



## WELLS CRITERIA

- These clinical prediction rules are designed to increase the probability of an accurate diagnosis of deep venous thrombosis. [1-4](#)
- Active cancer (patient receiving treatment for cancer within the previous 6 months or currently receiving palliative treatment) (1 point)
- Paralysis, paresis, or recent plaster immobilisation of the lower extremities (1 point)
- Recently bedridden for 3 days or more, or major surgery within the previous 12 weeks requiring general or regional anaesthesia (1 point)
- Localised tenderness along in the distribution of the deep venous system (1 point)
- Entire leg swollen (1 point)
- Calf swelling at least 3cm larger than that on the asymptomatic side (measured 10cm below tibial tuberosity) (1 point)

- Pitting oedema confined to the symptomatic leg (1 point)
- Collateral superficial veins (nonvaricose) (1 point)
- Previously documented DVT (1 point)
- Alternative diagnosis at least as likely as DVT (-2 points)

Score of 2 or higher = DVT likely and Score of less than 2 = DVT unlikely

## LOWER LIMB ULTRASOUND

- Most accurate non-invasive test for the diagnosis of a first symptomatic proximal deep vein thrombosis. [5,6](#)
- Involves a combination of: [6](#)
  - Compression ultrasonography: Starting at the inguinal ligament and generally extending to the venous trifurcation in the calf.
  - Doppler imaging: Particularly useful where compressibility is difficult to assess.
- Advantages of ultrasound: [7,8](#)
  - Excellent sensitivity for proximal vein thrombosis (97%). [5](#)
  - Ability to depict anatomical variants (eg. duplicated venous segments) and alternative causes of symptoms.
  - Non-invasive.
  - No exposure to ionising radiation.
  - Does not involve the use of contrast agent.
  - Relatively inexpensive.
- Limitations of ultrasound: [6,7](#)
  - Venous compressibility may be limited by patient characteristics such as obesity, oedema and tenderness.
  - False positives may occur due to extrinsic compression of a vein by pelvic mass or other perivascular pathology.
  - A negative ultrasound scan in moderate to high risk patients does not reliably exclude the diagnosis of deep vein thrombosis. [12](#)
  - Less sensitive for detecting distal vein thrombosis (73% sensitivity) and in detecting thrombosis in iliac veins. [5](#)
- Serial ultrasound is used to detect those DVTs that were isolated distally in the calf initially and undetected but which subsequently extend into the more proximal veins. [7](#)
- Isolated distal calf DVTs rarely lead to significant embolic events. [9](#)

## D-DIMER ASSAY

- Is formed as a result of plasmin generated degradation of thrombin and is therefore a marker of the presence of thrombus.

- There are various qualitative and quantitative assays available for D-dimer but in general they have a high sensitivity and negative predictive value for the presence of thrombus. [10,11](#)
- Of the various assays, the quantitative enzyme linked immunosorbent assay (ELISA) has the best negative likelihood ratio and is significantly superior to non-ELISA assays for excluding the presence of deep vein thrombosis. The sensitivity is higher for proximal, compared to distal DVT. [12,13](#)
- A negative quantitative ELISA D-dimer result is as diagnostically useful for excluding DVT as a negative duplex Doppler ultrasound. [12](#)
- If a patient is assessed, based on pre-test probability as unlikely to have leg DVT returns a negative D-dimer result, there is generally considered to be no requirement for a Doppler ultrasound. [4,12](#)
- An elevated D-dimer level is non-specific for venous thromboembolism, and diagnostic imaging is required to confirm the presence of disease. [14](#)
- D-dimer has a limited role in hospitalised patients, and ultrasonography should be performed if deep venous thrombosis is suspected.

## REFERENCES

1. Wells PS, Anderson DR, Bormanis J, et al. **Value of assessment of pretest probability of deep-vein thrombosis in clinical management.** Lancet 1997;350:1795-8. (Level II evidence). [Click here to view reference](#)
2. Perrier A, Desmarais S, Miron M-J, et al. **Non invasive diagnosis of venous thromboembolism in outpatients.** Lancet 1999;353:190-5. (Level II evidence). [Click here to view reference](#)
3. Wells PS, Hirsh J, Anderson DR, et al. **Accuracy of clinical assessment of deep-vein thrombosis.** Lancet 1995;345:1326-30. (Level II evidence). [Click here to view reference](#)
4. Wells PS, Anderson DR, Rodger M et al. **Evaluation of D-dimer in the diagnosis of suspected deep-vein thrombosis.** N Engl J Med 2003;349:1227-35 (Level II evidence). [Click here to view reference](#)
5. Kearon C, Julian JA, Math M, et al. **Noninvasive diagnosis of deep venous thrombosis.** Ann Intern Med 1998;128:663-77. (Review article)
6. American Thoracic Society. **The diagnostic approach to acute venous thromboembolism: clinical practice guidelines.** Am J Respir Crit Care Med 1999;160:1043-66. (Review article)
7. Keeling DM, Mackie IJ, Moody A, Watson HG; **The Thrombosis and Haemostasis task force of the British Committee for Standards in Haematology. The diagnosis of deep vein thrombosis in symptomatic outpatients and the potential for clinical assessment and D-dimer assays to reduce the need for diagnostic imaging.** Br J Haematol 2004;124:15-25. (Review article)
8. Fraser JD, Anderson DR. **Deep venous thrombosis: recent advances and optimal investigation with US.** Radiology 1999;211:9-24. (Review article)
9. Philbrick JT, Becker DM. **Calf deep venous thrombosis. A wolf in sheep's clothing?** Archives of Internal Medicine 1988;148:2131-8. (Analytical review)

10. Freyburger G, Trillaud H, Labrousche S, et al. **D-dimer strategy in thrombosis exclusion - a gold standard study in 100 patients suspected of deep venous thrombosis or pulmonary embolism: 8 DD methods compared.** Thromb Haemost 1998;79:32-7. (Level II evidence). [Click here to view reference](#)
11. Brill-Edwards P, Lee A. **D-dimer testing in the diagnosis of acute venous thromboembolism.** Thromb Haemost 1998;82:688-94. (Review article)
12. Stein PD, Hull RD, Patel KC, et al. **D-Dimer for the Exclusion of Acute Venous Thrombosis and Pulmonary Embolism: A Systematic Review.** Ann Intern Med 2004;140:589-602. (Level I evidence). [Click here to view reference](#)
13. Goodacre S, Sampson FC, Sutton AJ, Mason S, Morris F. **Variation in the diagnostic performance of D-dimer for suspected deep vein thrombosis.** Q J Med 2005;98:513-27 (Level II evidence). [Click here to view reference](#)
14. Ho WK, Hankey GJ, Lee CH, Eikelboom JW. **Venous thromboembolism: diagnosis and management of deep venous thrombosis.** MJA 2005;182:476-81. (Review article)

#### Website

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