Sensitivity and specificity of ultrasonography in the diagnosis of upper extremity deep vein thrombosis: a systematic review

Mustafa B O, Rathbun S W, Whitsett T L, Raskob G E

Authors' objectives
To determine the sensitivity and specificity of ultrasonography in the diagnosis of upper extremity deep vein thrombosis (DVT), and to determine the safety of withholding anticoagulant therapy in patients with negative ultrasonography results.

Searching
MEDLINE was searched from January 1980 to December 2000 using the MeSH terms 'upper extremity' and 'thrombosis'. In addition, the bibliographies of the retrieved articles were examined. Only studies reported in the English language were included.

Study selection
Study designs of evaluations included in the review
Prospective studies were eligible for inclusion.

Specific interventions included in the review
Studies that used ultrasonographic assessment of the upper extremity veins by one or more of the following techniques, were eligible for inclusion: real-time ultrasonographic imaging, standard Doppler evaluation, or colour flow Doppler imaging. The included studies investigated duplex, duplex plus colour flow, and Doppler alone.

Reference standard test against which the new test was compared
Although not a criteria for inclusion, the included studies used venography as the reference standard test.

Participants included in the review
Studies investigating patients with suspected upper extremity DVT were eligible for inclusion.

Outcomes assessed in the review
The inclusion criteria were not defined in terms of the outcome. The outcome measures of interest were sensitivity and specificity, either calculated or as reported in the included studies.

How were decisions on the relevance of primary studies made?
Two reviewers independently reviewed each article or abstract. A third reviewer adjudicated any disagreements.

Assessment of study quality
Aspects of methodological quality, which were relevant to the evaluation of diagnostic tests, were addressed as part of the review process. These included: spectrum composition; selection, execution and interpretation of the index and reference standard; and analysis. Two reviewers independently reviewed each article or abstract. A third reviewer adjudicated any disagreements.

Data extraction
The authors do not state how the data were extracted for the review, or how many of the reviewers performed the data extraction. The data were extracted under the following headings: the number of patients; the number of patients who underwent venography; ultrasonographic technique; veins imaged; the number of patients with catheter-related thrombosis; sensitivity; specificity; and the length of follow-up.
Methods of synthesis
How were the studies combined?
A narrative synthesis was undertaken.

How were differences between studies investigated?
Differences between the studies were discussed within the text of the review.

Results of the review
Six studies (n=170) were included.

Five and three studies reported the sensitivity and specificity, respectively, or provided sufficient information to calculate these values. Only one study met all of the predefined criteria for adequate evaluation of the sensitivity and specificity. The sensitivity of ultrasonography ranged from 56 to 100%, and the specificity ranged from 77 to 100%. The sensitivity and specificity varied with the ultrasonographic method used.

With regard to the safety of withholding anticoagulant therapy, no prospective studies were identified.

Authors' conclusions
Ultrasonography for clinically suspected upper extremity DVT has not been adequately evaluated. The safety of withholding anticoagulant treatment in a patient with suspected upper extremity DVT and negative ultrasonographic results is uncertain.

CRD commentary
The authors addressed a good review question and used broad but appropriate criteria to include or exclude the studies. However, the literature search was inadequate: one database was searched and only English language articles were included. Although additional studies may have been identified by checking the bibliographies of the retrieved articles, it is likely that relevant studies were still missed. The process used to select the studies was described and some aspects of methodological quality were addressed. However, the data extraction process was not described. Adequate study details were tabulated but further information about the patients' characteristics, in particular, was needed. The narrative synthesis of the studies was appropriate given the lack of data.

The authors' conclusions follow from the data presented.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors state that there is a need for prospective studies in more patients using the design features outlined in the review.

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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.