Calf sonography for detecting deep venous thrombosis in symptomatic patients: experience and review of the literature

Authors' objectives
To determine the accuracy of sonography in the detection of isolated calf deep venous thrombosis (DVT), and the rate of indeterminate ultrasound examinations, in symptomatic patients.

Searching
MEDLINE was searched from January 1982 to January 1998 for English-language papers using the reported search terms. The authors also screened the reference lists of retrieved papers for further studies.

Study selection
Study designs of evaluations included in the review
Studies were eligible for inclusion if they detected at least 5 cases of calf DVT, and assessors of ultrasound studies were blinded to patient outcome and the results of all alternative tests for DVT or pulmonary emboli. All the studies included in the meta-analysis of diagnostic accuracy had a prospective design. However, in the analysis of indeterminate results, the authors included their own retrospective study which did not confirm at least 5 cases of calf DVT with contrast venography.

Specific interventions included in the review
Studies using ultrasound to detect calf DVT were eligible for inclusion.

Reference standard test against which the new test was compared
The reference standard was contrast venography for the diagnosis of calf DVT, performed within 48 hours of the ultrasound examination.

Participants included in the review
Studies with participants clearly specified as symptomatic for lower extremity DVT were eligible for inclusion.

Outcomes assessed in the review
The studies were required to report positive and negative results for sonography and contrast venography. A positive ultrasound result for DVT had to be defined as noncompressibility of a deep calf vein, and a negative result as compressibility of all visualised deep veins of the calf or adequate visualisation of all deep calf veins with colour Doppler imaging. A positive contrast venography result for DVT had to be defined as a filling defect in a deep calf vein, and a negative result as the absence of a filling defect with all deep calf veins visualised.

The frequency of indeterminate results was a further outcome of interest. Indeterminate ultrasound results were defined as those in which segments of the deep calf veins were not visualised, or where the interpretation was inconclusive for the presence of a DVT.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction.
extraction. Data to enable the calculation of the sensitivity, specificity and accuracy (sum of true positives and true negatives, divided by the total examined), based on the number of extremities evaluated, were extracted. The frequency of indeterminate examinations was also extracted, where reported.

Methods of synthesis
How were the studies combined?
For the diagnostic accuracy analysis, the studies were combined using the meta-analytic method of Midgette et al. (see Other Publications of Related Interest). In analysing indeterminate evaluations, a combined frequency for all studies was calculated.

How were differences between studies investigated?
Statistical heterogeneity was assessed using the chi-squared test. Some differences between the studies were also discussed in the text.

Results of the review
Five studies (212 extremities) were included in the diagnostic accuracy analysis. An additional study (249 extremities) was included in the analysis of indeterminate results.

The pooled sensitivity, specificity and accuracy of calf sonography were 92.5% (95% confidence interval, CI: 81.8, 97.9), 98.7% (95% CI: 95.5, 99.9) and 97.2% (95% CI: 93.9, 99.0), respectively. The frequency of indeterminate examinations (4 studies) ranged from 9.3 to 82.7%. The combined frequency was 54.6%.

Authors’ conclusions
Sonography was highly accurate in detecting isolated calf DVT in symptomatic patients, but indeterminate examinations occur frequently, with a wide range of reported rates.

CRD commentary
The review question and inclusion criteria for the main analysis were clear, although one study that did not meet the inclusion criteria for study design was included in the secondary analysis. The search for primary studies was very limited, and it is therefore likely that relevant studies could have been missed. No attempts were made to minimise the likelihood of language or publication bias. No details were provided on how the review process was carried out and by whom, so it was not possible to assess whether steps were taken to reduce the introduction of bias and errors. Although statistical heterogeneity was assessed, the quality of the included studies was not addressed and few individual study details were provided, making it difficult to judge whether the studies were pooled appropriately. The limited search for primary studies, together with the other methodological limitations highlighted, means that the authors’ conclusions may not be reliable.

Implications of the review for practice and research
Practice: The authors recommended that each ultrasound laboratory should review its own rate of indeterminate examinations in the calf.

Research: The authors did not make any recommendations for research.

Bibliographic details

PubMedID
10477882
Other publications of related interest

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.