

To Study the Prevalence of DVT in Patients with Surgeries around Knee

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ABSTRACT

Introduction: The presence of thrombus within deep veins of the extremity is termed as deep vein thrombosis (DVT). If not recognized deep venous thrombi can embolize to pulmonary arterial circulation which can be fatal within few hours of onset. The thrombosis occurs due to inappropriate activation of the process of normal hemostasis as a response of the blood to injury. Study was done to find out the prevalence of DVT in patients with surgeries around knee.

Material and Methods: The study was a non analytical cohort study. The study was conducted in the department of Orthopedics, St Stephen's Hospital Tis Hazari, New Delhi between Oct '12 to Dec '14. A detailed history, clinical and radiological examination along with investigations was carried out in all 74 patients. 74 cases were included in study out of which 51 fracture patients and 23 arthroplasty patients. 16 cases of VTE were seen with highest prevalence in patients with fracture around knee.

Results: The overall prevalence of VTE was found to be 22%. Clinical DVT was 8% and subclinical DVT was 14%. In other words, 62% of DVT was subclinical while 38% was clinical. Among the patients with DVT, 10 cases i.e. 71% cases had proximal DVT and rest of 4 cases i.e. 29% cases had distal DVT.

Conclusion: Conservatively treated cases shows statistically significant more risk for VTE than operated cases. In our study, 63% cases of diagnosed VTE were clinically asymptomatic as compared to 37% of clinically symptomatic cases. Among the operative cases, use of tourniquet with DVT was assessed. But since the number of patients were too less, no adequate correlation can be made out.

Keywords: DVT, VTE, PE

INTRODUCTION

The presence of thrombus within deep veins of the extremity is termed as deep vein thrombosis (DVT).^{1,2} If not recognized deep venous thrombi can embolize to pulmonary arterial circulation which can be fatal within few hours of onset. The thrombosis occurs due to inappropriate activation of the process of normal hemostasis as a response of the blood to injury. A triad of these factors postulated by Virchow in 1856, namely venous stasis, endothelial damage and hypercoagulability are important in thrombogenesis.^{3,4}

Studies regarding the incidence of DVT in Asian patients are inadequate as compared to those in western literature.⁵ The disease is very elusive in terms of its recognition. Thromboembolism is the most common serious complication arising from total hip and knee arthroplasty.^{6,7} Because of the clinical silence of acute venous thrombotic event in most

instances, sudden death due to fatal embolism might be the first and the only clinical sign of the disease. There are various conditions, which place a person at risk to develop DVT e.g. fractures and surgeries, amongst them, total hip and knee arthroplasty, have a high risk.^{8,9} Some data suggest a deep vein thrombosis rate as high as 84% when prophylaxis is not administered to patients undergoing total knee replacement (TKR) and a rate of 57% after total hip replacement (THR).⁵ Other significant predisposing conditions are immobilization, cardiac disease, age (>40 yrs), and obesity, previous history of venous thromboembolism, pregnancy and puerperium.^{6,10} Deep vein thrombosis can present clinically as pain, edema, local tenderness, skin changes (including redness, pigmentation, cyanosis), and positive Homan's sign. The disease is very elusive both in terms of its recognition and management, the clinical diagnosis being inaccurate in up to 50% of cases.⁵

The incidence of deep vein thrombosis after major orthopedics lower limb surgery/ arthroplasty without prophylaxis is 40 to 70% that of proximal deep venous thrombosis is 10 to 20%, clinical deep vein thrombosis is 1 to 2% and fatal pulmonary embolism is 0.1 to 1%.

In Indian population the incidence is 34% with predominantly distal presentation.⁶ Study was done to find out the prevalence of DVT in patients with surgeries around knee

MATERIAL AND METHODS

The study was conducted in the department of Orthopedics, St Stephen's Hospital Tis Hazari, New Delhi between Oct '12 to Dec '14. The study was a non analytical cohort study. 74 patients were included in the study with lower limb trauma and knee arthroplasty as per inclusion criteria out of which 44 were males and 30 were female. The mean age was 49.1 (18-75 years age group). All patients underwent Doppler ultrasound within 24-48 hrs of admission and repeat Doppler was done 3 weeks after the first Doppler.

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Comorbid illness	n	%
Diabetes	15	20%
Hypertension	19	26%
Fracture	51	69%
Smoking	3	4%

Table-1: Co-morbid illness in our study group

Group	N	%
Normal	58	78%
DVT	12	16%
Pulmonary	4	6%
Total	74	100%

Table- 2: Prevalence of DVT and Pulmonary embolism

Clinical findings	n	%
Pain	6	8.11%
erythema	8	10.81%
oedema	6	8.11%
visible surface veins	8	10.81%

Table-3: Clinical findings in the study group

Inclusion criteria

1. All patients coming to St Stephen’s Hospital orthopaedics department with acute injuries around knee
2. All patients getting admitted for surgeries around the knee
3. All patients of trauma getting conservatively treated

Exclusion criteria

1. Patients with history of bleeding tendencies
2. All known cases of hypercoaguable states.
3. Patient not willing to be part of study.
4. Patient already diagnosed as having DVT.
5. Arthroscopic surgeries like ACL reconstruction.

RESULTS

15 patients had associated Diabetes Mellitus, 19 patients had Hypertension and 3 patients had smoking (table-1). 12 patients had DVT and 4 patients had pulmonary embolism as their complication (table-2). clinical signs of DVT was present only in 6 cases ie 8%.OUT of 22% DVT, Clinical DVT was 8% and subclinical DVT

DVT ↓	Normal		VTE	
	N	%	n	%
Proximal	-	-	10	71%
Distal	-	-	4	29%
Total	-	-	14	100%

Table-4: Comparison between proximal and distal DVT among patients with DVT

Age Interval	Management of Fracture			
	Conservative		Operative	
	n	%	n	%
< 20	1	6%	0	0.00%
20 – 30	1	6%	10	17%
30 – 40	9	53%	5	9%
40 – 50	1	6%	6	11%
50 – 60	1	6%	16	28%
60 – 70	3	17%	13	23%
>= 70	1	6%	7	12%
Total	17	100%	57	100%
Pvalue0.001				

Table-5: Age vs management of fracture

Management of fracture ↓	Group ↓	Whether tourniquet used				Total	p-value
		No		Yes			
		N	%	n	%		
Operative	Normal	9	17.31%	43	82.69%	52	0.244
	VTE	2	40.00%	3	60.00%		
	Total	11	19.30%	46	80.70%		

Table-6: comparison between cases where tourniquet was used

Co-morbid illness	Normal		VTE		p-value
	n	%	N	%	
Diabetes	9	15.52%	6	37.50%	0.026
Hypertension	18	31.03%	1	6.25%	0.022
Smoking	0	0.00%	3	18.75%	0.000

Table-7: Comparison between patients with various co-morbid illness and patients with VTE

was 14% (table-3).

Among the patients with DVT, 10 cases i.e 71% cases had proximal DVT and rest of 4 cases i.e 29% cases had distal DVT. Proximal DVT is defined as DVT involving popliteal vein and above while Distal DVT involves calf veins (table-4). Among operative cases developing DVT, tourniquet was used in 3 out of 5 cases (table-5, 6).

Out of the 15 patients with Diabetes, 6 patients had DVT. Out of 19 patients with hypertension, 1 had DVT. There were 3 patients with chronic smoking, all had DVT (table-7).

DISCUSSION

4 cases were positive after the first Doppler ultrasound. These cases were followed up as it was not clear at what stage they developed DVT. They had no clinical symptoms prior to admission in hospital. They might have developed DVT within initial 24 hrs as the first Doppler was done with 48 hrs. Additional 10 cases were positive on the 2nd Doppler at 3 weeks interval. While the 1st Doppler may have picked up pre-existing DVT, repeat picks up all those which have developed during the course of the treatment.

In our study out of 74 patients, majority of them belong to the 50-70 year age group(45%) and considerable amount of subjects in the 20-40 years age group(34%). Most number of cases developing DVT were in the age group of 30-40 yrs (38%) probably because it is the most common age group suffering from Road traffic accidents. Out of 74 subjects, 41 were male and 33 were female. But a significant statistical correlation could not be made out for association between gender and incidence of DVT.

In our study, 51 patients had fractures around knee, while Rest of the 23 cases were the non fracture groups who were admitted for arthroplasty.

In our study, Clinical DVT was 8% and subclinical DVT was 14%. In other words, 62% of DVT was subclinical while 38% was clinical. Clinical signs included were calf pain (6 cases), erythema(8 cases), edema (6 cases) and visible surface veins(8 cases). Calf pain and edema were the clinical signs which if present showed high clinical suspicion of DVT.

Among the patients with DVT, 10 cases i.e 71% cases had proximal DVT and rest of 4 cases i.e 29% cases had distal DVT. Proximal DVT is defined as DVT involving popliteal vein and above while Distal DVT involves calf veins. This also suggests that there are high chances of progression of thrombus to proximal veins during the course which gives more incidence of proximal DVT.

In our study, Amongst the 16 patients who developed VTE, 11 cases were being treated conservatively (69%) and 5 cases were being treated operatively(31%). While amongst the normal patients, maximum patients were treated operatively. This data is statistically significant. This suggests Conservatively managed cases had a higher incidence of DVT as compared to operative cases probably because they are mobilized by Non weight bearing ambulation almost the next day. Since the most number cases of DVT were present in the 30-40 yr age groups, maximum number of conservative cases were in the 30-40yr age group (53%) as

compared to other groups where operative intervention is used most commonly

Road traffic accidents was most common mode of injury (69%). Patients coming after Road traffic accidents had high energy trauma.

In our study we included a variety of fractures around the knee joint. Out of those variety, proximal Tibia fractures were more common (63%) while distal femoral fractures were (32%). We have found higher incidence of DVT in proximal tibial fractures (42%). The risk of DVT appears to increase with the proximity of the fracture to the knee, tibial plateau fractures have higher risk.¹⁷⁴ One of the Possible reasons could be as most of the trauma around the knee resulted from high energy And hence greater soft tissue damage leading to a higher incidence of DVT.

In our study, among operative cases developing DVT, tourniquet was used in 3 out of 5 cases (60%) while 2 cases did not use tourniquet. Since the data is insufficient, no adequate correlation can be made out with the use of tourniquet and DVT.

In our study, we have found out that Diabetes Mellitus is a strong risk factor for DVT as out of 15 patients with diabetes, 6 developed DVT. In a study by H. Lie,¹⁷⁹ they have suggested incidence of Diabetes in their study to be 13% and they have suggested high incidence of DVT in diabetics. Our study also suggests high incidence of DVT in Diabetics.

Among Diabetics, 9 were females and 6 were males. Therefore, though Diabetes was mostly present in females as compared to males, suitable correlation cannot be made out as the p-value is insignificant.

INR was an important parameter in our study group. All 16 patients developing VTE were given thromboprophylaxis due to which mean INR post-op was 2.51 with SD of 1.30. All our values were statistically significant.

3 patients expired in our study. The first one was a post traumatic # distal femur with established DVT and died because of pulmonary embolism. 2nd patient was a case of ovarian cancer on chemotherapy and was on prolonged bed rest and she developed pulmonary artery thrombosis and expired following hematemesis. Third case had # proximal tibia with # shaft of femur with established compartment syndrome. He developed acute renal failure and died due to electrolyte imbalance. All three of them were in ICU and required ventilator support.

There were 2 patients who didn't show any clinical and radiological characteristics of DVT and they developed pulmonary complications directly. They were Doppler negative pulmonary cases

Although arthroplasty cases were included in our study but there were no cases positive for DVT.

Patients with established DVT were kept on warfarin 2 mg HS at the time of discharge of DVT and they were kept on follow up for 3-6 months. Except 3 patients who expired in our study, rest all of the patients recovered. Edema lasted for 3 months.

Even with clinical sign with Doppler may not be able to pick-up all the cases. This is because of intra-observer and

inter-observer variations in picking DVT.

CONCLUSION

74 cases were included in study out of which 51 fracture patients and 23 arthroplasty patients. Preliminary evaluation using Doppler USG soon after admission (within 48 hrs) and 3 weeks following operative intervention and or conservative treatment. The overall prevalence of VTE was found to be 22%. 4 cases of pulmonary complications including 3 cases of pulmonary embolism with 1 case of Pulmonary artery Hypertension were seen during the period of study. The high prevalence of VTE and pulmonary embolism in this study highlights the importance of high index of suspicion for both VTE and Pulmonary embolism and need for both mechanical and chemoprophylaxis in these cases.

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