Deep vein thrombosis: diagnosis and treatment


Abstract
This article aims to give nurses an insight into proximal deep vein thrombosis (DVT). DVT is relatively common and is associated with significant morbidity and mortality. Complications such as post-thrombotic syndrome, venous leg ulcers, recurrent venous thromboembolism (VTE) – pulmonary embolism (PE) or DVT – and pulmonary hypertension can develop following DVT diagnosis. There is also a risk that a large PE could prove fatal. While VTE prevention is a clinical priority, nurses should also have appropriate skills and knowledge to care for patients with suspected DVT. Nurses need to be aware of the signs and symptoms of DVT, common diagnostic tests, pharmacological and mechanical treatments, and the follow-up investigations patients should be offered.

Authors
Lynda Bonner
Consultant nurse for thrombosis and anticoagulation, King’s College Hospital NHS Foundation Trust, London.
Jacqueline Johnson
Coagulation clinical nurse specialist, King’s College Hospital NHS Foundation Trust, London.
Correspondence to: lynda.bonner@nhs.net

Keywords
Anticoagulants, deep vein thrombosis, post-thrombotic syndrome, pulmonary embolism, venous thromboembolism

Review
All articles are subject to external double-blind peer review and checked for plagiarism using automated software.

Online
Guidelines on writing for publication are available at www.nursing-standard.co.uk. For related articles visit the archive and search using the keywords above.

Aims and intended learning outcomes
This article aims to inform the reader about proximal deep vein thrombosis (DVT), including signs and symptoms, diagnostic tests and available treatments. After reading this article and completing the time out activities you should be able to:
- Identify the signs and symptoms of DVT.
- Describe the methods used for diagnosing patients with DVT.
- Discuss common treatments for DVT.
- Summarise the possible complications that may occur following diagnosis of DVT.

Introduction
A DVT is a thrombus or blood clot that can occur in any of the deep veins in the body. However, DVT most commonly occurs in the deep veins of the leg or pelvis (National Institute for Health and Care Excellence (NICE) 2012a) (Figure 1). Although most DVTs start distally in the veins of the calf, they can extend proximally into the veins at knee level and above the knee; from here, the thrombus can break off and travel to the lungs, causing a pulmonary embolism (PE) (Kearon 2003). Silverstein et al (1998) estimated that the incidence of symptomatic DVT and PE was 145 and 69 respectively per 100,000 adults. The collective term venous thromboembolism (VTE) refers to both DVT and PE (NICE 2012a).

VTE is associated with significant morbidity and mortality. The most common complication of DVT is post-thrombotic syndrome (Roberts et al 2013). It can occur in more than one third of patients with DVT (Kahn 2009), and can significantly affect the
A patient who has been recently diagnosed with a DVT tells you that he has heard that DVTs are invariably fatal. What would you say to this patient to help him achieve a more balanced understanding of the possible consequences of having a DVT?

Create a presentation that you could use to teach junior colleagues or students about the signs and symptoms of DVT. Include pictures or diagrams of the typical appearance of the affected limb in a patient diagnosed with DVT. Ask the students what sort of symptoms they would expect the patient to report and what they would expect to find on examination of the affected limb. Emphasise that DVTs are often clinically asymptomatic so even in the absence of many of these signs and symptoms, a DVT could still be present.

FIGURE 1
Veins of the right leg

because DVT is common and causes significant morbidity and mortality, NICE (2010) has developed guidelines to assist healthcare professionals in reducing risk associated with VTEs in hospitalised patients, together with guidelines on the diagnosis and management of patients who are suspected of having VTE (NICE 2012a).

The economic burden on the NHS of diagnosing and managing DVT is considerable. The House of Commons Health Committee (2005) reported that VTE associated with hospitalisation costs the NHS £640 million per year. Although prevention of VTE was identified by the medical director of the NHS as a clinical priority for improving quality and productivity in hospitals in recent years (West 2009), it is essential that nurses are familiar with ways to prevent VTE and how to support and care for patients who develop signs and symptoms of DVT or who require treatment for a newly diagnosed DVT.

Signs and symptoms
DVT can occur without the patient showing any signs or symptoms. Several factors determine presentation of a DVT, including the size of the thrombus, which can extend to occlude both proximal and distal veins, the ability of collateral blood vessels to cope with transporting blood to bypass the thrombus, and the severity of vascular occlusion (blockage) and inflammation caused by the thrombus (Kearon 2003). A DVT is more likely to cause symptoms when it obstructs venous outflow, resulting in inflammation of the vein wall and surrounding tissue (Hirsh and Hoak 1996). Common symptoms of a DVT are warmth, redness, pain and swelling in the affected limb. When a patient reports these symptoms, a clinician should undertake a physical examination of the whole limb to observe for signs suggestive of DVT. These include tenderness on palpation, warmth, erythema, cyanosis, oedema and superficial venous dilatation that can present as prominent collateral veins (Kahn 1998).

Complete time out activity 1

Complete time out activity 2

These signs and symptoms are not specific to DVT and can be present in numerous other conditions. Therefore, clinical judgement about the likelihood of DVT should also take into account the patient’s individual risk factors for DVT, concurrent illnesses and medication, medical and surgical history, and demographic characteristics. By taking this information into account, the clinician should be able to improve their accuracy in predicting whether a DVT is present or not (Kahn 1998). NICE (2012a) recommends use of the two-level DVT Wells score (Wells et al 2003), which has been validated for its ability to estimate reliably the clinical probability of DVT (Table 1).
Clinical feature is given a score. A total score of two points or more indicates that a DVT is likely and further investigations should be undertaken.

**Diagnosis**

If the clinical probability of a DVT is likely (two or more points on the two-level DVT Wells score), then the patient should be offered diagnostic testing without delay. Clinical diagnosis of DVT is non-specific and subjective and therefore objective diagnostic tests must be used to reduce the chances of a missed diagnosis, the consequences of which could be very serious and even life-threatening (Zierler 2004).

NICE (2012a) recommends the use of a D-dimer test and ultrasound scanning for the diagnosis of DVT. The NICE (2012a) guidance also recommends that if a patient has to wait more than four hours for a diagnostic ultrasound scan, he or she should receive an interim 24-hour dose of a parenteral anticoagulant such as low-molecular-weight heparin. The patient should receive this treatment once daily while he or she is awaiting the diagnostic scan. Other diagnostic tests for DVT are available, but it is beyond the scope of this article to discuss these.

**D-dimer test**

D-dimer fragments can be measured by a simple blood test. These small fibrin fragments are produced and released into the blood when fibrin blood clots are broken down by plasmin. Although the presence of high levels of D-dimer fragments suggests a DVT may be present, D-dimer fragments are not specific to DVT and can occur in other conditions such as infection, inflammation, pregnancy, trauma, surgery and haemorrhage (Bockenstedt 2003). For this reason, the D-dimer test is used for its negative predictive value — it is unlikely that a DVT is present in a patient with a low or negative D-dimer test.

If both the D-dimer test is low or negative and the two-level DVT Wells score suggests that DVT is unlikely, the patient can be advised that it is unlikely he or she has a DVT (NICE 2012a). In this situation, other causes of the patient’s symptoms should be investigated. Further diagnostic testing with ultrasound scanning of the proximal (knee level or above) leg veins is recommended if either the D-dimer test is high or the two-level DVT Wells score suggests that DVT is likely (NICE 2012a).

**Ultrasound scanning**

Venous ultrasonography is accepted as the primary non-invasive diagnostic test for the diagnosis or exclusion of acute DVT (Zierler 2004). Although there are many different types of venous ultrasonography — for example, compression ultrasound, duplex ultrasound or colour Doppler imaging — overall, venous ultrasonography has a mean sensitivity and specificity of 97% and 94%, respectively, for the diagnosis of symptomatic proximal DVT (Kearon et al 1998).

There are practical issues that the nurse should consider if a patient requires venous ultrasonography. The patient needs to be able to change his or her position to allow scanning to take place. It may be difficult for the patient to tolerate the pressure from the ultrasound scanhead, which needs to be placed firmly on his or her skin, especially if the leg is painful. If the patient has a wound or is wearing bandages or a plaster cast, these can prevent or hinder venous ultrasonography (Zierler 2004). Where possible, bandaging should be replaced with a small dressing to assist scanning.

If the patient has difficulty in repositioning him or herself, the nurse should accompany

---

**TABLE 1**

<table>
<thead>
<tr>
<th>Two-level deep vein thrombosis (DVT) Wells score</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical feature</td>
<td>Score</td>
</tr>
<tr>
<td>Active cancer (treatment ongoing, within 6 months or palliative)</td>
<td>1</td>
</tr>
<tr>
<td>Paralysis, paresis or recent plaster immobilisation of the lower extremities</td>
<td>1</td>
</tr>
<tr>
<td>Recently bedridden for 3 days or more or major surgery within 12 weeks requiring general or regional anaesthesia</td>
<td>1</td>
</tr>
<tr>
<td>Localised tenderness along the distribution of the deep venous system</td>
<td>1</td>
</tr>
<tr>
<td>Entire leg swollen</td>
<td>1</td>
</tr>
<tr>
<td>Calf swelling at least 3cm larger than the asymptomatic leg</td>
<td>1</td>
</tr>
<tr>
<td>Pitting oedema confined to the symptomatic leg</td>
<td>1</td>
</tr>
<tr>
<td>Collateral superficial veins (non-varicose)</td>
<td>1</td>
</tr>
<tr>
<td>Previously documented DVT</td>
<td>1</td>
</tr>
<tr>
<td>An alternative diagnosis is at least as likely as DVT</td>
<td>-2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinical probability simplified score</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DVT likely</td>
<td>2 or more</td>
</tr>
<tr>
<td>DVT unlikely</td>
<td>1 or less</td>
</tr>
</tbody>
</table>

(Wells et al 2003, NICE 2012a)
the patient for the scan and assist with repositioning. If the patient has a painful leg then the nurse should discuss with the individual the use of analgesia before the scan to minimise further discomfort.

Complete time out activity 3

Results of diagnostic tests
Venous ultrasonography is highly accurate for diagnosing proximal DVT; treatment can be initiated without the need for further diagnostic tests or treatment can be withheld if the scan is negative (Kearon et al 1998). However, NICE (2012a) recommends that patients with a two-level DVT Wells score suggestive of DVT and a positive D-dimer test should have repeat venous ultrasonography six to eight days later, even if the initial proximal ultrasound scan was negative. This additional testing is necessary to check that there has been no extension of a distal DVT into the proximal veins, where a DVT is considered to be clinically significant. There has been much debate about the need to scan for distal DVTs, which are less clinically important than proximal DVTs because they are unlikely to break off and cause a PE. If the whole leg is scanned initially then a repeat ultrasound scan is not necessary (NICE 2012a).

If a repeat venous ultrasonography scan is required, the nurse should explain the importance of this additional scan to the patient in diagnosing or excluding DVT. Failure to diagnose DVT correctly could result in a fatal PE (NICE 2012a). Even if diagnostic testing has suggested it is unlikely that the patient has a DVT, it is still important for the nurse to advise the patient about the signs and symptoms of DVT and PE, and when and where to seek medical help should these symptoms occur (NICE 2012a).

Complete time out activity 4

Treatment
The aim of DVT treatment is to prevent the extension of the DVT in the short term, and to prevent recurrent DVT or a PE in the long term (Scarvelis and Wells 2006). Treatment is also targeted at preventing complications of DVT such as post-thrombotic syndrome (NICE 2012a). Normally the valves in the veins promote blood flow return, aided by contraction of the leg muscles. However, these valves can be damaged by a DVT, which results in venous reflux and venous hypertension in the leg. Venous reflux and venous hypertension are the main contributing factors for the development of post-thrombotic syndrome in the leg (Kearon 2003).

DVT treatment should take into consideration the patient’s needs and preferences (NICE 2012a). Allowing patients to have a role in decision making in agreeing treatment plans is important to encourage adherence to treatment (Horne et al 2005, Department of Health 2012). The nurse needs to be a skilled communicator and to convey effectively to the patient the importance of adhering to the agreed treatment plan (World Health Organization 2003). Verbal information should be supported by written information and should be tailored to accommodate the needs of patients who do not speak or read English or who may have learning disabilities (NICE 2012a).

Treatment of proximal DVT consists of both pharmacological and mechanical interventions (NICE 2012a). This article focuses on the use of anticoagulation and graduated compression stockings because these are the most common treatment options. Although it is beyond the scope of this article, it is worth acknowledging that in special circumstances patients may be considered for insertion of an inferior vena cava filter (University of Michigan 2013) or catheter-directed thrombolytic therapy (NICE 2012a).

Pharmacological interventions
Anticoagulation is the mainstay of treatment for DVT (Scarvelis and Wells 2006). Patients are usually offered dual therapy with a parenteral and an oral anticoagulant such as a vitamin K antagonist. Warfarin is the most commonly used vitamin K antagonist because there is a high level of evidence supporting its efficacy (Khoo et al 2009, NICE 2012a). Low-molecular-weight heparin, unfractionated heparin and fondaparinux are all parenteral anticoagulants; the decision about which one is best for the patient should take into account the person’s comorbidities (such as bleeding history and renal impairment), contraindications and preferences (NICE 2012a). Low-molecular-weight heparin is porcine derived (Harenberg et al 1990) and some patients may object to its use on the basis of cultural or religious grounds.

Administration of an oral and parenteral anticoagulant should be started as soon as possible after DVT diagnosis. The parenteral anticoagulant should be continued for at least five days, or until the patient has achieved therapeutic levels – international normalised ratio (INR) of 2.0 or above for a
minimum of 24 hours – of an oral vitamin K antagonist such as warfarin (NICE 2012a). The parenteral anticoagulant should then be stopped and the patient will remain on the oral anticoagulant for the duration of treatment. The most common side effect of anticoagulants is bleeding, so patients should be advised to report immediately any bleeding to their GP or emergency department depending on the severity of the bleeding; they should also inform the anticoagulation clinic.

Vitamin K antagonists The effectiveness of vitamin K antagonists can be influenced by many factors such as dietary changes, alcohol, other medicines, diarrhoea, vomiting and anorexia (Glee 2011). The maintenance of safe and therapeutic levels of vitamin K antagonists to reduce bleeding risk and likelihood of DVT extension are dependent on dose adjustments following frequent blood testing to measure the INR (National Patient Safety Agency 2007). Nurses should emphasise the need for patients to attend for regular blood testing while they are taking such antagonists and to inform the anticoagulation clinic if they develop any side effects or if there are any changes in their wellbeing or medication for other conditions, or if they become pregnant.

Novel oral anticoagulants The novel oral anticoagulant rivaroxaban has recently been licensed for the treatment of DVT. Rivaroxaban is a direct inhibitor of activated factor Xa and has been approved by NICE (2012b) for the treatment of DVT. Unlike traditional oral anticoagulants, such as warfarin, rivaroxaban does not require regular blood test monitoring. The drug has a rapid onset of action so the use of parenteral anticoagulants is not necessary when initiating treatment for DVT (Khoo et al 2009). A dose of 15mg rivaroxaban twice daily is recommended for 21 days, followed by a dose of 20mg once daily for the duration of treatment.

Treatment duration can vary depending on whether the patient has known risk factors predisposing him or her to DVT, or whether there are ongoing risk factors that could predispose the person to a future DVT. Suitability for rivaroxaban treatment and dose adjustments should be considered carefully in patients with renal impairment (NICE 2012b). Approval for other novel oral anticoagulants such as dabigatran and apixaban is currently being sought for use in the treatment of DVT.

Nurses should advise patients that rivaroxaban should be taken with food to aid absorption and stored at room temperature to maintain stability. Patients should also be told to report any side effects of the drug, such as dizziness, headaches or bleeding; and if minor bleeding does occur, the patient should be told to seek prompt medical advice. The anticoagulant effect of the drug wears off in about 24 hours. There is no specific antidote to rivaroxaban currently available, however in a clinical emergency, for example in the event of a traumatic accident, all hospitals should have agreed local protocols on how to manage major haemorrhage (King’s College Hospital Thrombosis Team 2012).

Patients taking rivaroxaban should check with their doctor or pharmacist before taking any new medications. As with all anticoagulants, patients should avoid contact sports or high-risk activities because of the risk of bleeding from injury and they should carry an anticoagulation alert card at all times. Patients should inform their doctor or dentist that they are taking rivaroxaban if they have surgery or a minor procedure planned (King’s Health Partners 2013). The effects of rivaroxaban during pregnancy are not known so patients should also inform their doctor if they become pregnant.

The patient should be given relevant verbal and written information about his or her treatment plan, and alongside any carer should be given the opportunity to ask questions and be involved in decision making (Glee 2011). The nurse should emphasise the importance of adhering to anticoagulation treatment for the recommended duration of time to minimise risk of recurrent VTE, which could be fatal (Kaatz et al 2010).

Duration of anticoagulation The duration of anticoagulant treatment can be tailored according to the patient’s comorbidities, the risk factors that predisposed the person to develop a proximal DVT, his or her individual bleeding risk factors, and his or her preference based on informed consultation with the clinician. If a proximal DVT has been caused by a risk factor such as recent surgery or trauma (Kaatz et al 2010), three months of anticoagulation treatment is recommended (NICE 2012a). However, if there was no obvious risk factor associated with the development of DVT, and the risk of recurrence is considered to be high, the duration of treatment may be extended into the long term, with annual review of ongoing risk factors.

Anticoagulation in cancer patients with deep vein thrombosis If the patient has a DVT in the...
presence of active cancer, then anticoagulant treatment should continue for six months or longer (NICE 2012a). Low-molecular-weight heparin is preferred over vitamin K antagonists for DVT treatment in cancer patients. This patient group might have poor appetite, require chemotherapy, or be prescribed interacting medications and these are factors that could lead to erratic INRs in patients taking vitamin K antagonists, which could increase their risks of bleeding or developing further VTE (Lee and Levine 2003). Treatment with a low-molecular-weight heparin has been shown to be an effective and safe alternative to conventional vitamin K antagonists in cancer patients with VTE (Linkins 2008).

**Mechanical interventions**

NICE (2012a) recommends the use of graduated compression stockings following diagnosis of proximal DVT. Superficial veins have to cope with increased blood flow volume diverted from any deep veins where a thrombus is present. Because of the extra pressure in the superficial veins, fluid can seep into the calf tissues, which can lead to the development of post-thrombotic syndrome. Graduated compression stockings can minimise this effect by exerting pressure on the limb and supporting the superficial veins, and have been found to reduce the incidence of post-thrombotic syndrome after DVT from 54.0% to 25.2% (Kakkos et al 2006).

A below-knee graduated compression stocking producing an ankle pressure of greater than 23mmHg should be worn on the affected leg for at least two years. The patient’s leg should be measured for a graduated compression stocking one week after the initial diagnosis of DVT or when any acute swelling has subsided, as long as the patient has no contraindications (NICE 2012a). Contraindications listed by most manufacturers of compression stockings include arterial insufficiency (such as peripheral arterial disease or neuropathy) that could impede blood circulation, fragile skin (oedema, dermatitis or skin grafts) that could become damaged, or a diagnosis of unstable heart failure.

To encourage adherence with the use of graduated compression stockings, the nurse should ensure the patient is aware that wearing the stocking will aid venous haemodynamics or venous circulation (Kakkos et al 2006) and may reduce the risk of post-thrombotic syndrome developing after DVT. Patients might need assistance to apply and remove the stocking, especially if they have problems with dexterity, and some may find it difficult to tolerate wearing them. Patients who can tolerate wearing graduated compression stockings should be advised to wear them during the day and remove them at night. Patients should ask the GP for repeat prescriptions for their stockings, which should be replaced regularly, according to manufacturer’s recommendations. If patients experience any numbness or tingling in their leg or notice any skin damage when wearing compression stockings, they should remove them immediately and seek medical advice.

**Additional nursing interventions and advice**

**Teaching injection technique**

Most patients with proximal DVT are managed as outpatients; if they require treatment with subcutaneous low-molecular-weight heparin or fondaparinux, a decision on who should administer the injections needs to be made. First, the nurse should assess the patient’s willingness to self-administer the injections and second, after teaching the patient the correct injection technique, the nurse should assess the person’s dexterity in relation to injecting the drug safely and effectively. The nurse supports the patient’s autonomy by assisting him or her in controlling treatment (Association for Physiological Science 2012).

In some cases, however, self-administration might not be appropriate and the nurse should consider other options, such as administration by the patient’s carer, or by making a referral to district nurses or practice nurses. Safe disposal of used needles and syringes should also be discussed with the patient. Nurses should be aware of their local hospital policy for promoting safe sharps disposal. In some cases, the nurse may be required to obtain a signature from the patient that he or she agrees to dispose of the used sharps safely.

**Follow-up investigations**

Patients with proximal DVT of unknown cause should be investigated for cancer and thrombophilia depending on certain criteria which are listed below (NICE 2012a). Cancer screening Lee and Levine (2003) commented on the association between VTE and occult cancer, stating that an underlying
diagnosis of cancer is more likely in patients who are diagnosed with unprovoked DVT compared with patients who have provoking risk factors such as recent surgery. Therefore, if there are no obvious provoking factors for developing a proximal DVT, NICE (2012a) recommends that these patients be offered investigations for cancer.

These investigations will usually be arranged on an outpatient basis with a haematologist. The nurse should ensure that the patient is aware of the importance of attending this appointment, so that he or she can be screened for underlying causes of the DVT. The patient should be advised to expect some or all of the following investigations: medical history, physical examination, chest X-ray, blood tests and a urinalysis. In all patients over 40 years, the need for an abdominal and pelvic computed tomography scan should be considered, and in women over 40 years a mammogram should also be considered (NICE 2012a).

**Thrombophilia testing** Thrombophilia is an umbrella term used to describe conditions that can increase clotting tendency of the blood. People who have thrombophilia have an increased likelihood of developing DVT (NHS Choices 2012). NICE (2012a) recommends that full thrombophilia testing is only offered to patients who are about to stop anticoagulation treatment and have had an unprovoked proximal DVT in addition to having a first-degree relative with VTE. Blood testing for thrombophilia is not usually performed until patients have completed their anticoagulation treatment, and only after they have been counselled on the reasons why they are being offered the test. If thrombophilia is diagnosed, it may affect their anticoagulation management plan for the future. Again, it is important that if thrombophilia testing is recommended that the nurse emphasises the importance of patients attending the appointment so that the underlying causes of DVT can be investigated and assessed as to their likelihood of increasing the risk of VTE in future.

**Patient information** The nurse has a central role in educating the patient (or his or her carer) about what action to take, and when to seek urgent medical advice, in the event of developing any signs and symptoms of VTE or any side effects from anticoagulant medication or compression stockings. Patients should be given written information to reinforce the verbal information given by the nurse. Nurses should ensure they document a synopsis of the verbal advice given.

References


Department of Health (2012) Liberating the NHS: No Decision About Me, Without Me. tinyurl.com/p41tc2n (Last accessed: January 2 2014.)


King’s Health Partners (2013) Rivaroxaban (Xarelto) for the Treatment of Deep Vein Thrombosis and Pulmonary Embolism. Information for Patients. tinyurl.com/dxf6d5j (Last accessed: January 2 2014.)


and any written information leaflets that have been provided. The Code (Nursing and Midwifery Council (NMC) 2008) requires the nurse to keep accurate records of discussions, assessments, treatments and medicines given, and their effectiveness. The Code (NMC 2008) also recognises the importance of the nurse’s role in acting as an advocate for the patient by helping him or her to access information relevant to his or her condition. Ensuring the patient is fully informed will increase the individual’s confidence, and better prepare him or her for any action that may need to be taken in future (NHS Institute for Innovation and Improvement 2008).

**Conclusion**

An understanding of DVT is important for all nurses because DVT can occur in any setting and is associated with a significant risk of morbidity and mortality. Although DVT can be asymptomatic, nurses should be able to recognise, and be vigilant for, the classic signs and symptoms of DVT. Should these occur, the nurse should immediately alert the doctor so that an objective and prompt diagnosis can be sought. The nurse should keep the patient informed at all times about what investigations to expect and therefore needs a sound understanding of the tests used to diagnose DVT. If a DVT is confirmed then the communication skills of the nurse will be paramount in reassuring and empathising with the patient. This communication needs to be reinforced by a comprehensive understanding of the common treatments used for DVT and the possible implications for the patient following diagnosis.

The patient should be involved in decisions about his or her care. These decisions should be based on having the relevant facts available to give the patient the opportunity to make an informed choice, with the aim of providing better care and treatment outcomes. In his or her role as patient advocate, the nurse should listen to the patient’s concerns about treatment and be proactive in seeking solutions that are tailored to the individual’s preferences and circumstances. This collaboration in decision making is essential for improving patient adherence to treatment, especially when the treatment is likely to last for at least three months. The nurse is ideally placed to enhance the care and experience of a patient with a suspected or confirmed DVT.

**TIME OUT**

7 Reflect on your role in supporting patients who require treatment following diagnosis of DVT. What are the five most important aspects to discuss with the patient?

8 Now that you have completed the article, you might like to write a practice profile. Guidelines to help you are on page 64.

---

**References**

British Medical Journal. 302, 6778, 709-711.


University of Michigan (2013) Inferior Vena Cava (IVC) Filters. tinyurl.com/j3qablh (Last accessed: January 2 2014.)


Zierler BK (2004) Ultrasoundography and Diagnosis of Venous Thromboembolism. tinyurl.com/q6w68x5 (Last accessed: January 2 2014.)