

An Observational Clinical Study of Deep Venous Thrombosis Patients at Tertiary Care Center of Central India

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Abstract

Introduction: Considering day to day life style modifications and increased hospital stays deep venous thrombosis (DVT) has become an undercover mortal disease complicating too many diseases and syndromes and finally death. To avoid such complications early diagnosis and treatment of DVT is the need of time

Materials and Methods: In present hospital based prospective observational study a total of 97 patients were primarily considered amongst which 7 were either drop outs or not full filing inclusion criteria hence a final of 90 patients were considered after their written and informed consent. The study comments about patients coming to tertiary care center of central India from a period from May 2021 to May 2022. Diagnosis of the patients were primarily made on their clinical presentations followed by Radiological investigation. Routine pathological, biochemistry and microbiology lab investigations were performed wherever and whenever required.

Results: Considering the demographic data mean age of patient was 52.8 with majority of cases belonging to 6th decade of their life. Present study showed male dominance and including smoking to be the most common risk factor amongst 45.5% with 82% having Homan's test of the population under study. Nearly 54% of the patients were having oedema and commonest vessel to be affected was superficial femoral vein. While majority of the patients were having acute features of the disease and got relieved after appropriate treatment showing better results of complete recanalization after six weeks.

Conclusion: The well-known direct risk factors for deep vein thrombosis were immobilization, and smoking. Patient need to have regular follow up to evaluate the recanalization. Patient needs to be highly motivated and educated regarding need to regular oral medication. Regular checkup of high-risk patients, early detection and prompt treatment of the disease can reduce chances of complication and enhance complete recovery of the patients.

Keywords: Deep vein thrombosis (DVT), Homan's test, Recanalization.

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Introduction

Considering day to day life style modifications and increased hospital stays deep venous thrombosis (DVT) has become an undercover mortal disease complicating too many diseases and syndromes and finally death. To avoid such complications early diagnosis and treatment of DVT is the need of time [1]. The incidence of DVT differs in different parts of the country and are not completely unstated. In general population the incidence stood up to 67 amongst 100 000 population. [2]

In cases of venous thromboembolism (VTE) nearly 2/3rd of cases are found to be of deep venous thrombosis (DVT) where age and sex adjusted venous thromboembolism incidence rate for adult people is 149 per 100,000. The overall age-adjusted incidence rate is higher for men (130 per 100,000) than women [3, 4].

The common risk factors for DVT comprise of increasing patient age and body mass index (BMI), prior superficial vein thrombosis, chronic renal disease, neurological disease with extremity paresis, fracture and immobility, and possibly infection. [5, 6]

The annual venous thromboembolism incidence is five-fold higher among postpartum compared to pregnant women (511.2 versus 95.8 per 100,000). [7]

Other conditions associated with venous thromboembolism include heparin-induced thrombocytopenia, myeloproliferative disorders (especially polycythemia rubra vera and primary thrombocythemia), intravascular coagulation and fibrinolysis/disseminated intravascular coagulation (ICF/DIC), nephrotic syndrome, paroxysmal nocturnal hemoglobinuria, thromboangiitis obliterans (Buerger's disease), thrombotic thrombocytopenic purpura, Behcet's syndrome, systemic lupus erythematosus, inflammatory bowel disease, Wegener's granulomatosis, homocystinuria, and possibly hyperhomocysteinemia. [8] Low

molecular weight heparin has been approved for the prevention and treatment of venous thromboembolism in pregnancy. These drugs do not cross the placenta and large case series suggest they may be both effective and safe.[9]

DVT occurs along a scale with dissemination, extension and advancement. Perhaps because DVT do not totally obstruct the vein in initial stages and also due to existence of collateral circulation, but commonly these creations are silent at the origin. Very less patients than one third amongst those having symptoms in the lower extremities show classic syndrome of edema, calf distress, venous engorgement and pain on involuntary dorsiflexion of the foot (Homan's sign). [10]

Thus, present study was carried for early detection of the disease and to observe clinical features of DVT which may be a steppingstone in overcoming disease and its complications.

Material and Methods:

In present hospital based prospective observational study a total of 97 patients were primarily considered amongst which 7 were either drop outs or not full filing inclusion criteria hence a final of 90 patients were considered for the study after their written and informed consent. The study comments about patients coming to tertiary care center of Bhopal city of central India for a period from May 2021 to May 2022.

Diagnosis of the patients were primarily made on their clinical presentations followed by Radiological investigation like ultra-sonography, Color Doppler, Computerized Tomography –angiography (CT- angio) or Magnetic Resonance angiography (MR- angio). Routine pathological, biochemistry and microbiology lab investigations were performed wherever and whenever required.

After confirming diagnosis of the patient's conventional treatment was given to the patients in form of surgical and medical treatments as required. Reinvestigations or follow up of the patients was done after 6 weeks of onset of treatment to observe response from the patients.

Inclusion Criteria: Patients with radiographically diagnosed deep venous thrombosis, above 18 years of age.

Exclusion Criteria: Age below 18 years or patient not willing to participate in study at any point of time during the study.

Statistical analysis will be done by using Graph pad prism 8 and Microsoft excel 2013. Appropriate statistical tests will be applied wherever required.

Results:

Considering the demographical data of the patients following observations were made. While considering the age of the patients maximum patients were in the age group of late 50's suggesting about the disease to occur in older vessels as depicted in table 1

Table 1: Age distribution of patients.

Age in years	Number of patients	Percentage
18-29	13	14.4
30-39	18	20.0
40-49	18	20.0
50-59	26	28.8
60-69	11	12.2
70-80	4	4.4
Total	90	100

Considering the gender distribution DVT was found to be more prominent amongst male patients 63.3% as depicted in Table.2

Table 2: Gender distribution of patients studied

Gender	Number of patients	Percentage
Male	57	63.3
Female	33	36.7

There are various risk factors for DVT like smoking, cancer, use of oral contraceptive pills, pregnancy, trauma and long stay hospitalization details of distribution of patients is depicted in table 3 as:

Table 3: Risk factors of DVT

Risk factor	Number of patients	Percentage
Smoking	41	45.5
Hypertension	7	7.7
Diabetes Mellitus	4	4.4
Stroke	5	5.5
IHD (ischemic heart disease)	3	3.3
Immobilization	21	23.3
Malignancy	5	5.5
Use of oral contraceptive pills / hormone replacement therapy	3	3.3
Trauma	1	1.1
Total	90	100

Most common risk factor amongst the study population was found to be smokers (45.5%) followed by immobilization of hospitalized patients or longer stay of patients in ICU in nearly 23.3% patients. Rest of the risk factors contribute very less for DVT.

Amongst the total female patients nearly 9 (27%) of female patients were either pregnant or were having history of puerperium whose details are depicted in table 4:

Table 4: History of pregnancy or puerperium.

History of pregnancy or puerperium	Number of patients (n=33)	Percentage
Present	9	27.3
Absent	24	72.7

Considering sign and symptoms shown by the patients majority of the patients were having edema nearly 54% followed by accompanying pain in nearly 27% of the patients; details of which are depicted in Table 5

Table 5: Sign and symptoms presented by deep venous thrombosis patients

Sign and symptoms	Number of patients	Percentage
Oedema	49	54.4
Pain and oedema	25	27.7
Previous history of DVT	8	8.8
Pain	5	5.5
Pulmonary embolism	3	3.3
Total	90	100

While considering the location of DVT majority of the cases were having origin of the disease at superficial femoral vein followed by common femoral vein and least was found in peroneal vein as depicted in table 6;

Table 6: Sites for DVT.

Site for DVT	Number of patients	Percentage
Common femoral vein	28	31.1
Superficial femoral vein	36	40
Posterior tibial vein	6	6.7
Anterior tibial vein	4	4.4
Popliteal vein	6	6.7
Peroneal vein	1	1.1
External iliac vein	4	4.4
Common iliac vein	4	4.4
Superficial venous system	2	2.2

Considering the Homan's sign majority of the patients were having a positive sign which sum up to be 74 patients of the total 90 cases. Details of which are depicted in Table 7

Table 7: Homan's sign

Homan's test	Number of patients	Percentage
Positive	74	82.2
Negative	16	18.8

While considering the onset or finding of the disease maximum number of patients were found to have acute onset of the disease followed by sub-acute onset details of which are depicted in table. 8

Table 8: Stage of disease in presentation of the patients.

Stage of disease	Number of cases	Percentage
Acute	47	52.2
Sub-acute	29	32.2
Chronic	14	15.5

After conventional treatment a follow up of the patients was done after 6 weeks and results showed that maximum number of patients were relieved from sign and symptoms which they were having with very less number landing in to complications. Details of which are depicted in table 9.

Table 9: Follow up of the cases under consideration.

Resolution of clinical signs	Number of patients	Percentage
Resolved	73	81.1
Not resolved	11	12.2
Complicated	6	6.7

Out of the total complicated maximum patients 3 patients were having ulcers and rest were having varicose veins and pulmonary embolism though only one patient was succumbed during study tenure and was also having many comorbidities. Details of complication is illustrated in table 10.

Table 10: Complication of DVT.

Complication	Number of patients (n=90)	Percentage
Ulcer	3	3.3
Varicose vein	2	2.2
Pulmonary embolism	0	0
Death	1	1.1

When color Doppler of the patients was done at the time of follow up majority of patients showed recanalization of the veins whose details are depicted in table 11.

Table 11: Color Doppler finding of the follow up patients.

Color Doppler	Number of patients	Percentage
Complete recanalization	71	78.8
Partial recanalization	13	14.4
No recanalization	6	6.6

Discussion:

In present hospital based observational prospective study a sum of 90 patients were involved after confirming the diagnosis clinically and radiologically.

Our study included patients of age group between 22 years to 79 years with average age of 52.8 ± 1.6 years similar age groups and statistical results were found by Silverstein et al, the mean age group of patients with Deep Vein Thrombosis was 51 years.²

Considering the gender distribution of the study population 57(63.3%) were males with 1: 0.57 gender ratio amongst the study population. Similar results were observed by Kasabe P identifying male preponderance amongst the affected cases. Finding could also be a mile stone in screening male patients on a larger scale for early detection and treatment of the disease which may also be suggestive of reduction in smoking by the males who are at higher risk of the disease. [11]

In our study, among the established risk factors, pregnancy or puerperium was present in 27.3%, history of immobilization was present in 23.3%, and history of smoking in maximum 45.5% of the patients. In the study done by Alikhan R et al, malignancy and immobilization were associated with increased risk of the disease . [6]

The majority of the patients in present study had edema as the most common presenting symptom which constituted 54.4% of all the patients, followed by pain and edema 27.7%, pain 5.5% and PE 3.3%. This correlates well with the study conducted by Glover-Bendick[12] and Ezeet al. [13] in which 25 patients with unilateral leg swelling were found to have DVT. In their study, only 5% of patients were found to have DVT in absence of leg swelling. This is well explained by the normal venous physiology that when major venous channels get obstructed, there is subsequent surge in venous pressure and volume which establishes edema. This also associates with the study directed by Langsfeld et al. [14] who established edema as the most common sign in patients detected with DVT.

Thus the present study localized thrombus predominantly in the superficial femoral vein (40%) followed by common femoral vein (31.1%) of the patients were seen findings of present study were correlated by Markel *et al.* and Khaladkar SM. [15, 16]

The predominant stage of DVT in the cases showing evidence for thrombosis was that of the acute stage seen in 47 cases (52.2%) as compared to the sub-acute stage of involvement seen in 29 cases (32.2%) and chronic stage seen in 14 cases (15.5%) in this study. These findings corroborate well with study led by Hill et al. who found that the positivity rate for acute DVT was 17.4%. [17]

While in present study nearly 81.8% patients who received the treatment were having relief from symptoms while only

6.7% landed in the complications of which majority of the patients were having ulcers. Similar Lewis TC also suggested to identify and treat patients at an earlier stage so that complications can be prevented. [18]

This finding correlated with the findings of our study. On successive follow up of these patients, 71 patients (78.8%) showed complete recanalization on venous color Doppler, while 6 patients (6.6%) showed no recanalization and 1 patient died during treatment and due to other comorbidities. In a study done by Piat PK et al majority if the patients were reanalyzed completely after an early treatment. [19,20]

Conclusion:

The well-known direct risk factors for deep vein thrombosis were immobilization, and smoking. Patient need to have regular follow up to evaluate the recanalization. Patient needs to be highly motivated and educated regarding need to regular oral medication. Regular checkup of high risk patients, early detection and prompt treatment of the disease can reduce chances of complication and enhance complete recovery of the patients.

References:

1. Prandoni P, Lensing AWA, CogoA, et al. The long-term clinical course of acute deep venous thrombosis. *Ann Intern Med.* 1996;125(1):1-7.
2. Silverstein MD, Heit JA, Mohr DN, Petterson TM, O'Fallon WM, Melton LJ III. Trends in the incidence of deep vein thrombosis and pulmonary embolism: a 25-year population-based study. *Arch Intern Med.* 1998;158(6):585-593.
3. White RH. The epidemiology of venous thromboembolism. *Circulation* 2003;107(23 Suppl 1):I4-I8.
4. Raskob GE, Angchaisuksiri P, Blanco AN, Buller H, Gallus A, Hunt BJ, Hylek EM, Kakkar A, Konstantinides SV, McCumber M, Ozaki Y, Wendelboe A, Weitz JI. Day ISCFWT. Thrombosis: a major contributor to

- global disease burden. *Arterioscler Thromb Vasc Biol* 2014; 34:2363–2371.
5. Heit JA, Petterson TM, Bailey KR, Melton LJ III. Risk factors for venous thromboembolism among patients hospitalized for acute medical illness: A population-based case-control study, *J Thromb Haemost.* 2005. 3(8): 1611.
 6. Alikhan R, Cohen AT, Combe S, Samama MM, Desjardins L, Eldor A et al. Risk factors for venous thromboembolism in hospitalized patients with acute medical illness, *Arch Intern Med.* 2004. 164: 963-968.
 7. James AH, Jamison MG, Brancazio LR, Myers ER. Venous thromboembolism during pregnancy and the postpartum period: incidence, risk factors, and mortality. *Am J Obstet Gynecol* 2006; 194:1311.
 8. Anand SS, Yusuf S, Pogue J, Ginsberg JS, Hirsh J. Relationship of activated partial thromboplastin time to coronary events and bleeding in patients with acute coronary syndromes who receive heparin, *Circulation.* 2003. 107(23): 2884-2888
 9. Hirsh J et al Heparin and Low-Molecular-Weight Heparin Mechanisms of Action, Pharmacokinetics, Dosing, Monitoring, Efficacy, and Safety *Chest.* 2001; 119:64-94.
 10. Hill SL, Holtzman GI, Martin D, Evans P, Toler W, Goad K. Selective use of the duplex scan in diagnosis of deep venous thrombosis. *Am J Surg* 1995;170:201-5.
 11. Kasabe P S, Jaykar R D, Lakhpatre S B. A study of clinical profile of 50 patients with deep venous thrombosis at general hospital. *Medpulse – International Medical Journal* October 2014; 1(10): 676-680
 12. Glover JL, Bendick PJ. Appropriate indications for venous duplex ultrasonographic examinations. *Surgery* 1996;120:725-30.
 13. Eze AR, Comerota AJ, Kerr RP, Harada RN, Domeracki F. Is venous duplex imaging an appropriate initial screening test for patients with suspected pulmonary embolism? *Ann VascSurg* 1996;10:220-3.
 14. Langsfeld M, Hershey FB, Thorpe L, Auer AI, Binnington HB, Hurley JJ, et al. Duplex B-mode imaging for the diagnosis of deep venous thrombosis. *Arch Surg* 1987;122:587-91.
 15. Markel A, Manzo RA, Bergelin RO, Strandness DE Jr. Pattern and distribution of thrombi in acute venous thrombosis. *Arch Surg* 1992;127:305-9.
 16. Khaladkar SM, Thakkar DK, Shinde K, Thakkar DK, Shrotri H, Kulkarni VM. Deep vein thrombosis of the lower limbs: A retrospective analysis of doppler ultrasound findings. *Med J DY P U.* 2014;7:612-19
 17. Hill SL, Holtzman GI, Martin D, Evans P, Toler W, Goad K. The origin of lower extremity deep vein thrombi in acute venous thrombosis. *Am J Surg* 1997;173:485-90.
 18. Lewis TC, Cortes J, Altshuler D, Papadopoulos J. Venous Thromboembolism Prophylaxis: A Narrative Review with a Focus on the High-Risk Critically Ill Patient. *J Intensive Care Med.* 2019 Nov-Dec;34(11-12):877-888
 19. Darmal, D. I., Khan, A., Ahmad, D. S., & Gowani, A. Frequency of Type II Diabetes Mellitus in ST Segment Elevated MI patients presented to French Medical Institute for Mothers and Children: A Cross Section Study. *Journal of Medical Research and Health Sciences,* 2022:5(6), 2023–2038.
 20. Piat PK, Peres AK, Andrade DO, Jorge MA, Toregeani JF. Analysis of recanalization of deep venous thrombosis: a comparative study of patients treated with warfarin vs. rivaroxaban. *J Vasc Bras.* 2019;18:e20180111.