Review: a low clinical probability plus a normal D-dimer test result excludes a diagnosis of deep venous thrombosis


In patients with suspected deep venous thrombosis (DVT), is a combination of rapid D-dimer testing and estimation of clinical probability accurate for excluding a diagnosis of DVT?

**METHODS**

- **Data sources**: Medline (1993–2003), Cochrane Database of Abstracts and Reviews, and bibliographies of relevant articles.
- **Study selection and assessment**: prospective studies (published in English) of consecutive outpatients with features of DVT that used a rapid D-dimer assay on at least a subgroup of patients; estimated the risk of DVT using a validated clinical probability tool that categorised patients as having low, intermediate, or high risk for DVT; evaluated outpatient data separately if patients were included; evaluated DVT data separately if patients with pulmonary embolism were included; had 100% patient follow up at ≥3 months; documented DVT using ultrasonography, venography, or impedance plethysmography; and presented sufficient data for calculation of sensitivity and specificity of the D-dimer assay and prevalence of venous thrombosis stratified by clinical probability level. Study quality was assessed based on the recommendations of the Cochrane Methods Group on Systematic Reviews of Screening and Diagnostic Tests.

**Outcome**: incidence of objectively confirmed symptomatic DVT and pulmonary embolism among patients with a normal D-dimer test result, stratified by level of clinical probability.

**MAIN RESULTS**

6 studies of diagnostic accuracy (n = 2199) and 6 studies of diagnostic management (n = 3232) met the selection criteria. Meta-analysis was done using a random effects logistic meta-regression model. The table contains pooled incidence rates of venous thrombosis among patients with normal D-dimer test results, stratified by level of clinical probability. Pooled sensitivity for the SimpliRED D-dimer assay was 88% (95% CI 82 to 92), and specificity was 46% (CI 28 to 67), resulting in a negative likelihood ratio of 0.16. Pooled sensitivity for the highly sensitive D-dimer tests was 77% (CI 65 to 86), resulting in a negative likelihood ratio of 0.16. Pooled sensitivity for the highly sensitive D-dimer assays was 77% (CI 65 to 86), resulting in a negative likelihood ratio of 0.16.

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**CONCLUSIONS**

In patients with suspected deep venous thrombosis (DVT), low clinical probability plus a normal result on the SimpliRED D-dimer test excludes a diagnosis of acute DVT. Furthermore, a normal result on the highly sensitive D-dimer test is effective for ruling out DVT in patients with low to moderate clinical probability of DVT.

A modified version of this abstract appears in Evidence-Based Medicine.

**Commentary**

DVT is both a common condition and a diagnostic challenge. 75% of outpatients who present with signs and symptoms of DVT are ruled out for that diagnosis. Currently, venous ultrasound imaging is the diagnostic test of choice. However, appropriate use of diagnostic testing is a concern; issues of cost, utilisation, and convenience abound, and alternative approaches are constantly being sought. Fancher et al present a sophisticated review of studies on the combined use of rapid D-dimer testing and estimation of clinical probability in the diagnosis of DVT, an approach used by DVT researchers. The clinical decision making tool is clear and easily understandable, and the D-dimer is a simple, readily available laboratory test. The authors conclude that strong evidence shows that DVT can be excluded when a patient has both low clinical probability and a normal D-dimer test result. Despite the fact that these clinical decision making tools are included in the curriculum of some advanced practice nursing programmes, many advanced practice nurses remain unaware of them. A search of nursing literature and review of selected texts did not reveal mention of these tools. This lack of publicity is disappointing because the approach described by Fancher et al could be useful to advanced practice nurses employed in ambulatory settings.

Many practitioners rely on venous ultrasound imaging and D-dimer tests because they feel that they are convenient and accurate. Thus, practitioners have little incentive to change. However, the combination of a clinical decision making tool and a simple laboratory test has the potential to eliminate the need for venous ultrasound imaging, resulting in cost savings and convenience for patients. To close this gap between research and practice, the tools studied in this review need to be more widely taught and publicised to advanced practice nurses.

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A combination of rapid D-dimer testing and estimation of clinical probability for excluding a diagnosis of deep venous thrombosis*

<table>
<thead>
<tr>
<th>D-dimer test result</th>
<th>Estimated clinical probability</th>
<th>3 month cumulative incidence of venous thrombosis (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal on the SimpliRED D-dimer test</td>
<td>Low</td>
<td>0.5% (0.07 to 1.1)</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>3.5% (1.4 to 6.9)</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>21% (8.5 to 38)</td>
</tr>
<tr>
<td>Normal on the highly sensitive D-dimer tests</td>
<td>Low or moderate</td>
<td>0.4% (0.04 to 1.1)</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>6.4% (1.7 to 15)</td>
</tr>
</tbody>
</table>

*CI defined in glossary.