Ultrasonography in screening for developmental dysplasia of the hip in newborns: systematic review

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CRD summary
This review assessed the diagnostic accuracy of ultrasonography in newborn infants for developmental dysplasia of the hip. The authors found only one diagnostic accuracy study and concluded that there was a lack of evidence either for or against the use of ultrasound screening. The review was well-conducted and its conclusions are likely to be reliable.

Authors' objectives
To assess the accuracy and effectiveness of ultrasonography for screening all newborn infants for developmental dysplasia of the hip (DDH).

Searching
The authors stated that 23 medical, economic and grey literature databases including MEDLINE, EMBASE, BIOSIS Previews, the Science Citation Index and the Cochrane Controlled Trials Register were searched (up to March 2004) without language limitations. Further studies were identified from reference lists, experts in the field and the Swiss Federal Office for Social Security (who commissioned the review).

Study selection

Study designs of evaluations included in the review
Diagnostic accuracy studies or studies comparing ultrasonography with other screening methods were eligible for inclusion. The included studies comprised randomised controlled trials (RCTs), non-randomised studies and studies with historical controls.

Specific interventions included in the review
Studies assessing ultrasonography were eligible for inclusion.

Reference standard test against which the new test was compared
The reference standard was any alternative screening method for DDH.

Participants included in the review
Studies in an unselected population of newborns were eligible for inclusion. Studies of infants with suspected or apparent DDH, or notable risk factors for DDH, were excluded.

Outcomes assessed in the review
The outcomes for diagnostic accuracy studies were not specified as part of the eligibility criteria. The outcomes used were sensitivity, specificity, positive and negative likelihood ratios, and positive and negative predictive values. The eligibility criteria specified that other study designs should report on the following outcomes: any long-term functional outcomes (such as osteoarthritis); false diagnostic labelling; adverse events; time to, and duration of, treatment; and the rates of treatments, operative intervention, abduction splinting and delayed diagnosis.

How were decisions on the relevance of primary studies made?
Two reviewers independently assessed studies for inclusion, with any disagreements resolved by consensus.

Assessment of study quality
The quality of the diagnostic accuracy studies was assessed using the Quality Assessment of Diagnostic Accuracy Studies (QUADAS) checklist. For other study designs, a quality checklist was created using guidelines from the NHS Centre for Reviews and Dissemination. Two reviewers independently assessed study quality, with any disagreements...
resolved by consensus.

**Data extraction**
One reviewer extracted the data, which a second reviewer checked. Where appropriate, treatment differences were calculated as the mean difference or absolute risk difference, along with the corresponding 95% confidence interval (CI).

**Methods of synthesis**
How were the studies combined?
The studies were combined in a narrative.

How were differences between studies investigated?
The studies were grouped according to study design and outcomes.

**Results of the review**
Ten studies were included: one diagnostic accuracy study using a historical control group (n=7,236), 2 RCTs (n=28,554), and 7 non-randomised studies (the numbers were unclear in 2 studies and ranged from 1,422 to 89,200 in the other 5 studies).

One diagnostic accuracy study, which used a reference standard that was not independent of the index test and might not have identified the target condition, reported a sensitivity of 88.5% (95% CI: 84.1, 92.1) and a specificity of 96.7% (95% CI: 96.4, 97.4) for ultrasonography.

The quality of the 10 studies (including the diagnostic accuracy study) reporting on the impact of ultrasonography on other clinical outcomes was limited. Six out of 7 studies reported an increase in overall treatment rate with ultrasonography. One of 2 studies reported a reduction in the duration of treatment after ultrasonography, while the other reported that screening at birth led to shorter treatment duration than screening at 3 to 4 months.

Two RCTs compared the prevalence of late (after 1 month) diagnosis of DDH after ultrasonography plus clinical screening with clinical screening alone, and found lower rates (although not statistically significant) after ultrasonography. Another study defined late diagnosis as diagnosis after 8 months and found similar rates of ‘missed’ cases for ultrasonography compared with clinical screening.

**Authors’ conclusions**
There was insufficient evidence for the diagnostic accuracy of ultrasonography as a screening tool for DDH in newborns.

**CRD commentary**
This review had a comprehensive literature search with no language restrictions, thereby reducing the risk of publication and language bias. The inclusion criteria were clear. An appropriate quality assessment was performed and all steps of the review were performed in duplicate, which minimised the chances of bias being introduced. The narrative review was appropriate given the small number of studies of different designs. This was a well-conducted review and its conclusions are likely to be reliable given the quality and quantity of the primary studies.

**Implications of the review for practice and research**
Practice: The authors stated that ultrasound screening could not yet be recommended.

Research: The authors stated that good-quality trials to establish the optimum treatment and management of DDH are needed. An RCT incorporating the optimum treatment and management of DDH and comparing screening at 1 and 3
months is warranted.

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