

Early Onset Fetal Growth Restriction: Does Path to Diagnosis Impact Both Pathology and Outcome?

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Objective

To evaluate maternal-fetal pairs in early onset fetal growth restriction (FGR) diagnosed prior to 30 completed weeks gestational age.

Study Design

This is a descriptive study of maternal-fetal pairs with severely early FGR as defined by diagnosis prior to 30 wks gestation and requiring delivery prior to 34 wks gestation. Pairs were dichotomized into those with maternal comorbidities leading to ultrasound diagnosis versus those referred for clinical suspicion of FGR (ie, following identification as uterine size less than dates (S<D) by fundal height). Patient characteristics and outcomes were tracked. Univariate and multivariate analyses were performed as appropriate.

Results

56 pregnancies were identified with FGR prior to 30 weeks and subsequent delivery prior to 34 weeks. Common comorbidities present in the group with maternal comorbidities included chronic hypertension (CHTN, 30.5%), hypertensive disorders of pregnancy (preE/GHTN, 36.1%), preexisting diabetes (DM, 13.9%), and gestational diabetes (GDM, 5.6%). Women measuring S<D were diagnosed with FGR on average 3 weeks later in gestation, had higher incidence of reverse end diastolic flow (REDF) on Doppler evaluation at diagnosis (80% vs. 22.9%, $p=0.01$), and were more likely to be delivered for an urgent indication. Amongst FGR pregnancies, women referred for S<D exhibited smaller mean placental capacity/mass compared to women having ultrasound for comorbidities with incidental finding of early FGR (172.5 vs 274.6 gm; $p=0.01$). Accordingly, placental infarcts were more commonly found in patients referred for size<dates (67% vs 39%; OR 1.6, 95% CI 1.1, 3.9). Both groups of babies had similar survival to discharge rates and length of stay in the NICU; **see Table**.

Conclusion

Women measuring small were diagnosed later with FGR and may represent a severe phenotype. Placental findings implicate more acute physiological changes in utero-placental flow in pregnancies identified as measuring S<D. These pregnancies often demonstrated high incidence of abnormal fetal-placental circulation resistance as demonstrated by abnormal umbilical Doppler velocimetry, met criteria for urgent delivery in a short time frame, and showed high incidence of placental infarcts and low placental weight for gestational age following delivery. Our data suggest women measuring S<D in the mid-trimester should be evaluated by ultrasound without significant delay.

Table: Pregnancy Characteristics and Outcomes based on Ultrasound indication

	S<D (18)	Maternal Comorbidity (38)	P value

EGA at diagnosis of FGR (weeks) Mean (SD)	27.86 (2.92)	24.74 (3.14)	0.04
Abnormal umbilical artery (UA) Dopplers at diagnosis	18/18 (100%)	32/38 (84%)	0.18
Elevated UA Dopplers	5/18 (28%)	3/38 (8%)	0.06
Intermittent or Persistent Absent EDF	5/18 (28%)	17/38 (45%)	0.23
Intermittent or persistent reversed EDF	8/18 (44%)	8/38(21%)	0.04
Tobacco abuse	9/18 (50%)	10/38 (26%)	0.09
Maternal age (years) Mean (SD)	27.00 (6.44)	29.61 (6.95)	0.43
Gravidity Mean (SD)	2.80 (1.92)	2.92 (1.52)	0.88
Parity Mean (SD)	1.40 (1.67)	1.03 (1.06)	0.50
EGA at delivery (weeks) Mean(SD)	29.46 (2.92)	27.37 (2.60)	0.11
Diagnosis to delivery interval(weeks) Mean (SD)	1.60 (1.01)	2.64 (2.81)	0.42
Birthweight (g) Mean (SD)	928 (508)	696 (278)	0.13
SGA at birth	13/18 (72%)	25/38 (66%)	0.63
Cesarean Delivery	18/18 (100%)	32/38 (84%)	0.02
Urgent delivery due to nonreassuring fetal status	18/18 (100%)	22/38 (56%)	0.02
Placental weight Mean [SD]	172.5 [80.8]	274.6 [147.5]	0.01
Placental infarcts	12/18 (67%)	14/38 (37%)	0.04
NICU Length of stay in surviving neonates (days) Mean (SD)	65.65 (54.50)	67.48 (37.61)	0.94
Neonatal survival to discharge	13/18 (72%)	35/38 (92%)	0.06