A comparison of SMFM and ISUOG criteria in the prediction of newborns with features of fetal growth restriction

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INTRODUCTION & OBJECTIVES

Identifying a fetus with growth restriction (FGR) remains challenging. Unlike small for gestational age (SGA) fetuses, there is no widely agreed antenatal criteria whereby FGR is diagnosed. It is well documented that most adverse outcomes are in growth restricted rather than SGA fetuses.

The objective of this study was to compare the test performances of consensus criteria (International Society of Ultrasound in Obstetrics and Gynaecology, ISUOG) against the simpler Society of Maternal-Fetal Medicine (SMFM) criterion to diagnose fetal growth restriction in the prediction of newborns with an anthropometric feature of preceding growth restriction.

METHODS

ISUOG criteria (1) consist of either:

1. Estimated Fetal Weight (EFW) <3rd centile or
2. Two out of three from: EFW <10th centile, EFW crossing >50 centiles or umbilical artery Doppler pulsatility index (PI) >95th centile.

The SMFM criterion is solely EFW <10th centile (2).

The criteria were applied to previously described prospectively collected data from 269 low-risk pregnancies undergoing serial EFW, umbilical artery Doppler and neonatal anthropometric measurements (Figure 1) (3). Preceding growth restriction was defined as a skinfold thickness (SFT) <10th centile.

Since FGR is a progressing condition, we limited the analysis to the ultrasound features at the last scan before birth.

Sensitivity, specificity, PPV, NPV, +LR and –LR were calculated for the identification of a low SFT.

RESULTS

Ultrasound (median = 6 scans) was undertaken between 24+0 and 42+2 weeks gestation.

Ultrasound parameters of the population:

- EFW<3rd centile; 11% at last US.
- EFW <10th centile; 22% at last US.
- EFW crossed > 50 centiles; 20% at last US.
- Umbilical PI >95th centile; 12% at last US.
- 19% and 22% of cases met the ISUOG and SMFMS criteria respectively (last US).

Measures of test accuracy:

	FGR (SFT <10th centile): last US (ISUOG)	FGR (SFT <10th centile): last US (SMFMS)
SENSITIVITY	57%	68%
SPECIFICITY	84%	78%
PPV	33%	30%
NPV	93%	95%
+LR	3.6	3.1
-LR	0.51	0.41

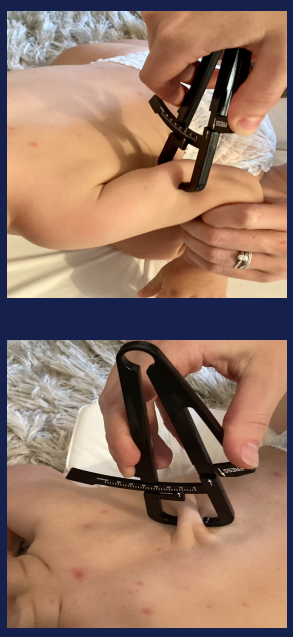

Figure 1: Triceps and subscapular skinfold thickness measurements.

DISCUSSION & CONCLUSION

This is the first comparison of the performance of published criteria (ISUOG and SMFM) for fetal growth restriction in the prediction of malnourished newborns. Anthropometric features of growth restriction are generally considered to be superior indicators of preceding intrauterine malnourishment than birthweight centiles.

Both ISUOG and SMFM criteria are helpful in ruling out FGR but are of limited utility in positively identifying growth restriction (low LR+).

Recent studies have explored the utility of both ISUOG and SMFM criteria in large datasets; both criteria usefully identify the small for gestational age infant but neither usefully identifies infants who experience neonatal morbidity or mortality (4,5). The findings of our study reinforces the limited utility of both ISUOG and BMFMS criteria in the identification of the truly growth restricted rather than small for gestational age infant.

A limitation of our study is our inability to calculate the cerebroplacental ratio, a metric included in the ISUOG criteria; it is therefore possible that our study has under-represented the performance of the ISUOG criteria.

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