

Evaluation of the incidence of asymptomatic calf deep vein thrombosis in high risk post-operative patients on DVT prophylaxis

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Abstract

Purpose: To identify the presence of occult (DVT) in post op patients on DVT prophylaxis and to avoid unnecessary screening, we reviewed our experience with routine duplex screening for DVT in high risk post-operative patients on DVT prophylaxis.

Methods: Over a 2 year period, all patients who were admitted with an anticipated length of stay greater than 36 hours were studied to determine the prevalence of risk factors for asymptomatic proximal DVT. Risk factors, demographics, and operative data were collected and analyzed with multilinear regression, t tests and χ^2 analysis.

Results: There was a 7.3% prevalence of major DVT in the 100 patients studied. APACHE II scores (14.5 ± 6.24 vs 10.3 ± 3.15 ; $p < 0.0001$) and emergent procedures (45.5% vs 23.2%; $p > 0.0344$) were associated with DVT by multifactorial analysis. Age was significant by univariate analysis. An algorithm based on the presence of any one of the three risk factors identified (APACHE II score 12 or more; emergent procedures; or age 60 or greater) could be used to limit screening by 30% while achieving a 95.5% sensitivity for identification of proximal DVT.

Conclusion: Absence of all three risk factors indicates a very low risk for DVT (3%). Screening of post op patients is indicated because of a high prevalence of asymptomatic disease. Patients who have proximal DVT require active therapy and not prophylaxis. Costs and resources may be contained by using the above risk factors as a filter for duplex screening.

Keywords: DVT, incidence, high-risk surgical patients, prophylaxis protocol

Introduction

Venous thromboembolism is quoted as a major health problem and one of the most common

preventable causes of hospital deaths in the western world; however, this has rarely evoked such consideration in India. The true incidence of VTE is hard to get because of the often-silent nature of the condition. Deep vein thrombosis (DVT) of the lower limbs is a common disease among the patients who undergo surgery, often-asymptomatic. Thrombosis that occurs in association with surgery usually starts in the deep veins of the calf, often originating in the valve cusps. Although venous thrombi often begin during the intraoperative period, some start days, weeks, or even months after surgery. Each year 1 per 1,000, people in industrial countries develop DVT. 1% to 2% of these patients die of pulmonary embolism and as many as 25% of these patients will suffer from effects of chronic thrombotic syndrome by 20 yrs of development of DVT. Asymptomatic DVT is defined as DVT detected by screening with radionuclide scanning, fibrinogen scanning, ultrasound, or ascending venography. Symptomatic DVT (leg pain or swelling) results from occlusion of a major leg vein. It requires specific investigation and treatment. Symptomatic DVT in hospitalized patients may delay discharge, or require readmission to hospital. Pulmonary embolism, which in 90% of cases results from an asymptomatic DVT, may present as sudden death, breathlessness, faintness, collapse, or chest pain. Nonfatal PE in hospitalized patients may delay discharge, or require readmission to hospital. Deep venous thrombosis (DVT) is often overlooked as a major public health problem and viewed as a complication of hospitalization for another illness rather than as a specific entity. The potential public health benefit of preventing DVT is substantial: Data from randomized trials involving general surgical patients suggests that adequate prevention in high-risk patients can prevent VTE in 1 of 10 patients and save the life in 1 of 200 patients. There are many reports concerning individual prophylactic measures against asymptomatic deep vein thrombosis (DVT) after major surgeries, but little is known about asymptomatic DVT development during the administration of prophylaxis as per current guidelines and protocol in the Indian population.

Worldwide DVT prophylaxis is an accepted and integral part of perioperative management of surgical patients. Studies evaluating the true incidence of DVT in surgical patients pertaining to Indian subset of patients are few and far in between. There are a few studies to define incidence of asymptomatic and symptomatic DVT in an Indian subset of patients. Most studies from India have looked at specific patient groups like postoperative orthopedic patients and there is no data on the overall incidence of VTE in the general population. The prevailing belief that VTE in the Asian population is less than in the Western population has essentially been disproved and there appears no reason to believe that it should be any different in India.

Objective

The main objective of the study is, to find out the incidence of asymptomatic calf DVT in high risk postoperative patients who are on DVT prophylaxis as per our hospital protocol and to validate the efficacy of this protocol in preventing DVT in surgical patients.

Materials and Methods

This prospective observational study was carried out for a period of 2 years 11 months, from Jan 2018 to Dec 2020 at a tertiary centre for care of high-risk surgical patients and super speciality surgeries for other service institutions in Karnataka. All patients who have to undergo surgery are assessed for venous thromboembolism risk factor during pre op work up and scoring of these patients done as per risk assessment scoring system (Appendix-II). This risk stratification score is followed as per the Caprini risk stratification scoring system. Depending on the total risk factor score VTE risk stratification of these patients done to determine if preoperatively and postoperatively patients have asymptomatic DVT, a standard

duplex scan and a Tc99m MAA venography was carried out in preoperative High risk surgical patients picked up in a random fashion. Patients without DVT were given DVT prophylaxis peri operatively as per our Hospital Protocol (Appendix-III) and they were reevaluated within 25 h to 30th post op day for asymptomatic calf DVT by repeating duplex scan and Tc99m MAA venography.

Results

To calculate the incidence of asymptomatic calf vein DVT

Total number of patients evaluated in 24 months = 100.

Patients excluded due to pre op asymptomatic DVT = 1.

Patients in whom Post op evaluation could not be done due death in early post op period = 1.

Total number of patients detected to have asymptomatic calf vein DVT = 3.

Table 1: Gender distribution of patients studied

Gender	Number of PTS	%
Male	67	67
Female	33	33
Total	100	100

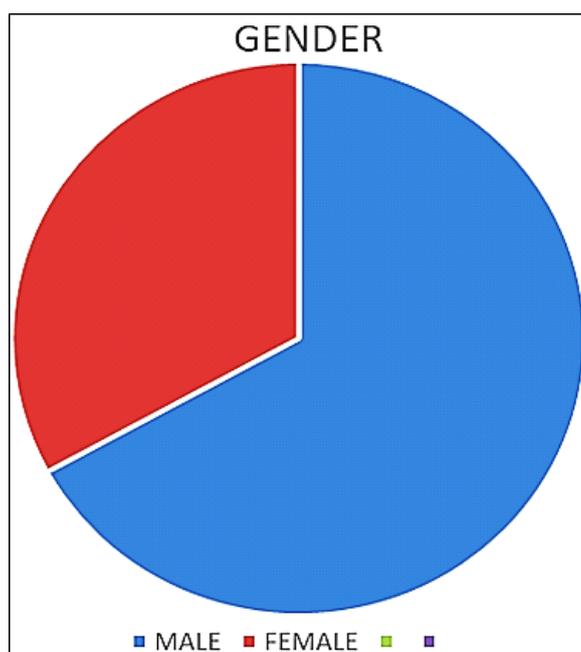


Fig 1

Discussion

Total 100 patients studied, of which 99 patients who underwent surgery in a tertiary center and were in a high-risk group with score 5 and above as per risk stratification score, during the study period of 24 months. Risk stratification was done as per venous thromboembolism risk factor assessment formulated by Modified Caprini Guidelines. It is well accepted that patients who undergo major surgical procedures are at increased risk for having DVT when compared with the average population. Unfortunately, the clinical identification of DVT is poor, and the diagnosis is missed in as many as two thirds of patients who have proximal DVT. Advances in ultrasound technology have allowed this method to essentially replace invasive studies and enable clinicians to accurately identify major venous thrombi. It is

important to identify what clinical criteria are appropriate to identify asymptomatic patients for screening to maximize our ability to identify DVT and to conserve resources. Many studies have examined risk factors associated with DVT and have identified the following factors: major surgery, prior DVT, age greater than 40 years, malignancy, obesity, multiple trauma, varicose veins, myocardial infarction, congestive heart failure, stroke, lower extremity fracture, hormone therapy, pregnancy, and immobility. Major surgery is classified as a procedure that requires greater than 30 minutes of general anesthesia. Orthopedic surgery is also associated with a particularly high rate of DVT, with more than 90% occurring on the operated side. Once DVT develops in a patient, there is a 10% risk of subsequent DVTs developing. For patients who have more than one DVT, the risk of recurrence increases to 20%, even in face of adequate anticoagulation. Age is related in an exponential fashion to the development of DVT; the risk of DVT doubles with each decade after 40 years of age. Malignancy imposes a twofold to threefold increased risk of DVT. Multiple trauma patients experience roughly a 47% incidence of DVT, with proximal DVT being identified in approximately 12%. Post op patients typically have many of the above risk factors, and adjunctive prophylaxis and screening may be expected to decrease the morbidity and mortality rate in these patients. Current recommendations regarding prophylaxis of patients are based on risk factor analysis. The importance of treating proximal DVT to prevent PE has been well documented. The importance of prophylaxis in the surgical population to decrease the incidence of DVT has also been well documented. Patients at moderate risk may be treated with low-dose heparin, graduated compression stockings, or intermittent compression devices. Combination therapy using heparin, dextran, or warfarin with intermittent compression devices is recommended for patients at high risk, those with at least three of the classically identified risk factors. Combining low-dose heparin with PCDs has recently been shown to offer a 62% risk reduction for PE in open heart patients over heparin prophylaxis alone. Ramos *et al.* studied 2786 patients who underwent open heart surgery by screening patients who had unexplained hypotension or dyspnea, and found a 4% incidence of PE in patients who underwent prophylaxis with low-dose heparin (of 5.24% screened) versus 1.5% (of 5.31% screened) in those who were treated with low-dose heparin plus PCDs. Despite appropriate prophylaxis with low-dose heparin therapy, in the general surgical population there is an 8% to 10% risk of developing DVT. This observation suggests that PCDs may be indicated in addition to giving pharmacologic therapy to increase the efficacy of prophylaxis. Current recommendations by the manufacturer for the placement of intermittent compression devices recommend placement only when no DVT is present. No statement is issued as to how this determination should be made. Admission. PCDs may be placed without screening in those individuals who do not have any of the above risk factors with minimal risk of missed proximal DVT. Mechanical Foot Pumps and Foot Impulse Technology the A-V impulse system foot pump has been developed to provide mechanical prophylaxis in patients who are unable to bear weight and has only been used in surgery. RCT data suggest efficacy in prevention of asymptomatic DVT, There is no evidence that these devices reduce symptomatic DVT or PE. Skin necrosis has been reported and discomfort from the device can lead to poor compliance. Antiplatelet agents (Aspirin). 1. Efficacy and Safety in Surgical Patients a meta-analysis of 53 RCTs of antiplatelet agents (usually aspirin) in prophylaxis of VTE in general or orthopedic surgery reported significant reductions in risks of asymptomatic DVT (26% vs. 35%), pulmonary embolism (0.6% vs. 1.6%) and fatal PE (0.2% vs. 0.6%); with a non-significant trend to lower mortality and a significant increase in major bleeding. Evidence level 1++ Unfractionated and low molecular weight heparins Unfractionated heparin (UFH) and several LMWHs (dalteparin, enoxaparin, reviparin and tinzaparin) are currently licensed in the UK for prophylaxis of VTE.

Conclusion

There is a significant 3% incidence of asymptomatic calf vein DVT in the high risk surgical patient with a risk stratification score of 5 and above, who were on VTE prophylaxis, in a tertiary center. This is comparable with the lowest incidence, which are available in literature. Hence, we recommend, screening tests for DVT should be applied widely in the high-risk surgical patients and hospital population. Every hospital needs to have a DVT prophylaxis protocol.

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