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REVIEW ARTICLE

Journal Watch

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1. Biparietal/transverse abdominal diameter ratio ≤ 1: potential marker for open spina bifida at 11–13-week scan. Simon EG, Arthuis CJ, Haddad G, Bertrand P, Perrotin F. Ultrasound Obstet Gynecol. 2015 Mar;45(3): 267–72.

Screening for spina bifida in the first trimester of pregnancy has been the topic of numerous studies. In the literature, early ultrasound signs have been described (intracranial translucency, posterior shift of the brainstem, cisterna magna, and frontomaxillary facial angle), but their detection requires high level of expertise which limits their utility for screening in the general population. The aim of this study was to assess the biparietal diameter (BPD)/transverse abdominal diameter (TAD) ratio in predicting open spina bifida during the first trimester of pregnancy.

Cases of open spina bifida (n = 26) and 17665 unaffected pregnancies with a crown rump length (CRL) of 45–84 mm were analyzed retrospectively, and both BPD and TAD measurements were recorded. The mean BPD measurement in isolation in the population with spina bifida (19 ± 2.38 mm) was significantly lower than in the control population (21.17 ± 2.38 mm) ($p < 0.0001$, Mann–Whitney U–test). The mean TAD measurements in isolation in the spina bifida and control cases were 19.19 ± 2.90 mm and 18.78 ± 2.31 mm, respectively ($p = 0.33$, Mann–Whitney U–test). The mean BPD/TAD ratio were 1.00 ± 0.06 for spina bifida cases versus 1.13 ± 0.06 for the control cases ($p < 0.0001$, Mann–Whitney U–test). In screening for open spina bifida, the AUC was 0.76 (95 % CI, 0.67–0.84) for BPD < 5th centile and 0.95 (95 % CI, 0.92–0.97; $p < 0.0001$) for the BPD/TAD ratio. The optimal value of the BPD/TAD ratio was ≤ 1.00, with a sensitivity of 69.2 % and a specificity of 97.7 %. Considering cases with either BPD < 5th centile or BPD/TAD ratio ≤ 1.00, it was possible to identify 76.9 % of cases of spina bifida during the first trimester with a false positive rate (FPR) of 5.1 %.

These results suggest that the BPD/TAD ratio is a simple and useful sign for the detection of open spina bifida during the first trimester. Screening using this marker is easily applicable to a large population.

2. An integrated model with classification criteria to predict small-for-gestational-age fetuses at risk of adverse perinatal outcome. Figueras F, Savchev S, Triunfo S, Crovetto F, Gratacos E. Ultrasound Obstet Gynecol. 2015 Mar;45(3):279–85.

Over the last decade, numerous criteria have been introduced for the prediction of adverse outcome in small-for-gestational-age (SGA) pregnancies. It has been demonstrated that the reduced impedance in middle cerebral artery (MCA) blood flow in fetuses with normal uterine artery (UtA) Dopplers, cerebroplacental ratio (CPR) and a very low estimated fetal weight (EFW) are all associated with a poor perinatal outcome. The aim of this study was to create an integrated model consisting of the above criteria for prediction of SGA fetuses at higher risk of perinatal adverse outcome. Singleton pregnancies (n = 509) with an EFW below the 10th centile after 32 weeks and eligible for vaginal delivery were included in the prospective study, and the data of perinatal outcome were recorded. A predictive model for emergency cesarean delivery for nonreassuring fetal status or neonatal acidosis was developed

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with a decision tree analysis algorithm (SPSS 19.0, IBM, Armonk, NY, USA).

Of these, 134 (26.3 %) SGA pregnancies had an adverse outcome. The decision tree analysis showed that:

1. Adverse outcome was observed in 74/200 (37.5 %) with CPR $<$ 10th centile as compared to 59/309 (19.09 %) with CPR $>$ 10th centile ($p = 0.049$).
2. In the group of CPR $>$ 10th centile, 52 cases had abnormal UtA pulsatility index (PI), 19 out of whom (36.5 %) had an adverse outcome. Out of the remaining 257 cases with normal UtA PI, 40 (15/6 %) had an adverse outcome ($p = 0.023$).
3. Out of 55 cases with normal CPR, normal UtA PI and an EFW $<$ 3rd centile, 17 (30.9 %) had adverse outcome ($p = 0.019$). Only 23/202 (11.4 %) of the fetuses with EFW $>$ 3rd centile, normal CPR and UtA PI had an adverse outcome ($p = 0.019$).

The algorithm showed a sensitivity of 82.8 % and a specificity of 47.7 %, a positive predictive value (PPV) of 36.2 % and a negative predictive value (NPV) of 88.6 % for the prediction for emergency cesarean delivery for non reassuring fetal status or neonatal acidosis. These results suggest that this model could be used in the risk stratification of pregnancies with late-onset fetal growth restriction (FGR) and to help the clinician in the appropriate management of these pregnancies.

3. Poor effectiveness of antenatal detection of fetal growth restriction and consequences for obstetric management and neonatal outcomes: a French national study. Monier I, Blondel B, Ego A, Kaminiski M, Goffinet F, Zeitlin J. BJOG. 2015 Mar;122(4):518–27.

Previous publications have shown that the effectiveness of screening for smallness in the general population is rather limited. Only between 10 % and 36 % of infants with birthweight under the 10th centile are detected before birth. The aim of this study was to assess the proportion of small-for-gestational age (SGA) babies (BW $<$ 10th centile) suspected antenatally to have FGR and to investigate obstetric and neonatal outcomes at birth. Among 14100 singleton live-born and stillbirth infants after 22 weeks of gestation, 1219 (8.6 %) were SGA. Out of these, only 265 (21.7 %) were suspected to be small at the ultrasound evaluation between 30 and 35 weeks of gestation (true positives). The rate of SGA infants without a suspicion of FGR during the pregnancy (false negative) was 78.3 % (954). Rates of cesarean section, prelabor cesarean and elective delivery were higher for true and false positive as compared to the false negative group in the entire sample and in the low-risk population. In contrast, cesarean section after onset of labor was more frequent in SGA infants regardless of antenatal suspicion of FGR (16.1 % for true positive and 13.9 % false negative group versus 9–10 % in AGA; $p < 0.001$). Moreover, neonatal outcomes were not better for SGA infants if FGR was suspected.

These results support previous publications suggesting that the sensitivity of antenatal detection of SGA is poor. The increased risk of provider-initiated delivery observed in nonSGA infants suspected of FGR raises concerns about the iatrogenic consequences of a screening model based only on the EFW at 30–35 weeks of gestation.

4. Absence of PO_2 change in fetal brain despite PO_2 increase in placenta in response to maternal oxygen challenge. Huen I, Morris DM, Wright C, Sibley CP, Naish JH, Johnstone ED. BJOG. 2014 Dec;121(13):1588–94.

There is a limited understanding of the response of the fetal brain to maternal supplemental oxygen. The efficacy of maternal oxygen administration in the setting of acute or chronic fetal hypoxia is unclear. The aim of this study was to assess the effect of maternal hyperoxaemia on PO_2 in placenta and fetal brain in normal pregnancies between 21 and 33 weeks of gestation with magnetic resonance imaging. Changes in PO_2 are proportional to changes in the magnetic longitudinal relaxation time ($\Delta R1$).

Maternal inhalation of 100 % O_2 led to a higher placental mean $\Delta R1$. This was significantly higher than fetal brain mean $\Delta R1$ ($p = 0.0008$, paired t test). The authors also studied nonpregnant female adults with 100 % O_2 inhalation, which led to a higher $\Delta R1$ in adult brain, and was greater than fetal brain mean $\Delta R1$ ($p = 0.004$).

These results suggest that maternal hyperoxygenation leads the oxygen to enter fetal blood but not fetal brain. At present, the reason for the lack of increase of fetal brain oxygenation is unknown.

It is well known that fetal brain is sufficiently oxygenated by the mechanism of fetal brain-sparing, which increases the fetal cerebral blood flow in response to hypoxia at the expense of other organs. One explanation could be a "reversed" fetal brain-sparing in response to hyperoxia, based on Doppler observations suggesting increased cerebral vascular resistance under oxygen breathing. Furthermore, these findings are in agreement with the results of trials about maternal oxygen therapy during labor that showed no benefit in labor outcomes.