Ultrasound for fetal assessment in early pregnancy

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RHL summary

Key Findings

This updated review found that routine early ultrasound (before 24 weeks ‘gestation) was associated with:

- Statistically significant increased detection rates for multiple pregnancies and fetal abnormalities;
- Statistically significant reduction in induction of labour by improving gestational dating;
- No significant reduction in perinatal death, adverse outcomes for babies or in health service use;
- No adverse effects in long-term follow-up of children exposed to scan in utero.

Evidence included in this review

This review included 11 trials involving 37,505 pregnant women, comparing routine versus selective ultrasound before 24 weeks of gestation. Trials were conducted between 1984 and 2007 in high-income countries.

Quality assessment

Overall, trials were large, well-designed. GRADE quality of the evidence was considered to be moderate to low due to the lack of blinding, imprecision of results and presence of heterogeneity.

Clinical implications

The increased detection rates of multiple gestations, of fetal abnormalities at the time legal interruption of pregnancy is possible, and improved gestational dating with less induction of labour, have not resulted in improved outcomes for babies. The lack of data on economic impact is important, particularly in low-resource settings. No data on chorionicity, on diagnosis or management of ectopic pregnancy or abortion.

Further research

Current, larger, well designed trials including low and middle-income settings would be required to demonstrate the real impact on maternal, perinatal and infant short and long-term outcomes. Skills and expertise of ultrasound providers, training and quality control should be assessed in future trials. Information on economic issues, dates and number of scans women received and women’s opinion should be included.
Diagnostic ultrasound is a sophisticated electronic technology, which utilises pulses of high-frequency sound to produce an image. Diagnostic ultrasound examination may be employed in a variety of specific circumstances during pregnancy such as after clinical complications, or where there are concerns about fetal growth. Because adverse outcomes may also occur in pregnancies without clear risk factors, assumptions have been made that routine ultrasound in all pregnancies will prove beneficial by enabling earlier detection and improved management of pregnancy complications. Routine screening may be planned for early pregnancy, late gestation, or both. The focus of this review is routine early pregnancy ultrasound.

To assess whether routine early pregnancy ultrasound for fetal assessment (i.e. its use as a screening technique) influences the diagnosis of fetal malformations, multiple pregnancies, the rate of clinical interventions, and the incidence of adverse fetal outcome when compared with the selective use of early pregnancy ultrasound (for specific indications).

We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (30 March 2015) and reference lists of retrieved studies.

Published, unpublished, and ongoing randomised controlled trials that compared outcomes in women who experienced routine versus selective early pregnancy ultrasound (i.e. less than 24 weeks' gestation). We have included quasi-randomised trials.

Two review authors independently assessed trials for inclusion and risk of bias, extracted data and checked them for accuracy. We used the Review Manager software to enter and analyse data.

Routine/revealed ultrasound versus selective ultrasound/concealed: 11 trials including 37,505 women. Ultrasound for fetal assessment in early pregnancy reduces the failure to detect multiple pregnancy by 24 weeks' gestation (risk ratio (RR) 0.07, 95% confidence interval (CI) 0.03 to 0.17; participants = 295; studies = 7), moderate quality of evidence). Routine scans improve the detection of major fetal abnormality before 24 weeks' gestation (RR 3.46, 95% CI 1.67 to 7.14; participants = 387; studies = 2, moderate quality of evidence). Routine scan is associated with a reduction in inductions of labour for 'post term' pregnancy (RR 0.59, 95% CI 0.42 to 0.83; participants = 25,516; studies = 8), but the evidence related to this outcome is of low quality, because most of the pooled effect was provided by studies with design limitation with presence of heterogeneity (I² = 68%). Ultrasound for fetal assessment in early pregnancy does not impact on perinatal death (defined as stillbirth after trial entry, or death of a liveborn infant up to 28 days of age) (RR 0.89, 95% CI 0.70 to 1.12; participants = 35,735; studies = 10, low quality evidence). Routine scans do not seem to be associated with reductions in adverse outcomes for babies or in health service use by mothers and babies. Long-term follow-up of children exposed to scan in utero does not indicate that scans have a detrimental effect on children's physical or cognitive development.

The review includes several large, well-designed trials but lack of blinding was a problem common to all studies and this may have an effect on some outcomes. The quality of evidence was assessed for all review primary outcomes and was judged as moderate or low. Downgrading of evidence was based on including
studies with design limitations, imprecision of results and presence of heterogeneity.

Early ultrasound improves the early detection of multiple pregnancies and improved gestational dating may result in fewer inductions for post maturity. Caution needs to be exercised in interpreting the results of aspects of this review in view of the fact that there is considerable variability in both the timing and the number of scans women received.

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