

A Prospective Study of Clinical Profile, Predisposing Factors and Management of Deep Venous Thrombosis

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ABSTRACT

Introduction: Deep venous thrombosis (DVT) of lower limbs is one of the most common cause for the majority of deaths caused by pulmonary embolism. Deep vein thrombosis is the formation of blood clots in the deep veins which commonly affects the leg veins such as the calf veins, femoral vein, or popliteal vein or veins of the pelvis. The aim of the study was to evaluate clinical profile of patients in form of age, sex, etiological factors of deep venous thrombosis in our institute. Also study risk the factors in patients of deep venous thrombosis.

Material and Methods: Study was a prospective study which was conducted on 108 symptomatic patients of deep vein thrombosis which were proved by colour doppler ultrasonography. All patients who were more than 18 years of age and either sex were taken into study.

Results: In our study 37.03% of the patients were males and 62.97% were females with majority belonging to 21-30 years of age group (33.82%). In this study the youngest patient was 20 years old female and the oldest patient was 96 years old female. Male: Female ratio was 1:1.7. The least common age group affected is extreme of age i.e. ≥ 20 years and > 60 years of age in both sexes. The most common limb affected is left lower limb 62 patients (57.40) and right limb involvement is seen in 39.81% of patients. Bilateral lower limb DVT is present in two patients and one patient was upper limb DVT. Predisposing factors associated with thrombosis in deep veins maximally seen in 46 patients in 42.59% due to unknown cause. Pregnancy and post-partum was the second most common predisposing factor associated with DVT which is seen in 33 patients in 30.55%. Thrombosis due to orthopaedic trauma is seen eight patients only. Chronic illness and malignancy was present in 19.44% of patients.

Conclusion: It is very important for accurate diagnosis of DVT to prevent potentially fatal complications like pulmonary embolism (PE) and pulmonary hypertension. Also it is very important to avoid anticoagulants therapy with associated risk of bleeding in patients of misdiagnosed and negative colour doppler findings. Because clinical features are nonspecific; hence new strategies were evolved for diagnosing this condition.

Keywords: Deep Vein Thrombosis, Pulmonary Embolism, Venous Thromboembolism, Prophylaxis, Treatment, Immobilisation, Anticoagulants

annually.² and in South Asia it is 4-75 per 1,00,000 in general population,³ Regarding the exact incidence of DVT in India is not well known because literature survey shows scanty works in this field and that is mostly from the orthopaedic departments, that's why overall incidence in general population of DVT is largely not known.^{4,5} 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.⁶ Vessel endothelium injury causes sluggish blood flow, which promotes blood clot formation.⁷ and reduces venous blood flow, or in severe cases can induce pulmonary embolism (PE) as the thrombi move from the deep veins to the lungs via the vasculature. Since PE can be fatal in certain circumstances, early diagnosis of DVT and subsequent adequate treatment with anticoagulants is of great clinical significance.⁸ This was a prospective study to document the patient profile of DVT, study the effectiveness and safety of treatment modalities at our centre. However, because the clinical manifestations of DVT are unspecific, and it can be asymptomatic, early diagnosis is clinically challenging.

MATERIAL AND METHODS

This was a prospective study which was conducted in our institute over a period of one and half year from January 2018 to May 2019.

We studied 108 patients above 20 years of age with proven deep venous thrombosis by Doppler ultrasound. All patients had been admitted through accident and emergency in general surgical ward of proven DVT. A complete clinical history was taken to assess risk factors, Level of Immobility if present and through physical examination was done. Routine investigations such as hemogram, haematocrit, blood indices, liver and renal function tests were done. All these patients of DVT were treated according to standard

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INTRODUCTION

Venous thrombosis commonly manifests in the lower limbs, although it may occur in other veins also, like veins of the arm, retina, mesentery and cerebral sinus.¹ Its incidence in the western societies has been reported 80-100 per 1,00,000

Male	40	37.03%
Female	68	62.97%
Total	108	100%
Ratio=M:F	1:1.7	

Table-1: sex wise distribution of patients with % age of (n=108)

Male			Female			Total	% Age
≥ 20	1	2.5%	≥ 20	4	5.88%	5	4.66
21-30	12	30%	21-30	23	33.82%	35	32.40
31-40	9	22.5%	31-40	10	14.70%	19	17.59
41-50	6	15%	41-50	13	19.11%	19	17.59
51-60	7	17.5%	51-60	11	16.17%	18	16.66
> 60	5	12.5%	> 60	7	10.19%	12	11.11
Total	40	100%		68	100	108	100

Table-2: Age wise distribution of patients (n=108)

Site	Number	% Age
Right	43	39.81
Left	62	57.40
Bilateral	2	01.85
Upper limb	1	00.92
Total	108	100

Table-3: Site of distribution of DVT

Factor	Number	% Age
Pregnancy and post partum	33	30.55
Ch. Illness including malignancy	21	19.44
Orthopaedic trauma	08	07.14
Unknown causes	46	42.59
Total	108	100

Table-4: predisposing factors associated with dvt

treatment guidelines with low molecular weight heparin and simultaneously with tablet warfarin with monitoring of PT-INR (Prothrombin Time and International Normalised Ratio). Ambulation, as tolerated, was advised along with elastic compression stockings. The patients were examined daily in ward and clinical features recorded regularly. Systemic antibiotics, analgesics along with limb elevation were advised in treatment.

Inclusion criteria: Patients above 20 years of age with proven deep venous thrombosis

Exclusion criteria: Patients who were excluded from study: Colour Doppler did not confirm DVT, patients receiving anticoagulant therapy and those with superficial thrombophlebitis.

RESULTS

In the present study which was conducted between period January 2018 to May 2019 includes 108 patients. There were forty males (40) patients and sixty eight(68) female patients in the percentage of 37.03% and 62.97% respectively as shown in table 1.

In our study the youngest patient was 20 years old female and the oldest patient was 96 years old female. In our study Male: Female ratio was 1:1.7

The maximum number of patients were 12 (30%) of male in the age group of 21-30 years and in females 23(33.82%) in the same age group making the most common age group in both sexes i.e.32.40%. The least common age group affected is extreme of age i.e. ≥ 20 years and > 60 years of age in both sexes as shown in table 2.

The most common limb affected is left lower limb 62 patients (57.40) and right limb involvement is seen in 39.81% of patients. Bilateral lower limb DVT is present in two patients and one patient was upper limb DVT as shown in table 3.

In the present study, thrombosis in deep veins maximally seen in 46 patients in 42.59% due to unknown cause. Pregnancy and post-partum was the second most common predisposing factor associated with DVT which is seen in 33 patients in 30.55%. Thrombosis due to orthopaedic trauma is seen eight patients only as per table 4. Chronic illness and malignancy was present in 19.44% of patients.

DISCUSSION

There are three conditions that predispose to venous thrombus, also known as Virchow's triad. The triad includes injury to endothelium, stasis of blood, and hypercoagulability. The stasis of blood and endothelial injury are very important in development of DVT following accidental or surgical trauma while maximum cases of spontaneous deep venous thrombosis are due to hypercoagulability. At least one risk factor is always present in more than 96% of patients of venous thrombosis.⁹ The risk of deep venous thrombosis in life is about 3.1% and its prevalence is higher in women (3.5%) as compared to men (2.4%) also still higher in older population.¹⁰

We studied 108 patients who were having clinical sign symptoms of DVT admitted after confirmation of thrombosis in deep vein by colour doppler ultrasonography. All patients were treated with low molecular weight heparin after the baseline investigations. The low molecular weight heparin was given subcutaneously for a minimum period of five to seven days and oral anticoagulant was started immediately. In a study done by Brandjes et al the initial therapy for treatment of DVT must involve either unfractionated heparin or low molecular weight (LMW) heparin and the only therapy of oral

anticoagulant is not acceptable as Initial treatment of DVT.¹¹ Due to easy administration and efficacy of LMW heparin make it the preferred anticoagulant, whether given on an inpatient or outpatient basis. In a meta-analysis done by Van Dongen et al comparing the effectiveness of LMW heparin with unfractionated heparin at an adjusted dose, significantly very few deaths, recurrent venous thromboembolism and major haemorrhage occurred with the LMW heparin.¹² The current standard of care to administer LMW heparin as initial treatment on once daily basis for 5–7 days. Whether to administer LMW heparin once or twice daily It remains unknown phenomenon.¹³

Our study included patients of age group between 20 years to 96 years. The sex distribution in our study shows a significant difference. Out of 108 patients, 40 were male (37.03%) and 68 were female (62.97%). Male : Female ratio is 1: 1.7. The age group commonly affected was 21-30 years (32.40%) followed by 31-40 and 40-50 years (17.59%) each. Age group >60 years was least commonly involved (11.11%). Hence the economically productive age group was commonly affected, which has grave social and community implications. Fowkes et al in 2003 stated that below 20 years of age was less commonly involved, but the increased incidence with age. Also he studied the incidence of DVT in men and women remains equal.¹⁴ This study differ from our study which has higher incidence in females. However studies done in past have recorded a higher incidence in males than females.¹⁵ In a similar large study done in France in 2000, women were more commonly affected than men.¹⁶ The study done by Silverstein et al, venous thrombosis was known to be associated with male preponderance (M: F = 1.2:1).¹⁷ The sex distribution of patients in our study was in accordance with this trend of major different studies. In our study, among the established risk factors, pregnancy and puerperium was present in 30.55 0%, orthopaedic trauma in 7.14 0%, chronic illness and malignancy was present in 19.44% patients and majority of patients were DVT of unknow cause which is 42.59%. Different studies done in the past shows some variations in the risk factors. Alikhan R et al, studied malignancy and immobilization were associated with increased risk of venous thrombosis.¹⁸ This finding correlated with the findings of our study.

The incidence of DVT is expected to be increased by certain acquired or genetic risk factors.¹⁹ The most commonly are: (a) Age. The DVT incidence increases with age, and it is very rare during childhood.²⁰ (b) Orthopaedics Surgery. in major orthopaedic surgery or with lower limb fractures, DVT is more common. thrombosis In these patients, suggested to be associated with injury of vascular wall, immobility, and activated coagulation pathways.²¹

(c) Trauma. higher Incidence of DVT is seen in patients with lower extremity fractures compared to those with trauma at other sites, such as the abdomen, face or thorax. DVT in trauma patients may be complicated, for example by the presence of early coagulopathy which may confound subsequent anticoagulation therapy.²² (d) Cancer. Incidence of DVT is higher in patients with cancer, and the precise

incidence of DVT varies according to the biological characteristics of the tumor. Moreover, patients undergoing active treatment for cancer, such as chemotherapy, have been associated with increased risk for DVT, perhaps due to inhibition of the plasma activities of protein C and S.^{23,24}

(e) Other factors like, Immobility, surgery, hospitalization, pregnancy and puerperium, hormonal therapy, obesity, inherited and acquired hypercoagulable states, anaesthesia, myocardial infarction, past history of DVT, varicose veins, infections, inflammatory bowel disease, and renal impairment are common risk factors for development of DVT.^{25,26} 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.¹⁵ The diagnosis of DVT is often not suspected clinically, and there is a possibility of underdiagnosis. Therefore, venous compression ultrasonography was performed for all patients irrespective of the clinical suspicion. Doppler analysis has emerged as a sensitive and accurate non-invasive test for confirming the presence of acute DVT.²⁷

In our study we found one case of upper limb thrombosis. In a study done by Bernardi et al, upper-extremity DVTs can be subdivided into catheter- and non-catheter-related thrombosis. There is a risk of pulmonary embolism with this condition, and therefore treatment with anticoagulation therapy is generally recommended.²⁸

In our study 105 (97.21%) cases showed unilateral lower limb involvement by dvt, whereas two (1.85%) cases showed bilateral lower limb involvement. Maximum patients 62(57.40) having left limb involvement and right limb involvement is seen in 43 (39.81%) of patients. No case with unilateral symptom had bilateral involvement. Also no case with bilateral symptoms had unilateral involvement in our study. This correlated well with the study conducted by Sheiman and McArdle²⁹ in 1995 who in their study indicated a low incidence of thrombosis in contralateral extremity. This correlated well with the venographic study conducted by Stamatakis et al³⁰ who found out that major thrombi occurred more frequently in left lower limb.

Fewer than the third patients among those having symptoms in the lower extremities present with the classic syndrome of oedema, calf discomfort, venous distension and pain on forced dorsiflexion of the foot (Homan's sign). Thus to prevent the complications and sequelae, there is a need to confirm the cases of DVT by ultrasonography. The diagnosis and treatment of DVT has remarkably been altered after the introduction of Doppler ultrasound (USG). It can even be used in pregnant women, safe, painless and not expensive an also easily available. It is also non-invasive and can be repeatedly used, performed even in the clinic, bedside or even at home and the results are easily available immediately.³¹

CONCLUSION

Deep Venous Thrombosis is a very serious and life threatening medical condition that can causes severe morbidity and mortality and this condition can be prevented if timely

intervention is done. It presents a challenge to physicians in form of its diagnosis, predisposing risk-factor, D-dimer examination, and venous ultrasonography can facilitate to identify a case of DVT. The ultimate aim of treatment of DVT is to prevent further extension of thrombus from deep veins, development of acute PE, recurrence and prevention of later complications such as pulmonary hypertension and post-thrombotic syndrome. So high index of suspicion should be kept in patients even if classical clinical signs are not present and prophylactic treatment should be given to these patients.

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