Management of Deep Vein Thrombosis and Prevention of Post Thrombotic Syndrome

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Deep vein thrombosis (DVT) is suspected in patients who present with sudden swelling, redness, and pain of the calf or leg. Standard treatment is anticoagulation for at least three months, daily wearing of compressive stockings for two years, and immediate mobilization. The post thrombotic syndrome (PTS) is a frequent complication of DVT, seen in about 43% of patients. Clinically PTS is characterized by chronic, persistent pain, swelling with heavy leg, cramps, paraesthesia, and pruritus and rarely ulceration in the affected limb. PTS is burdensome and costly. Anticoagulation protects against pulmonary embolism but post thrombotic syndrome is common after DVT. Preventing DVT with the use of effective thromboprophylaxis in high risk pts & settings and minimizing the risk of ipsilateral DVT recurrence are likely to reduce the risk of development of PTS. Catheter directed thrombolysis for DVT is a new treatment under study that improve quality of life and reduce the risk of post thrombotic syndrome.

Key words: Deep vein thrombosis

Introduction

The annual global incidence of deep vein thrombosis (DVT) of the leg is 1.6 per 1000.1 Classically; venous thrombosis of a lower limb begins in a deep calf vein and propagates more proximally. To minimize the risk of fatal pulmonary embolism, accurate diagnosis and prompt therapy are crucial. Long term complications include the post-thrombotic syndrome & recurrent thromboembolism. The signs and symptoms of DVT are non-specific and unreliable.

Symptoms of deep vein thrombosis:

1) Swelling
2) Pain
3) Redness of the leg, depending on the vein segment.

Location of the thrombus: % of total DVT

- Distal veins: 40%
- Popliteal veins: 16%
- Femoral vein: 20%
- Common femoral vein: 20%
- Iliac vein: 4%

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Patients are at risk of pulmonary embolism. Despite optimal conservative treatment with anticoagulation and compression, one in four patients develops a post thrombotic syndrome with in one year, and one in three develops a recurrent DVT with in 5 years. The formation of venous thrombosis depends on a triad of i) hypercoagulability ii) stasis iii) vascular damage / interruption Of the Integrity of the vein wall. One or more factors may dominate, depending on the underlying risk factors.

Hypercoagulability factors:
- Age
- Surgery
- Trauma
- Malignancy
- Primary hypercoagulable states (deficiency of antithrombin –III, protein – C, protein s, factor v leiden)
- History of DVT
- Family History
- Use of oral contraceptives
- Oestrogen replacement
- Pregnancy and puerperium
- Presence of phospholipid and antcardiolipin antibodies
- Inflammatory bowel disease

Stasis:
- Immobilization or prolonged bed rest (after acute MI, CVA, fracture)
- Age
- Surgery – prostatectomy, hip or pelvic surgery, lower limb surgery
- Trauma
- Pregnancy and puerperium
- Obesity
- MI or chronic Heart failure
- Varicose veins

Venous injury / Vascular Damage:
- Trauma
- Central venous catheters
- Berger’s disease

Patient with DVT usually present with pain and swelling of the leg, varying degrees of redness, or muscle cramps. When DVT originates or extends more proximally to the iliofemoral vein segment, patients usually have swelling of the whole leg and more severe pain and redness. Mobility may be impaired because of heaviness and pain in the leg.

In severe cases – patients may develop phlegmasia cerulea dolens that means the entire left or right leg is swollen and inflamed, with a blue red aspect. The leg is very painful. It occurs when the whole venous return of the leg is blocked by a deep vein thrombosis. It can ultimately lead to gangrene of the leg.
Figure 1. Phlegmasia cerulea dolens: the entire left leg is swollen and inflamed, with a blue-red aspect. It occurs when the whole venous return of the leg is blocked by a deep vein thrombosis.

Figure 2. Venous ulceration of the leg. Active ulceration is the most severe form of post-thrombotic syndrome. Dark red pigmentation and painful skin thickening (lipodermatosclerosis) are seen proximal to the ulceration.
Figure 3. Magnetic resonance venogram showing a thrombus in the left leg extending from the popliteal vein to the common femoral vein; the red arrows point to the position of the thrombus in the vessel.

The wells score is the most widely validated method used to assess a patient’s risk of current DVT.

- Wells score for risk of DVT.

Factors with a score of 1 points:
- Active cancer treatment (treatment less than six months ago or palliation)
- Paralysis, paresis or recent plaster immobilization of the lower extremities
- Recently bedridden for more than three days or major surgery within past four weeks.
- Localized tenderness along the distribution of the deep venous system
- Entire leg swollen
- Calf swollen by more than 3 cm when compared with the asymptomatic leg.
- Pitting oedema.
- Collateral superficial veins (non varicose)
- Previously documented DVT.

Factors with a score of 2 points:
An alternative diagnosis is as likely or more likely than diagnosis DVT.

Total score:
< 2: Low risk of DVT.
≥ 2: high risk of DVT.

A wells score of less than 2 means that the patient has a low risk of DVT, while those with a score of 2 or more are at high risk of current DVT.

- Doppler USG of lower limb vessels – To see velocity of blood flow in the vein
- By imaging deep vein with B mode USG (Duplex) (Thrombosis can be seen)
- Venography (Confirmatory)
D dimer test – demonstrates the presence of blood clot degradation products. It has a sensitivity of 95.3% and specificity of 44.7% for DVT.

In patients with clinical signs consistent with DVT and a Wells score of 2 or more or a positive D dimer test imaging is used to confirm the diagnosis. Duplex Ultrasound has a sensitivity of 98.7% and specificity of 100% to detect or rule out an above knee thrombus, and a sensitivity of 85.2% and specificity of 98.2% for below knee DVT. Computed tomography venography and magnetic resonance venography can be used to image the exact extent of the DVT.

Risk of pulmonary embolism
If DVT is left untreated about 50% of patients will develop a symptomatic pulmonary embolism, which carries a 10% risk of death within one hour of onset of initial symptoms. The main goal of treatment is to prevent pulmonary embolism, propagation of clot, and recurrence of the DVT.

Risk of post thrombotic syndrome
In addition, 45 – 47% of patients develop post thrombotic syndrome with in two years of developing symptomatic DVT.

Post thrombotic syndrome is a chronic debilitating condition caused by venous hypertension as a result of persistent obstruction of venous outflow and venous insufficiency. Post thrombotic syndrome comparable to that of patients with chronic disease such as DM, obstructive lung disease, and congestive heart failure. Patients presents with painful heavy leg and may also have cramps, paraesthesia and pruritus. On examination: The leg may be oedematous with varicosities or hyperpigmentation of the skin.

A retrospective study estimated that 30%, 10% and 3% of people with DVT develop mild, moderate, and severe post thrombotic syndrome, respectively and venous obstruction combined with reflux increased the risk significantly.

Risk of venous ulcer disease:
Of those who develop post thrombotic syndrome, 3 – 5% go on to develop venous ulcer while are usually painful, resistant to treatment and tend to recur and tend to venous ulcers, may greatly impair the patient’s quality of life and incur high healthcare costs.

Treatment of DVT
General Treatment
- Bed Rest
- Use of elastic stockings with compression pressure of 30-40mm of Hg from midfoot to below knee at least two years.
- Relief of pain by analgesic
- Intermittent elevation of foot during day and night
- Mobilization slowly when the patient is fully anticoagulant

The current standard treatment for DVT is immediate anticoagulation with subcutaneous LMWH for at least 5 days and later with oral anti coagulants for at least three months reduces the risk of pulmonary embolism, recurrent DVT and post thrombotic syndrome.

Patients remain at increased risk of pulmonary embolism, recurrence of DVT (30% with in five years) and post thrombotic syndrome (43% at two years). Patients treated with anticoagulants are also at increased risk of severe bleeding complications.

Anti coagulant is used as follows:
Standard unfractionated heparin initially a loading dose at 5000IU intravenously.
Followed by continuous infusion of 1000 to 2000 IU/hr (20 U/kg/hr) with infusion pump. APTT monitoring is essential.

Heparin may be given for 6 to 8 days. LMWH is preferred (1.5mg/kg daily S/c). Oral anticoagulant should be started with heparin then heparin should be stopped. Anticoagulation alone decrease the risk of pulmonary embolism to 3-8%, the risk of recurrent DVT to 30% and the risk of post thrombotic syndrome to 82%.

The degree of clot lysis at treatment is directly correlated with long term outcome after iliofemoral DVT. Patients with iliofemoral DVT have double the risk of recurrent thrombosis compared with those with DVT below this segment. On the basis of these findings experts consider that patients with iliofemoral DVT might benefit most from a more aggressive approach to thrombus removal. A systematic review has shown that the administration of systemic thrombolytic agents – aimed at achieving indirect clot lysis - achieves a small increase in vein segment patency. Catheter directed thrombolysis for DVT is a new treatment under study that improve quality of life and reduce the risk of post thrombotic syndrome.

Conclusion
Patient with symptomatic deep venous thrombosis, especially those without transient risk factors for deep venous thrombosis, have a high risk for recurrent venous thromboembolism that persists for many years. The post thrombotic syndrome occurs in almost one third of these patients and is strongly related to ipsilateral recurrent deep venous thrombosis. Because of its prevalence, severity, and chronicity, PTS is costly and burdensome to patient and society. It is likely to become more prevalent, since the incidence of DVT has not decreased. The availability of newer, more effective antithrombotic agents may lead to a reduction in the future incidence of DVT, & therapy PTS, is certain settings. The overall frequency of PTS after symptomatic DVT ranges from 45%-47%; severe PTS occurs in 5% to 10% of patients with DVT. Preventing ipsilateral DVT recurrence is likely to reduce the risk of PTS. There is no proven role for thrombolysis in preventing PTS. Daily use of graduated compression stockings after DVT may reduce the risk of PTS and may prevent the worsening of established PTS. Prevention of PTS is the key to reducing its morbidity, since, at present; treatment options for PTS are extremely limited.

References
5. Kahn SR, shbakio H, Lamping DL, Holcroft CA, Shrier, Miron mj, et al. Determinants of health -related quality of life during the 2 years following deep vein...
Below knee elastic compression stocking to prevent the post thrombotic syndrome: a randomised, controlled trial, Ann intermed 2004; 141:149-56.