



Clinicoetiological Profile and Management of Deep Vein Thrombosis (DVT) of Lower Limb

Authors

Rajiv Ranjan¹, Kishore K. Sinha², Mahesh Chaudhary³

Department of Surgery, A.N.M.M. College Hospital, Gaya, Bihar, India

Corresponding Author

Rajiv Ranjan

Department of Surgery, A.N.M.M. College Hospital, Gaya, Bihar, India

Email: drdrr7@gmail.com

Abstract

Background: Venous thrombosis of deep vein is a serious life threatening condition that may lead to sudden death in short term or to long term morbidity due to development of a post thrombotic limb and venous ulceration. The most frequent location of deep vein thrombosis is in the lower limb. In 10% of patients who die in hospital, the cause of death is pulmonary embolism following a lower limb deep vein thrombosis. In India, the incidence of deep vein thrombosis (DVT) is not well highlighted and literature survey shows little works in this field.

Objectives: To study patterns of clinical presentation, etiology and management of deep vein thrombosis of lower limb..

Material & Methods: A 2 year study of DVT in lower limb conducted at Anugrah Narayan Magadh Medical College Hospital, Gaya, Bihar, India. Patients were admitted from both surgery OPD as well as from Central Casualty. The risk factors, response to treatment, clinical course were documented using physical examination and relevant laboratory tests at regular intervals. The data was prospectively analyzed.

Conclusion: Most of the DVTs are idiopathic or primary and occur in less than 45 years age group. Irrespective of the etiology, LMWH and Warfarins are efficient, safety is well recognised, and home based treatment is advisable with follow up. Idiopathic DVTs require long term follow up to watch for recurrent thrombosis. Further studies are necessary to stratify risks, and incidence in Indian population.

Keywords: Deep Vein Thrombosis, India, Low molecular weight heparins, Warfarin, VTE, DVT.

Introduction

Venous thromboembolism (VTE) commonly manifests as deep vein thrombosis of the leg, but it may also occur in other veins like cerebral sinus, veins of the arm, retina and mesentery.^[1]

Venous thrombosis of deep vein is a serious life threatening condition that may lead to sudden death in short term or to long term morbidity due

to development of a post thrombotic limb and venous ulceration. The most frequent location of deep vein thrombosis is in the lower limb. This condition may arise spontaneously or after injury to limb. The incidence of DVT in the general population has been estimated to be 80100 per 1-,00,000 annually in the western societies,^[2] 475 per 1,00,000 in –South Asia^[3]. In India, the incidence of DVT is not well documented. Most

of the literature available in India is from the orthopaedic departments, overall incidence of DVT in general population is largely unknown.^[4,5]

The present study is a prospective study to document the clinical profile of DVT patients and to study the effectiveness and safety of treatment options at our center. The most common cause of death of patients with lower limb DVT is pulmonary embolism (PE) (10%). In 1858, Virchow had pointed out the pathological correlation of pulmonary embolism to venous thrombosis and proposed that thrombosis was primarily caused by the interplay of three classical factors, reduced or stagnant blood flow in the veins, injury to the vein wall and hypercoagulability of the blood.^[6] There are two newly discovered clinical entities: 1. ETHROMBOSIS has been used to describe blood clots in people sitting at their computer for prolonged period of time.^[7] and 2. the 'economy class syndrome'^[8] i.e. development of VTE due to prolonged periods of sitting with bent knees during travel.

Colour Doppler (Duplex) ultrasound is now the most commonly performed test for the detection of lower limb DVT, with sensitivity and specificity greater than 95% in symptomatic patients. DVT and PE represent different manifestations of the same clinical entity called venous thromboembolism (VTE). It has been generally agreed that VTE is a disease of the Western countries and is uncommon in east (including India). But the scenario is changing fast with availability and accessibility to new investigations and well equipped centres. A study in 19 Asian centres revealed that DVT occurred in 41% of patients undergoing major joint surgery without thrombo-prophylaxis.^[9] An autopsy study on 1000 medical patients at the Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh revealed that PE was present in 159 (16%) of 1000 patients who died in the hospital—it was a fatal embolus in 36 and was a major contributor to death in 90 patients; in 30 patients, the embolus was an incidental finding at

autopsy as death occurred due to some other cause. A clinical (pre-mortem) suspicion of PE was recorded in 30% of patients and a diagnosis of PE could be made in <10%; >80% of 159 patients with PE were young (<50 years).^[10]

Investigations required to confirm or exclude DVT are d-dimer, Doppler ultrasonography, isotope venography, conventional contrast venography and those for PE are contrast pulmonary angiography, CT pulmonary angiography, ventilation perfusion isotope scan. These may not be available/possible to do (in a sick or postoperative patient) or may be invasive or expensive. So, the diagnosis of VTE is confirmed with difficulty. The preferred investigation for diagnosis of DVT is Doppler US. Patients with recurrent VTE should be investigated for thrombophilia, e.g. protein C, antithrombin deficiency and S deficiency, factor V Leiden.

Aims & Objectives

The object is to study patterns of clinical presentation and etiology of deep vein thrombosis. The purpose of this population-based prospective observational study was to describe trends in the incidence rates, clinical profile, management, and outcomes for patients with VTE.

Materials and Methods

The present study was conducted on 60 suspected/symptomatic DVT patients during September 1, 2016 to September 30, 2018 at Anugrah Narayan Magadh Medical College Hospital, Gaya, Bihar, India which is a tertiary medical facility. Patients were admitted from both surgery OPD as well as from Central Casualty Department. A detailed history of patients was taken with emphasis on age, sex, obesity, pregnancy, puerperium, varicose vein, history of trauma, job profile of patients, history of traveling, estrogen therapy, previous history of DVT, history of major surgery in the past. A detailed physical examination was done to diagnose DVT and to find out clinically the extent

of the thrombosis. Any associated complications like cellulitis, lymphangitis etc. were also recorded. Colour Doppler (Duplex) examination was done on all patients. It was a prospective study and approved by the Hospital Ethical Committee. Patients were treated in the surgical ICU.

Inclusion Criteria

Doppler confirmed deep vein thrombosis of lower limb with patient not on anticoagulant medications before diagnosis for other causes were included for the study.

Procedure

All patients with symptoms and signs were screened with Doppler and if found positive were admitted. Consent for participation in the study was obtained. Detailed history was taken to assess risk factors. Level of Immobility if present was graded after Sharma *et al.*^[11]

Soon after establishing the diagnosis patients were started on heparin therapy specially low molecular weight heparin (LMWH), Dalteparin sodium, (100 IU/kg) administered subcutaneously in the gluteal region twice daily according to the weight of the patient and monitored by APTT. Warfarin sodium (0.2 mg/kg) was started on day 3 of admission and overlapping heparin and anticoagulant treatment was done for next 3 days. Dose modification was done depending upon the individual variation and INR, After which heparin was stopped and patients took only oral anticoagulants. Limb elevation was advised for at least 8 hours in a day during treatment. The patients were examined daily and any complains recorded. Doppler ultrasonography was repeated after first and second weeks of initial treatment on both lower limbs.

The anticoagulant therapy was monitored by international normalised ratio (INR). The monitoring of heparin was done by partial prothrombin time APTT, bleeding time (BT), clotting time (CT) and urine for RBC. To monitor therapy, a fasting blood sample obtained 10 to 12 hours after the last dose of an oral anticoagulant, and the patient's PT was determined along with

that of a sample of normal pooled plasma. The results were reported as a simple ratio of the two PT values. Patients were monitored regularly for clinical improvement, reduction in girth of calf/thigh and USG examination for recanalization of thrombus. After clinical improvement, patients were discharged with advise to follow up regularly for blood test, urine test and color doppler USG. All the patients were followed-up clinically and with Doppler study after 1 week, 2 weeks and 3 months.

Statistical analysis

The categorised data were expressed as actual numbers and percentage. Pearson's chi-square test was used to compare categorical data. Continuous data was expressed as mean \pm SD and student 't' test was used for comparison.

Results

Out of 60 suspected cases, 38(63%)(N=38) cases had doppler proven thrombosis. The mean age of cases was 38.41 ± 13.81 years, ranging from 14-71 years with majority of cases in the age group of 35-39years [11(28%)]. Out of 38 cases, there were 20(52.6%) males and 18(47.3%) females with male to female ratio of 1.11:1. This sex ratio is in agreement with establish epidemiology of DVT.^[12] Incidence for DVT was more common among males (52.1%) compared to females (47.9%).The average length of stay in the hospital was 5.4 days.

	Distribution of cases	Number	Percent
Side of involvement	Left	28	73
	Right	8	21.3
	Bilateral	2	2.6
	Proximal	14	36.8
	Distal	24	63.1
Clinical Presentation	Pain	38	100
	Swelling	38	100
	Skin changes	11	28.8
	Edema	38	100
	Tenderness	38	100
	Homan's sign	18	47.3

Table 2: Predisposing Factors in study (N=38)

Predisposing Factor	Number	Percent
Smoking	9	23.6
Multiple Risk Factors	6	15.7
Hypertension	7	18.4
Pregnancy or Post partum	4	10.5
Prolonged Immobility	3	7.9
Prior Thromboembolism	2	5.2
Electric burn	3	7.9
Cellulitis	1	2.6
Not known	16	42.1

Table 3: Age and sex distribution of patients with deep vein thrombosis in study.

Age in years	Males	Females	Total(%)
15-30	3	4	7(18.4)
31-45	6	4	10(26.3)
46-60	10	8	18(47.3)
61-75	1	2	3(7.8)
Total(%)	20(52.6%)	18(47.3)	38(100)

All cases received anticoagulation with heparin and warfarin with monitored INR.

At the end of first week, clinically, 6(15.7%) cases had no resolution of signs and symptoms, 32(84%) cases had partial resolution and 1(2.5%) case had complete resolution. On ultrasound, 23(65.7%) cases showed improvement, 14(36.8%) cases showed no changes. 1(2.5%) cases showed resolution.

By second week, clinically, 32(85.3%) cases had partial resolution, 5(13.2%) cases had complete resolution. On ultrasound, 33(89.6%) cases showed improvement, 2(5.2%) cases showed no change while 3(7.9%) cases showed resolution.

At the end of 3 months follow-up, 25(65.7%) cases had complete clinical resolution while 9(22.4%) cases had persistent swelling, pain, tenderness or skin changes. On ultrasound, 20(52.6%) cases showed resolution, 7(18.4%) cases showed improvement. 7(18.5%) cases showed chronic changes.

All these findings correlated with previous studies [13,14,15].

Discussion

Venous thromboembolism (VTE) affects 1–2 per 1000 people in the general population each year, usually as deepvenous thrombosis (DVT) of the

leg or pulmonary embolism (PE). The incidence increases from 1 in 10 000 for individuals younger than 40 years to 1 in 100 for those older than 60 years.^[16] Here we studied the risk factors for DVT, the natural history, diagnosis and treatment of DVT, and primary prevention of DVT.

Prevalence and Incidence of Deep Vein Thrombosis

The life-time prevalence of DVT is 3.1% and tends to rise towards older age groups, and it is higher in women (3.5%) compared with men (2.4%)^[17]. But in our study male were more than female perhaps due to small sample size. The age of the patients with DVT ranged from 18 years to 74years (mean 46 years). In contrast to other studies, most of our patients were <45 years (72.97%). Differences in study designs may be the main reason behind this variation. There were 20 (52.6%) male patients and 18 (47.3%) female patients. The difference in sex was not found to be significant in our study. Swollen, painful limb was the commonest presentation. Twentyfour patients (63.1%) belonged to middle-class family.

Risk Factors of Deep Vein Thrombosis

Major surgical procedures are known risk factor of post-operative DVT, the incidence being highest for major orthopaedic surgeries, and in surgeries involving urogenital and abdominal cancers.^[18] None of our patients had abdominal or pelvic surgery as a risk factor, majority were smokers (23.6%), more common in the elderly age group, immobilization due to other causes like chronic obstructive pulmonary disease with pneumonia (3%), electrical burns (7.9%), cellulitis (2.6%) were associated. Electrical burns caused DVT in 6.5%-7.2% patients, with highest risk in patients with high Caprini scores, high total body surface area burns and the patients needing fasciotomy^[19]. DVT is rare in our experience with thermal burns with no reported DVT case in our centre. None of the patients had known malignancy at diagnosis or during our short follow-up (3-6 months). Sixteen patients (42.1%) had no known cause similar to study by Pilger *et al.*^[20]. No proven risk factor could be associated

with them. These cases probably had genetic factors risking DVT and may also be a first sign of occult malignancy which some studies have reported.^[21]

Long Term Anticoagulation

All our patients were advised oral anticoagulation for a minimum of three months. The patients with primary DVT were put on warfarin for 6-8 months. We noted no significant hemorrhagic complication or recurrent thrombosis or embolism during follow-up. Treatment may have to be continued for a variable period, from 3–6 months; may be even longer, depending upon whether it is secondary, idiopathic or recurrent DVT^[22].

Conclusion

In our two years study, DVT in < 45 year age group is high with unknown risk factors- probably genetic being the most common cause and immobility due to other illnesses. Sex was equally distributed, with distal DVT being the commonest irrespective of aetiology. Painful swollen limb was the most common presentation. The clinical symptoms and signs lack sensitivity and specificity. Colour Doppler is a reliable non-invasive investigation. Irrespective of the etiology, LMWH are efficient and safe. The length of warfarin therapy should be individualised, weighing haemorrhage and recurrent thrombosis especially in primary DVTs. Further, idiopathic DVTs require long term follow up to detect recurrent thrombosis. Because of the low morbidity and safety, home treatment with LMWH is advocated in agreement with other studies. Patients needing hospitalization should be encouraged to remain ambulant, as far as possible. With only few Indian studies on primary DVT, in the absence of obvious predisposing factors, there is a large scope of research and further studies.

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