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Letter to Editor

Is it Time to Introduce the Doppler Ratio between MCA/UA Doppler from 32 Weeks to Reduce the Risk of Stillbirth in SGA Babies?

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Introduction

Stillbirth is the loss of pregnancy from 24 weeks till delivery having significant emotional and moral consequences for the couple. Despite advances in antenatal care through the introduction of different protocols and customised growth charts since 2015, stillbirth rates are still really hg even in developed countries, like e.g. the UK. It is well recognised that stillbirth rates are higher in developing countries, where the antenatal care is very poor or even non-existing. According to NHS birth statistics, the number of births in England, Wales and Northern Ireland were 697352 and the stillbirths were 3152. One of the major risk factor for stillbirth is the intrauterine growth restriction, which can occur in early or late gestation.

Clinical Opinion

Placenta is unquestionable the organ which supplies oxygen and nutrients to the foetus and participates in gas exchange (oxygen-carbon dioxide). There is no doubt that, if placenta functions adequately, the risk of stillbirth is very small. There are numeral studies in the literature, which link SGA with an increased risk for stillbirth. There is no doubt that, SGA foetuses with normal umbilical Doppler and normal liquor volume have more favourable outcomes compared to SGA with abnormal umbilical artery Doppler waveforms, and/or LV. However, A study by Chang., *et al*. [1], reported cases where despite good uterine Doppler waveforms, SGA foetuses were compromised further, when growth scans performed 2 weeks later. For this reason, the American College of Obstetricians and Gynaecologists [2], introduced a bulletin suggesting serial growth scan monitoring. Harrington K., *et al*. study [3], suggests that uterine artery Doppler waveform from early gestation is able to predict the uteroplacental insufficiency. Richardson BS., *et al*. study [4], indicate that the middle cerebral artery waveform Doppler is able to identify the redistribution of cerebral blood in the expense of the rest of the body leading to mild arterial hypoxemia, which of course correlates with the foetal outcome [5,6]. A study from J Morales-Roserro., *et al*. [7], indicates that the appropriate for gestation foetuses, are also at risk for stillbirth or poor neonatal outcome, because they don't reach their potential growth, despite being ''normal'' size in scan, which is the result of abnormal MCA/UA PI ratio (increased UA PI and reduced MCA PI). M. Parra-Saavedra et al study [8], suggest that, a significant number of late onset SGA foetuses with normal umbilical Doppler artery waveforms can be explained by placental insufficiency, since he found that, despite umbilical Doppler being normal, there were significant placental abnormalities in the SGA and non-SGA group of his study, when he examined microscopically the placentas. There is also a study by Oros., *et al*. [9] which suggest that, umbilical artery Doppler waveform is a poor predictor of perinatal outcome in late onset SGAs. Llurba., *et a*l. study [10], found that 1/3 of studied SGA pregnancies with normal second trimester Doppler studies had abnormal uterine artery Doppler waveform in the third trimester and were associated with poor perinatal outcome. J Morales-Roserro., *et al*. study [11] suggested that, the low cerebroplacental perfusion ratio (CPR) is correlated with a poor perinatal outcome, since the increased pulsatility index (PI) of the uterine artery and the low pulsatility index of the middle cerebral artery, leads to increased redistribution of blood to the cerebral artery in expense of the other organs. There are 2 studies [12,13] which suggest that foetuses with blood redistribution in antenatal period are associated with poor neurodevelopment and low IQ levels.

Discussion

SGA it can occur in early or in late pregnancy and it can be due to several risk factors, like previous SGA, smoking, preeclampsia, infections, etc. There is a consensus that, well grown babies are associated with well functioning placenta and as a result has a very small risk of stillbirth. In order to assess placental function we perform ultrasound scans assessing the foetal growth, LV and Doppler waveform of the umbilical artery. In the UK, all hospitals have introduced the customised growth charts, instead of population growth charts, as per NICE suggestion after a systematic review which shown the supremacy of the customised versus the population growth charts. RCOG green top guideline for the management of SGA [14] suggests the assessment of LV and umbilical Doppler waveform, in case of reduced growth or in case of no linear growth. But, despite all these protocols, still the numbers of stillbirths, even in developed countries with advanced antenatal care, are really high without reduction of stillbirth rates, worldwide.

This depressing reality leads to the logical question of why? Why for example, despite the advanced antenatal care in developed countries the stillbirth rates are still high Why despite all the risk assessments that we undertake, adverse perinatal outcomes, such as stillbirth still occur? What is the reason of poor perinatal outcome (either stillbirth or neonatal death or poor neurological outcome in early childhood), despite of normal LV and Doppler?

By reviewing the literature and the reasons behind the correlation between SGA foetuses and poor perinatal outcome we strongly believe that there is a correlation between abnormal CRP ratio; which can be detected if we don't perform Doppler studies of the cerebral artery in case of SGA, and a poor perinatal outcome and therefore, women would benefit from measuring the CRP ratio between 32-34 weeks, even if the umbilical artery Doppler and LV are normal. Of course, due to small number of enrolled pregnancies in published literature, we need to undergo further studies with larger number in order to study the effect of the abnormal uterine artery Doppler waveforms in foetal growth and the association between low CRP ratio and increased risk of stillbirths and neurodevelopmental delay. But based on the literature we strongly believe that the answer to why stillbirths occur in normal grown babies, with normal Doppler umbilical artery waveforms and normal LV, is behind the study of the CPR ratio which should be done between 32-34 weeks, as some of the studies suggest, in order to identify which well grown babies are in greater risk for stillbirth or poor future perinatal outcome, like e.g. babies with neurodevelopmental delay.

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