

A Study of Etiological And Clinical Profile with associated Risk Factors of Deep Vein Thrombosis Detected In A Hospital Based Setting And Review of Literature of This As An Emerging Health Problem In Hospitals

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Abstract: Introduction: Deep vein thrombosis (DVT) is one of the commonest thrombotic manifestations encountered in a hospital setting due to several causes. Method: This cross sectional, observational study was conducted in a tertiary care centre in Western India on 30 patients of proven deep vein thrombosis (DVT) to assess clinical profile, etiology and risk factors. Data was compiled in Epi info version 7 software for analysis. Results: The age group most commonly affected was 31-44 years (36.67%) with a male preponderance (80%). Most patients of DVT had Body Mass Index (BMI) 20-25(43.33%).The most common risk factor was immobilization (80%) out of which,50% patients were immobile due to coexisting medical problems and 30% due to fracture(13.3%) or other trauma(16.67%).Congestive cardiac failure (26.67%),diabetes with urosepsis who were in intensive care unit, one of whom had mechanical ventilation (20%)were the common medical morbidities. The remaining 20% had DVT due to mostly acquired and less commonly hereditary causes of hypercoagulability.83.33% patients had proximal DVT and the rest had distal DVT.13.33% patients had pulmonary embolism successfully treated. There were no deaths. Conclusion: In this study, as compared to others, younger economically productive age group with normal BMI or mild obesity is affected. The main risk factor is immobilisation due to medical comorbidities and traumatic injuries.

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Key Words: deep vein thrombosis,hospital,immobilisation,health problem

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Introduction: Venous thrombosis of deep veins accounts for more than half of venous thromboembolic events (VTE) and the average annual incidence of new deep vein thrombosis (DVT) ranged between approximately 48 per 100000 persons to 117 per 100000 persons in various studies. It is an emerging health problem in hospitalized patients. Relatively few studies have been done in Indian patients to assess risk factors of DVT and need for prophylaxis.^{1,2,3} Most important consequence of DVT is Pulmonary Embolism and chronic venous insufficiency.⁴ Frequent location of DVT is in lower limbs, and 10% of the DVT cases are idiopathic in origin.^{4,5} Stasis is the most important factor in the development of DVT. Risk factors of immobilisation promoting stasis are surgery, hospital or nursing home confinement, trauma, neurologic disease with paresis, varicose veins etc.⁶ In a hospital setting, immobilisation due to medical morbidities such as cerebrovascular accidents, congestive cardiac failure, intensive care admissions etc are the commonest and totally preventable causes of DVT.⁷ Hereditary conditions like Antithrombin III deficiency, Protein C and S deficiency are relatively rare. Acquired conditions of hypercoagulability are pregnancy, oral contraceptives, malignant neoplasm, chemotherapy central venous catheter or pacemaker.⁶

Prophylaxis and treatment of DVT requires a delicate balance between risk of pulmonary embolism and overt bleeding. A clinical mode is used to predict pretest probability for DVT, where high probability is a score of more than or equal to 3.⁸ that would help in deciding about treatment. The present work aimed to study demographic and anthropometric characteristics of patients of DVT, risk factors in hospitalised patients, the etiological and clinical profile and the associated complications of DVT.

Methods: This cross sectional, observational study was conducted in a teaching hospital over a period of one year. Institution ethics committee approval was taken before the start of the study. Written informed consent was taken from each patient. 30 consecutive patients above 18 years of age with proven DVT on peripheral venous Doppler ultrasound by Sonosite micromax portable machine with two transducers: linear 6-13 Hz and curvilinear 2 -5 Hz frequency were included from medical and surgical wards and intensive care units (ICU) .Cases of superficial thrombophlebitis, affection of only perforators or superficial veins on doppler were excluded. A complete history and physical examination was done. An exhaustive questionnaire was used. Age, sex, duration of hospital stay was recorded. History of

immobilization was taken in detail as to the causes, intensive care unit stay if any, duration and medications used. History of addictions such as smoking and alcohol was recorded. History of oral contraceptive use was taken and obstetric history was also recorded in detail. Family history of hypercoagulable disorders was taken. Examination included local examination of limbs with Homan’s and Moses signs being demonstrated and recorded and systemic examination. Routine investigations such as hemogram, hematocrit, blood indices, liver and renal function tests were done. Appropriate available investigations were done to find out associated risk factors when economically feasible, for example, homocysteine levels, protein C, S Antithrombin 3 and Antiphospholipid antibodies. A complication such as pulmonary embolism (PE) was diagnosed in presence of dyspnea, tachycardia, ECG changes and 2 D Echocardiography. All these patients of DVT were treated according to standard treatment guidelines with low molecular weight heparin and warfarin. Data in qualitative and quantitative form was compiled and analysed using Epi Info Version7 software and the mean and standard deviation were calculated. Percentages were calculated.

FIGURE 1 : SEX DISTRIBUTION

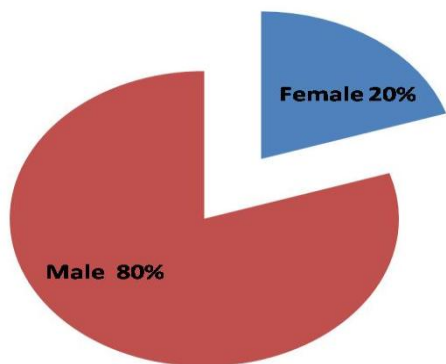


FIGURE 2 : AGE DISTRIBUTION

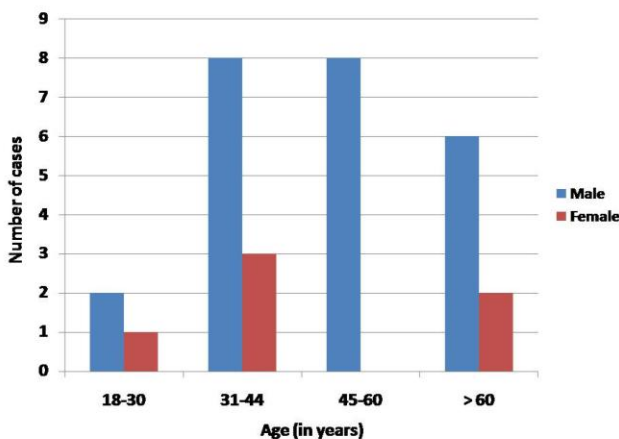


Table 1 : Body mass index in patients of DVT

Body mass index	Number of patients
<20	6(20%)
21-25	13(43.33%)
26-30	9(30%)
31-35	1(3.33%)
≥35	1(3.33%)

Table 2: Etiology of medical immobilisation as risk factor for DVT

Cause of medical immobilisation (15 patients)	Number of patients
Congestive cardiac failure (2 in intensive care)	4 (26.67%)
Neurological causes	4 (26.67%)
Diabetes with urosepsis (Intensive care)	3(20%)
Post partum	2(13.33%)
Chronic kidney disease due to diabetes	2(13.33%)
Total	15

FIGURE 3 : RISK FACTORS

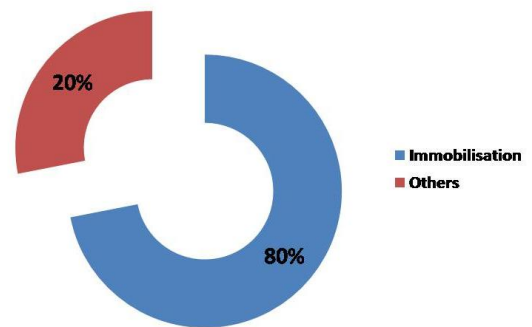
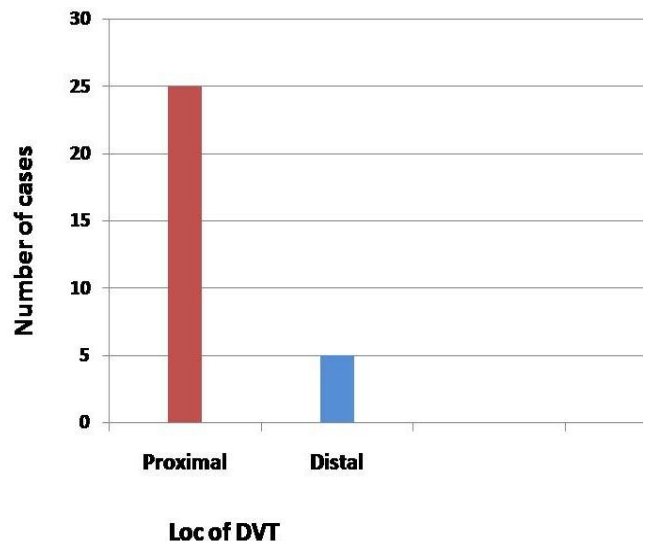


FIGURE 4 : LOC OF DEEP VEIN THROMBOSIS



Results: This study included 30 patients out of which 24(80%) were males and 6(20%) females(Figure 1).The age group (Figure 2)most commonly affected was 31-44 yrs-11 patients (36.67%) followed by 45-60 yrs-8patients (26.67%) and >60 yrs-8 patients (26.67%). Age group below 30 yrs was rarely involved (10%). The mean duration of hospital stay was 10 days. 12 patients (40%) were chronic smokers and 10 (33.33%) were chronic alcoholics. The BMI in most of our patients was 20-25:13 patients (43.3%), followed by BMI of 25-30 :9 patients(30%),<20 (20%),30-35(3.33%) and >35(3.33%). (Table 1)

In this study, the most common risk factor for DVT was immobilization: 24 patients (80%).Out of that, 15 patients (50%) were immobilized because of medical morbidityand 9patients (30%) due to fracture or trauma. Out of the 9 patients (30%) immobilized due to fracture or trauma, 4 patients (13.33%) had fracture femur and 5(16.67%) had trauma or injury to affected limb. The other 15 patients (50%) who were immobilised due to medical morbidity include congestive cardiac failure (4 patients 26.67%), diabetes with urosepsis who were in intensive care unit, one of whom had mechanical ventilation (3 patients 20%) post partum (2 patients 13.33%), chronic kidney disease due to diabetes (2 patients 13.33%), compressive myelopathy (2 patients 13.33%) and stroke (2 patients 13.33%). (Table 2) 6 patients (20%) had DVT due to causes other than immobilization, including malignancy:2 patients (6.67%) out of which, one had Ca prostate and other had seminoma testes.2 patients (6.67%) had raised homocysteine levels. 1 patient (3.33%) had family history of DVT(mother and brother), who was found to have antithrombin 3 deficiency.(Figure 3)

In this study, 96.33% patients had limb oedema whereas approximately 77% patients had Homan's sign and Mose's sign positive.

83.33% patients in this study had DVT involving above knee and only 16.67% patients had below knee veins involvement. (Figure 4)In this study,13.33% patients developed PE due to immobilization as the main precipitating cause. All patients recovered with anticoagulation. All the patients suffering from pulmonary embolism (PE) were having DVT involving above knee veins. Maximum number of patients with trauma or fracture had above knee (proximal DVT) whereas DVT involving below knee (distal) veins,

cause for immobilization was other than fracture or trauma.

Discussion: In present study,30 patients of age more than 18years were studied. The sex distribution shows a significant difference. There are 80%males and 20% females. The age group commonly affected was 31-44years (36.77%) followed by 45-60 years (26.67%) and >60 years (26.67%). Age group< 30 years was least commonly involved (10%). Hence the economically productive age group was commonly affected, which has grave social and community implications. Fowkes et al in 2003 stated that DVT occurred rarely below 20 years of age, but the incidence increased with age and over 70 years of age the rate was maximum. According to his study, DVT rates were same in men and women.⁹ However, most studies done in past have recorded a higher incidence in males than females.¹⁰In a large study in France in 2000,mean age was 66 years and women more affected than men. ¹¹

The mean duration of hospital stay in this study was 10 days. 5 patients were in intensive care unit (ICU). In the ENDORSE study, median length of hospital stay was 6 days.⁷ 12 patients (40%) were chronic smokers and 10 (33.33%) were chronic alcoholics. In a study done by Sharma SK et al, out of 163 patients, 34 % patients were chronic smokers and 18% were alcoholics.¹²

In present study, most commonly involved group is with BMI 21-25 (43.33%), followed by patients with BMI 26-30(30%). Samama et al studied the risk factors for DVT and found that approximately 66% of patients with DVT had BMI of >30.¹⁰In a study done by Oren E et al, maximum patients of DVT were in the normal or mild obesity range of BMI (21-30), a finding which is similar to present study.¹³ Obesity is considered to be a moderate risk factor for developing DVT.^{10,13} In present study, most common risk factor was immobilization-24 patients (80%). Out of that, 15 patients (50%) were immobilized because of coexisting medical illnesses and 9 patients (30%) were immobilised due to trauma or fracture. 6 patients (20%) had DVT due to causes other than immobilization and include malignancy, raised homocysteine levels and antithrombin 3 deficiency. So, medical morbidity was a commoner cause of immobilisation in the hospital setting, even though the patients were taken unbiased from both medical and surgical wards. In the ENDORSE study done by

Pinjala R et al, chronic pulmonary disease/ heart failure and complete immobilization were the most common risk factors before and during hospitalization.⁷ In a study by Heit et al, neurological disease formed a significant cause for immobilisation causing DVT.⁶ In a study done by Kaeron et al, it was found that immobilization was a significant risk factor for DVT and approximately 70% patients in study had history of immobilization, out of which medical morbidities formed a large chunk.¹⁰ Similar results were found in studies done by Fowkes et al and Samama et al.^{9,11}

In present study, 96.33% patients had limb oedema whereas 77% patients had Homan s and Moses signs positive. In a study done by Asbeutah et al in 2004, similar results were found in patients with DVT. But in that study, only clinical signs should not be considered in diagnosis of DVT and investigatory evidence should support the diagnosis.¹⁴ In a study by Kazmers-Meeker in 1999, clinical signs were in almost all patients but investigations should support diagnosis.¹⁵

In present study,83.33% patients had DVT involving above knee and only 16.67% had below knee vein involvement .In a study done by Ulka Sachdev et al in 2006,DVT was found more commonly in below knee (23%) as compared to above knee (4%).¹⁶ In this study, all patients suffering from PE were having DVT in above knee veins and similar results were found in various other studies with DVT and PE.¹⁷ Previous studies have demonstrated higher incidence of below knee DVT than above knee in symptomatic and high risk patients.¹⁸

The propensity of below knee DVT to propogate to proximal veins warrants formal anticoagulation.^{10, 19, 20} as reported by Lagerstebt et al in 1985, formal anticoagulation has been found to decrease risk of PE in patients with below knee DVT from 29% to 0%.²⁰

In present study, we found that maximum number of patients with trauma or fracture had above knee (Proximal) DVT whereas in DVT involving below knee (distal) veins, the cause for immobilization was other than fracture or trauma. Kohn H et al stated that incidence of PE was 46% in patients with DVT confined to calf (distal), but increased to 67% if thigh(proximal) and to 77% if pelvic veins (proximal) were involved as well.²¹

In present study, 4 patients (13.33%) developed PE due to immobilization because of various reasons. All patients recovered after anticoagulation.

In a study done by Kohn H et al in 1987,they studied 169 patients with suspected DVT.DVT was detected in 62%.Incidence of PE was 57% of the patients with confirmed DVT.²¹

Hence we can conclude that in this study, a younger age group which is economically productive, and male sex were involved. This has huge social and community heakth implications as main bread winners of a family were affected. Patients with normal BMI and mild obesity were affected, showing that in Indian population, obesity only may have small contribution. The main risk factor was immobilisation due to medical comorbidities and lesser due to traumatic injuries. Very few were due to other causes such as malignancies or hereditary disorders. Hence in hospitalised patients, DVT is emerging as a major health problem and should be anticipated according to an elaborate list of risk factors. High index of suspicion should be kept and prophylaxis given for the same.

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