

OBJECTIVES:

To assess whether the addition of fetal Doppler evaluated by machine learning to EFW at 27-28 weeks improves the prediction of SGA among high-risk pregnancies .

METHODS:

Prospective observational study including singleton pregnancies with RCOG criteria at 2nd trimester for serial scanning

Fetal ultrasound (US) scan between 27+0 and 28+6 weeks:

- Estimated fetal weight (EFW) (*Hadlock-4 formula*)
- Doppler evaluation
 - Umbilical artery (UA) PI
 - Middle cerebral artery (MCA) PI
 - Mean uterine arteries (mUTA) PI
 - Ductus venosus (DV) PI.
- A machine learning (ML) analysis was performed off-line from waveform stored images.

SGA was defined as BW <10th centile (Local curves reference)

We compared by means of ROC and AUC the predictive capacity for SGA of:

MODEL 1: EFW centile

MODEL 2: EFW centile + clinical standard Doppler

MODEL 3: EFW centile + ML derived variables

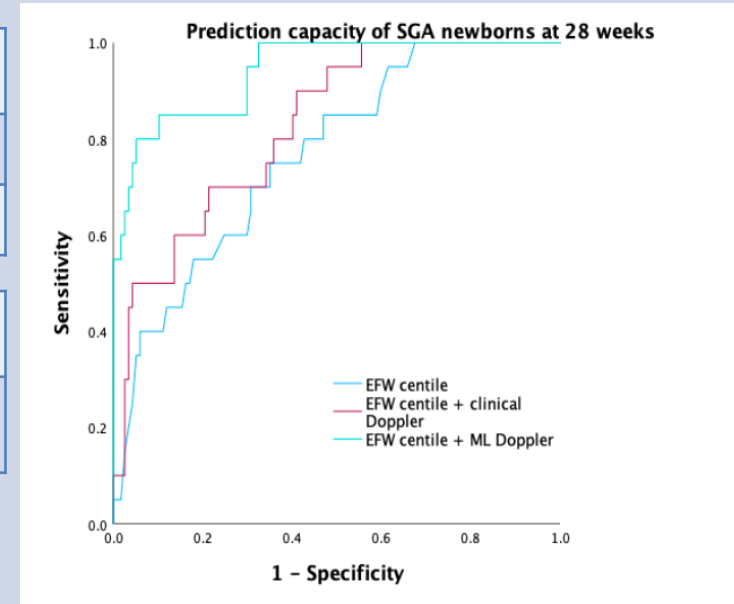
RESULTS:

- 137 high-risk (HR) pregnancies were included. 20 women had an SGA neonate.
- Fetal ultrasound was performed at 27.8 weeks (SD 0.5). Mean GA at delivery was 39.2 weeks (SD 1.6)
- Mean EFW and median EFW centile at US were 1179 g (SD 130) and 54.4 (SD 25.3) respectively
- Mean BW was 3223g (SD 469) and the median BW centile 47 (SD 30).

	SGA (n=20)	No-SGA (n=117)	p-value
UA-PI	1.09	1.0	p=0.014
mUTA-PI	0.94	0.84	p=0.045

	Model 1	Model 2	Model 3
AUC (95% IC)	0.77 (0.66-0.87)	0.83 (0.74-0.91)	0.94 (0.89-0.99)*

(*p<0.05, between groups)



CONCLUSIONS:

- UA-PI and mUTA-PI were significantly higher among SGA
- Doppler evaluation by ML adds to EFW at 28 weeks in predicting SGA among HR pregnancies