EDITORIAL

# Deep vein thrombosis is a challenge to a Surgeon

A deep-vein thrombosis (DVT) is a blood clot that forms within the deep veins, usually of the leg, but can occur in the veins of the arms and the mesenteric and cerebral veins. Deep-vein thrombosis is a common and important disease. It is part of the venous thromboembolism disorders which represent the third most common cause of death from cardiovascular disease after heart attacks and stroke.[1,2]

Even in patients who do not get pulmonary emboli, recurrent thrombosis and "post-thrombotic syndrome" are a major cause of morbidity.[3,4,5] DVT is a major medical problem accounting for most cases of pulmonary embolism. Only through early diagnosis and treatment can the morbidity and mortality can be reduced.

The causes of deep venous thrombosis are reduced blood flow Immobility (bed rest, general anesthesia, operations, stroke, long flights) and increased venous pressure due to mechanical compression or functional impairment leading to reduced flow in the veins like neoplasm, pregnancy, stenosis, or congenital anomaly which increases outflow resistance and mechanical injury to the vein trauma, surgery, peripherally inserted venous catheters, previous DVT, intravenous drug abuse and increased blood viscosity polycythaemia rubra vera, thrombocytosis, dehydration and anatomic variations in venous anatomy can contribute to thrombosis.

Increased risk of coagulation seen in deficiency. Anticoagulation proteins C and S, antithrombin III deficiency, factor V Leiden mutation. It is also seen in causes like cancer, sepsis, myocardial infarction, heart failure, vasculitis, systemic lupus erythematosus and lupus anticoagulant, Inflammatory bowel disease, nephrotic syndrome, burns, oral estrogens, smoking, hypertension, diabetes. Constitutional factors like Obesity, pregnancy, Increasing age, surgery, and cancer.[6] Deep-vein thrombosis and pulmonary embolism are common and often "silent" and thus go undiagnosed or are only picked up at autopsy. It is thought the annual incidence of DVT is 80 cases per 100,000, with a prevalence of lower limb DVT of 1 case per 1000 population.[1] Annually in the United States, more than 200,000 people develop venous thrombosis; of those, 50,000 cases are complicated by pulmonary embolism.[8-10] Deep-vein thrombosis is rare in children, and the risk increases with age, most occurring in the over 40s. There is no consensus about whether there is a sex bias in the incidence of DVT. There is evidence in the United States that there is an increased incidence of DVT and an increased risk of complications in African Americans and white people when compared to Hispanics and Asians. In the hospital, the most commonly associated conditions are malignancy, congestive heart failure, obstructive airway disease, and patients undergoing surgery. According to Virchow's triad, which was first described in 1856 in three contributing factor in the formation of thrombosis, venous statis, vascular injury to hypercoagulaty.

Thrombosis is a protective mechanism that prevents the loss of blood. Fibrinolysis counteracts or stabilizes the thrombosis. The triggers of venous thrombosis are frequently multifactorial, with the different parts of the triad of Virchow contributing in varying degrees in each patient, but all result in early thrombus interaction with the endothelium. This then stimulates local cytokine production and causes leukocyte adhesion to the endothelium, causes venous thrombosis. DVT is commonest in the lower limb below the knee and starts at low-flow sites, such as the soleal sinuses, behind venous valve pock-

ets.[11-13] Patient may have Pain (50% of patients), Redness, Swelling (70% of patients). On physical examination Limb edema may be unilateral or bilateral if the thrombus is extending to pelvic veins, Red and hot skin, with dilated veins, Tenderness.

As per the NICE guidelines following investigations should be done like D-dimers (very sensitive but not very specific). Coagulation profile is proximal leg vein ultrasound, which when positive, indicates that the patient should be treated as having a DVT. Deciding how to investigate is determined by the risk of DVT. The clinical probability of a DVT using the Wells scoring system. For patients with a score of 0 to 1, the clinical probability is low, but for those with 2 or above, the clinical probability is high.

If the patient does not score 2 on the DVT Wells score, but the D-dimer test is positive, the patient should have a proximal leg vein ultrasound scan within 4 hours, or if this is not possible, the patient should receive an interim 24-hour dose of a parenteral anticoagulant. A proximal leg vein ultrasound scan should then be carried out within 24 hours of being requested.

Treatment of DVT aims to prevent pulmonary embolism, reduce morbidity, and prevent or minimize the risk of developing post-thrombotic syndrome. The cornerstone of treatment is anticoagulation. NICE guidelines only recommend treating proximal DVT (not distal) and those with pulmonary emboli. In each patient, the risks of anticoagulation need to be weighed against the benefits. Anticoagulation is Low-molecular-weight, Vitamin K analogs for three months, In patients with cancer, consider anticoagulation for 6-months with low-molecular-weight heparin, In patients with unprovoked DVT consider vitamin K analogs beyond three months, Rivaroxaban is an oral factor Xa inhibitor which has recently been approved by the FDA and NICE and is attractive because there is no need for regular INR monitoring If platelet count drops to less than 75,000, switch from heparin to fondaparinux, which is not associated with heparin-induced thrombocytopenia. Rivaroxaban, apixaban, dabigatran, edoxaban, betrixaban are relatively newer factor Xa inhibitors approved for prophylaxis of deep vein thrombosis. The duration of treatment for DVT is for 3-6 months, but recurrent episodes may require at least 12 months of treatment. Patients with cancer need long term treatment. Inferior vena cava filters are not recommended in acute DVT. There are both permanent and temporary inferior vena cava filters available.

DVTs occur in many hospitalized patients, and one of the most feared complications is a pulmonary embolus. Failing to diagnose DVT can result in a pulmonary embolus, which can be fatal. The focus is on the prevention of DVT all preoperative cases should be evaluated for DVT prophylaxis. Nurses need to educate the patients on the importance of ambulation, being compliant with compression stockings, and taking the prescribed anticoagulation medications. In both the operating room and post-surgery, nurses play a key role in reminding physicians for the need for DVT prophylaxis.

Outcomes close to 300,000 patients die from a pulmonary embolus each year in the US alone. DVT prophylaxis is often not done. The fact is that DVT is preventable in the majority of patients, and the onus is on healthcare.

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