

Re: Next steps to prevent stillbirth associated with growth restriction:

Continuous-wave Doppler, fetal growth restriction and small-for-gestational-age babies

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Sir,

Kingdom and Smith¹ conclude that real-time ultrasound screening cannot prevent stillbirth, even though the latter is associated with fetal growth restriction (FGR), when defined as below the fifth or tenth centile. They suggest that now is the time to abandon the biophysical approach and embrace a biochemical one.

However, perhaps before throwing the baby out with the bath water we should first revisit the place of continuous-wave Doppler (CWD) in identifying the 'Low-risk mother carrying the high-risk fetus', while noting that we (Beattie and Dornan) previously concluded that CWD screening also proved unsuccessful in identifying FGR using the same definitions.²

We have shown that by identifying abnormal CWD resistance indices (RIs) (11.7%) and absent end-diastolic flow (1.5%) at 28 weeks, and taking appropriate action, stillbirth rates could be reduced by 42% in healthy low-risk mothers in a low-and-middle-income population.³

Further, appropriate-for-gestational-age babies of these low-risk mothers, who showed abnormal RIs, have reduced fat-free mass, indicating true FGR. In 81 term infants of low-risk mothers, fat-free mass, determined by the deuterium dilution method, is significantly less at 6, 10 and 14 weeks and at 6 months in infants with abnormal RIs compared with infants with normal RIs, indicating continued altered postnatal growth.⁴

Importantly, more than 75% of these infants were classified as appropriate for gestational age according to birthweight centiles. Although a small-for-gestational-age baby is associated with poor outcomes, size alone does not define FGR, which is defined as failure to reach the full genetic growth potential. A fetus genetically destined for the 75th centile and born on the 25th centile is at more risk than a fetus destined to be on the tenth centile and born on the tenth centile. However, the former fetus will not be detected as FGR using the small-for-gestational-age definition, but the second one will, who is not growth restricted.⁵

Further, we know that inferior CWD at 28 weeks in low-risk mothers is associated with reduced neurocognitive indices at age 12 years⁶ in a cohort of the offspring of mothers investigated previously.¹

We suggest that screening with CWD at 28–34 weeks identifies the truly growth-restricted fetus, with reduced fat-free mass, that will not reach its genetically determined potential weight, before or after birth, and, without intervention, will have increased risk of stillbirth. Further, such screening potentially gives us the opportunity to maximise fetal physical and mental health/wellbeing antenatally, and identify infants needing special care postnatally,

Doppler ultrasound of the umbilical artery detects poor placental blood flow (measured by the RI), which is the major determinant of placental insufficiency and fetal growth restriction and potential neurological deficiency. An abnormal RI is a direct measure of poor placental function and is not dependent on measuring fetal size.

The place of CWD and real-time ultrasound is accepted in known high-risk pregnancy but these data suggest strongly that the place of the former in identifying the high-risk fetus in the low-risk mother is now, at last, assured.

References

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