clear in a population at increased risk for defects. A trend in difficulty of clearing anatomy was observed with non-longitudinal lie (eg, transverse, oblique). Variable fetal presentation during an anatomic survey reduces number of incomplete scans validating effort and time to reposition patients.

Table 1: Maternal and Fetal Factors Influencing Clearance of Fetal Anatomy

	Positive (uncleared initial scan)	Negative Control (uncleared initial scan)	Odds Ratio (95% CI; p-value)
Smoking	47.6%	39.8%	1.3 (0.8, 2.4; NS)
DM	86.3%	13.7%	5.9 (2.2, 8.2; $p=0.04$)
Intake BMI >50	100%	32.4%	3.1 (1.6, 5.4; $p=0.001$)

Excessive GWG *uncleared by delivery	59.7%	40.3%	1.2 (0.5, 1.5)
Variable presentation (initial scan)	6.3%	12.1%	0.49 (0.25,0.96; p=0.03)
Fetal position not cephalic	50.3%	38.1%	1.5 (0.9, 2.2; p=0.1)
Fetal lie transverse/oblique	19.8%	10.1%	1.8 (0.93, 3.58; p=0.07)

Figure 1: Structures not cleared on initial fetal survey

