



## Ultrasound during pregnancy to identify small-for-gestational-age infants

A UK cohort study found that ultrasound screening of all pregnant women was more effective at identifying small-for-gestational-age infants than clinically targeted screening and, combined with fetal abdominal circumference growth velocity, could determine infants at risk of neonatal morbidity.

### Overview:

- A study of UK data found that ultrasound screening of all women was almost 3 times better at identifying small-for-gestational-age infants than screening only when clinically indicated.
- Among infants identified as small-for-gestational-age on screening, those who also had slow abdominal circumference growth velocity were at significantly higher risk of poor outcomes.

**Background:** Infants are classified as small for gestational age (SGA) if they have a birth weight less than the 10th percentile ([Royal College of Obstetricians and Gynaecologists 2013](#)). Many of these infants will simply be constitutionally small, but a subset will have fetal growth restriction. Fetal growth restriction is associated with a number of adverse outcomes, such as stillbirth ([Pilliod et al. 2012](#)) and cerebral palsy ([McIntyre et al. 2013](#)).



Ultrasound scanning can be used in late pregnancy to estimate the weight of the fetus and whether it is growing as expected. A recent Cochrane review concluded that routine late-pregnancy ultrasound in low-risk or unselected populations does not benefit mother or baby ([Bricker et al. 2015](#)).

**Current advice:** The NICE guideline on [antenatal care for uncomplicated pregnancies](#) recommends that fetal growth should be determined using symphysis–fundal height measured and recorded at each antenatal appointment from 24 weeks. It advises that the evidence does not support the routine use of ultrasound scanning after 24 weeks of gestation, and therefore ultrasound should not be offered. Routine doppler ultrasound should not be used in low-risk pregnancies.

The NICE guideline on [diabetes in pregnancy](#) recommends offering pregnant women with diabetes ultrasound monitoring of fetal growth every 4 weeks from 28 to 36 weeks.

The NICE guideline on [hypertension in pregnancy](#) recommends that women with chronic hypertension and women at high risk of pre-eclampsia should undergo ultrasound assessment of fetal

growth, and umbilical artery doppler velocimetry, between 28 and 30 weeks and between 32 and 34 weeks.

The NICE pathway on [antenatal care](#) brings together all related NICE guidance and associated products on the area in a set of interactive topic-based diagrams.

**New evidence:** A prospective cohort study by [Sovio et al. \(2015\)](#) compared the effectiveness of universal versus selected ultrasound screening during the third trimester of pregnancy for identifying SGA infants. The study also evaluated whether ultrasound indicators could be used to determine SGA infants at risk of adverse outcomes.

This study recruited 4512 (56%) pregnant women from 8028 nulliparous women with singleton pregnancies who attended a single hospital in Cambridge for their dating ultrasound scan.

All women underwent research ultrasound scans at 20 weeks, 28 weeks and 36 weeks (universal ultrasound). The scans had both routine elements (review of fetal anatomy and biometric measurements) and research elements (uterine and umbilical artery doppler flow velocimetry).

A subset of women (n=1666, 42%) were selected for additional clinically indicated ultrasound scans during their third trimester (selective ultrasound), as per routine clinical care.

Estimated fetal weight was calculated using universal and selective ultrasound scans. Infants were identified as at risk of being SGA if their estimated fetal weight was less than the 10th percentile. Infants were subsequently classified SGA at delivery if their birthweight was less than the 10th percentile for gestational age.

A total of 352 (9%) infants were classified as at risk of SGA on ultrasound and were SGA at delivery. Universal ultrasound identified 57% of SGA infants (sensitivity), whereas selective ultrasound correctly identified 20% of SGA infants (relative sensitivity=2.9, 95% confidence interval [CI] 2.4 to 3.5). Infants who were identified as at risk of SGA by ultrasound scan were at higher risk of neonatal morbidity than infants of normal size (relative risk=1.6, 95% CI 1.2 to 2.1, p=0.001).

Several indicators of fetal growth restriction were evaluated to assess whether universal ultrasound screening could predict poor outcomes in infants identified as at risk of SGA during pregnancy.

Of the 5 indicators, only abdominal circumference growth velocity was associated with neonatal morbidity in SGA infants. Infants who were classified as SGA on ultrasound screening and who fell in the lowest decile of abdominal circumference growth velocity were significantly more likely to experience neonatal morbidity (relative risk=17.6, 95% CI 9.2 to 34.0, p<0.0001) and severe adverse perinatal outcomes (39.8, 95% CI 3.6 to 436.6, p=0.007) than infants who were normal weight on screening.

**Commentary by Dr Marie Anne Ledingham, Consultant in Maternal and Fetal Medicine, The Queen Elizabeth Hospital Glasgow:**

“Current evidence on the use of routine ultrasound scanning in pregnancy to detect fetal growth restriction is controversial, with the [most recent Cochrane review](#) suggesting no benefit on fetal or maternal outcomes.

“The results of this new study by Sovio et al. (2015) suggest that universal ultrasound scanning at 20, 28 and 36 weeks’ gestation in nulliparous women performs better than clinically indicated (selective) ultrasound scanning in the detection of SGA infants (relative sensitivity=2.9, 95% CI 2.4 to 3.5). Universal ultrasound scanning may therefore improve the detection rate of SGA babies who are at risk of neonatal morbidity (such as metabolic acidosis or neonatal admission) and reduce the risk of these adverse outcomes.

“In infants identified by universal ultrasound as being SGA, those with the slowest abdominal circumference growth velocity had an almost 18 times increased risk of adverse outcomes and about a 40 times increased risk of severe morbidity. However, those infants in whom the growth

velocity was normal had no increased risk. This finding may be extremely relevant in clinical practice because it may help clinicians determine which SGA infants are pathologically rather than constitutionally small and reduce intervention in the small but normal group.

“The limitations of this study include the fact that it was conducted in nulliparous women, therefore the findings cannot be extrapolated to determine the effectiveness in a multiparous group. The study also showed that universal screening was associated with a lower specificity (90%) than clinically indicated screening (98%) and a higher false positive rate (10% versus 2%). In clinical practice this would mean an increase in the number of women identified as having SGA infants who may then be potentially at increased risk of intervention. Approximately 30% of stillborn babies are SGA, and the use of universal screening would potentially identify more of these babies at risk of this complication in pregnancy. However, this study was underpowered to detect any benefit in terms of reduction in the number of stillbirths due to universal ultrasound screening.

“Routine universal screening by ultrasound scan at 20, 28 and 36 weeks may therefore improve detection rates of SGA infants. Use of abdominal circumference growth velocity may help identify a subgroup of infants who are at increased risk of adverse outcomes and allow targeted intervention directed only at those infants who are pathologically growth restricted.”

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