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Computer-assisted venous occlusion plethysmography in the diagnosis of acute deep venous thrombosis. Flanagan et al, QJMed 93: 277-282. 2000

Are the results of the study valid?	
Was there an independent 'blind' comparison with a reference standard?	Yes. Contrast venography, considered to be the gold standard, was undertaken in about 70%, with the remainder undergoing sonovenography, which is more variable. The former was analysed separately. Sonovenography was undertaken when patients were unwilling to have venography, it was technically not possible, or was not available at particular times of the day. All patients, however, were diagnosed by a consultant radiologist who was blind to the results produced by plethysmography, undertaken first.
Did the patient sample include an appropriate spectrum of patients to whom the test will be applied in clinical practice?	Yes. These were <u>all</u> patients admitted to at a DGH with suspected DVT. Males and females were roughly equal the age range was 17-95 with a mean around 65 years.
Did the results of the test influence the decision to perform the reference standard?	No. All patients had some form of venography.
Were the methods of performing the test described in sufficient detail to permit replication?	Plethysmography was described in detail and a reference to the method also provided.

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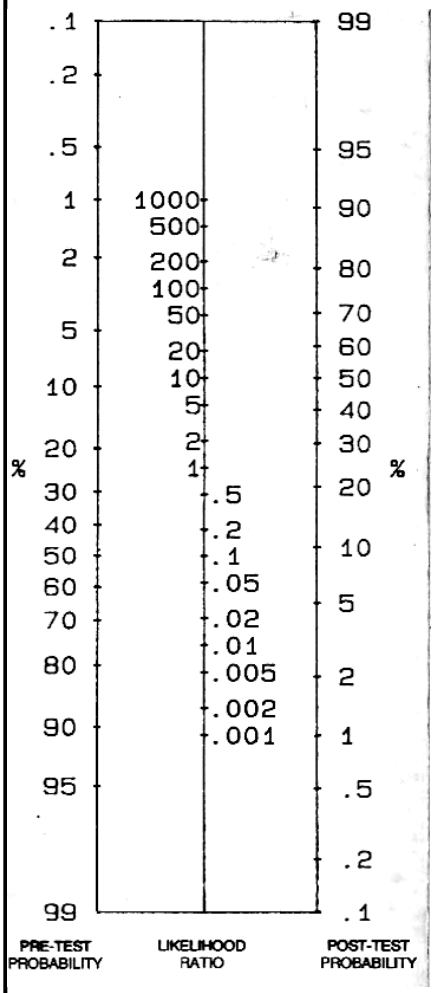
Critical Appraisal of a Diagnostic Paper (continued)

What are the results?

Are likelihood ratios, or the data necessary to calculate likelihood ratios, provided?



Likelihood ratios are not provided but can be calculated.

The LR of a positive test is calculated as the sensitivity / (1-specificity) – i.e. the odds of getting a positive test result if you have the disease.

From table 1: LR+ve = 0.95 /(1-.75) = 3.8 x more likely to have DVT than not if the test is positive (3.7 if you incorporate the less standard sonovenography)

LR-ve = (1-sensitivity) / specificity = (1-0.95) / 0.75 = 0.06 times more likely to have DVT than not if the test is negative (0.05 with sonography)

These LRs are more useful than sensitivity, specificity, positive and negative predicted values. These can be used along with the pre-test probability (estimated from other patient specific clinical information), using a nonogram, to provide a better estimate of whether your patient has a DVT or not.

(The nonogram is not something you always carry around but it is probably useful to remember 4 very rough horizontal lines, and know that the distribution is logarithmic, then you can make a quick sketch assessment rather than having to go to the calculator to work out what the nonogram shows)

Pre test probability

Approx	Likelihood ratio Approx	Post test probability Approx
1	1000	90
10	10	50
50	0.1	10
90	0.001	1

The best estimate of pre-test probability of a proximal DVT is given in their 215 patients, rather than a sub-selection that was influenced by inability to do the test – which was age related. 64/215 = about 30%. Looking at the nonogram a positive test would increase the probability to about 70%, and a negative test will decrease the probability from 30% to about 20%. This is significantly more than the maximum of 7% that they are suggesting and I can't work out where this comes from – **am I going wrong somewhere? I could be wrong. Please tell me!**

Will the results help me in caring for my patients?

Will the reproducibility of the test and its interpretation be satisfactory in my setting?	Interpretation of the plethysmography was clearly a problem, despite training. Their solution of smaller trained people doing more regular assessments is unlikely to be practical and other solutions need to be investigated if this technique is to be used.
Are the results applicable to my patient?	The test seems reasonable and its non-invasive nature is clearly advantageous but it fails in a significant number of, mainly older, patients.
Will the results change my management?	Given that post test probability increases from 30% (of having a proximal DVT) to about 70% if the test is positive, then one could consider avoiding the more invasive confirmation and treat. A reduction to 20% if the test is negative (on my calculations) is not particularly useful – they seem to be suggesting that these patients could be discharged. The authors suggest that combining these results with D dimers might be useful. This should (and has I believe) be assessed against using D dimers alone
Will patients be better off as a result of the test?	144/215 had a plethysmography result and 75 had a positive result. If my suggestion that these could be treated is reasonable (and it might not be) then 75/215 – about 35% with a possible DVT would avoid more invasive tests. These 35% would tend to be disproportionately younger than the population that present.