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# Ductus venosus Doppler and cerebroplacental ratio for the prediction of adverse perinatal outcome

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## Objective

To compare the accuracy of the ductus venosus pulsatility index (DV PI) with that of the cerebroplacental ratio (CPR) for the prediction of adverse perinatal outcome (APO) at two gestational ages (GA): <34 and ? 34 weeks' gestation.

## Methods

This was a retrospective study of 169 high-risk pregnancies (72 <34 and 97 ? 34 weeks), that underwent an ultrasound examination of CPR, DV Doppler and estimated fetal weight (EFW) at 22-40 weeks. The CPR and DV PI were converted into multiples of the median (MoM), and the EFW into centiles according to local references. APO was defined as a composite of abnormal cardiotocogram, intrapartum pH requiring cesarean delivery, 5' Apgar score <7, neonatal pH <7.10 and admission to neonatal intensive care unit. Values were plotted according to the interval to labor to evaluate progression of abnormal Doppler values, and their accuracy was evaluated at both gestational periods, alone and combined with clinical data, by means of univariable and multivariable models, using the Akaike Information Criteria (AIC) and the area under the curve (AUC).

## Results

Prior to 34 weeks' gestation, DV PI was the latest parameter to become abnormal. However, it was a poor predictor of APO (AUC 0.56, 95% CI 0.40-0.71, AIC 76.2, P>0.05), and did not improve the predictive accuracy of CPR for APO (AUC 0.88, 95% CI 0.79-0.97, AIC 52.9, P<0.0001). After 34 weeks' gestation, the chronology of the DV PI and CPR anomalies overlapped, but again DV PI was a poor predictor for APO (AUC 0.62, 95% CI 0.49-0.74, AIC 120.6, P>0.05), that did not improve the CPR ability to predict APO (AUC 0.80, 95% CI 0.67-0.92, AIC 106.8, P<0.0001). The predictive accuracy of CPR prior to 34 weeks persisted when the GA at delivery was included in the model (AUC 0.91, 95% CI 0.81-1.00, AIC 46.3, P<0.0001, versus AUC 0.86, 95% CI 0.72-1, AIC 56.1, P<0.0001), and therefore was not determined by prematurity.

## Conclusion

CPR predicts APO better than DV PI, regardless of GA. Larger prospective studies are needed to delineate the role of ultrasound tools of fetal wellbeing assessment in predicting and preventing APO.