

# Epidemiology of Deep Vein Thrombosis in Patients Undergoing Major Lower Extremity Orthopedic Surgery: A Two-year Study from Tertiary Care Hospital of North India

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## Abstract

**Introduction:** Deep vein thrombosis (DVT) is defined as thrombosis of deep veins of the lower extremities. High incidence of DVT has been reported postoperatively worldwide, and definite prophylactic guidelines have been formulated to prevent it. It is generally believed that incidence of DVT is low in India.

**Aim:** This study was conducted to see the incidence of DVT in our patients.

**Material and Methods:** This study was conducted in Department of Orthopaedics, Government Medical College Jammu from November 2014 to December 2016. The reason of doing this study was to find the prevalence of DVT in periarticular hip and knee fractures and surgeries, as we had no policy of giving thromboprophylaxis as we believed the incidence to be less besides studies regarding the prevalence of DVT in periarticular hip and knee fractures and surgeries in Asian patients are very few.

**Results:** It showed that there is the almost equal incidence of DVT in our patients as compared to reported in literature.

**Conclusion:** Thromboprophylaxis should be given to patients undergoing major lower limb surgeries.

**Key words:** Deep vein thrombosis, Major lower limb surgery, Thromboprophylaxis, Venous thromboembolism

## INTRODUCTION

Deep vein thrombosis (DVT) is the thrombosis of deep veins of lower extremities. Symptomatic DVT causes morbidity in itself due to acute pain and swelling of affected limb. DVT may embolize to pulmonary arterial circulation and can lead to fatal complications.<sup>1-6</sup> Worldwide, high incidence of DVT is reported with lower limb surgeries and prophylaxis to prevent it given to patients operated for lower limb. Our institution had no policy of any prophylaxis for DVT as it was held that DVT was not

common in this part of world. This study was done to see prevalence of DVT in our patients and compare with the world literature and to see if prophylaxis is required in our patients or not.<sup>7-14</sup>

## Aims and Objectives

This study evaluates the prevalence of DVT in patients undergoing major lower limb surgeries.

## MATERIAL AND METHODS

This study was conducted in Department of Orthopaedics, Government Medical College Jammu from November 2014 to December 2016. The reason of doing this study was to find the prevalence of DVT in periarticular hip and knee fractures and surgeries, as we had no policy of giving thromboprophylaxis as we believed the incidence to be less besides studies regarding the prevalence of DVT in

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periarticular hip and knee fractures and surgeries in Asian patients are very few.

All the patients who were operated for major lower limb injuries were included in the study. Patients who had evidence of DVT before surgery and patients younger than 15 years were excluded from the study.

A detailed history, clinical and radiological examination was carried out in all the patients. Laboratory Investigation was carried out on all patients which included:

1. Complete hemogram, erythrocyte sedimentation rate, blood urea, serum creatinine, Sr. electrolytes, random blood sugar, coagulation profile (prothrombin time/activated partial thromboplastin time/international normalized ratio, Chest X-ray, electrocardiogram
2. Venous Doppler B/L lower limbs to look for evidence of deep venous thrombosis. A pre-operative assessment for DVT was done in patients by Doppler ultrasonography. The assessment included examination of the bilateral common femoral, superficial femoral-popliteal, anterior tibial vein, posterior tibial vein
3. Postoperatively, Doppler was done on 3 occasions, on day 5, 3 weeks and 3 months.

A diagnosis of DVT was made in the case of visualization of thrombus, absence of flow, lack of compressibility, or lack of augmentation.

## RESULTS

A total of 347 patients underwent lower limb surgery in our unit, 39 of which were below 15 years of age and 7 had evidence of DVT on pre-operative assessment. They were excluded from the study. A total of 301 patients were included in the study. 178 (59.13%) were males and 123 (40.86%) were females.

The average age of our patients was 53.04 years, males 50.11 years and females 54.86 years. On 5<sup>th</sup> day 11 patients had evidence of DVT on ultrasonography Doppler, out of which 8 were females. We had 17 positive Doppler at 3<sup>rd</sup> week out of which 11 were females. At 3 months, 34 patients had a positive scan for DVT with 23 being females and 11 males. The overall prevalence of DVT in major surgeries of lower limb in our study as detected by Doppler ultrasonography was found to be in 62 patients (21.26%). 42 out of 62 (67.74%) patients who developed DVT were females.

Only 17 (27.41%) patients out of 33 patients diagnosed to have DVT were symptomatic. Out of 301 patients, only 17 (5.64%) had symptoms.

Four of our patient expired due to a massive pulmonary embolism within 3 weeks of their surgery which was confirmed by elevated D dimer levels and computed tomography chest.

With the increase in the age group, the incidence of development of DVT increased as depicted in Table 1.

A total of 134 patients were operated for hip, while 43, 51, and 73 patients were operated for thigh, knee and leg and ankle, respectively. Periarticular surgeries showed a higher incidence of DVT 19.4% hip surgeries and 27.45% in knee surgeries as shown in Chart 1. 36 patients (58.06%) had thrombus proximal to knee, 23 (37.09%) had it below the knee whereas 3 (4.83%) had it proximal to inguinal region.

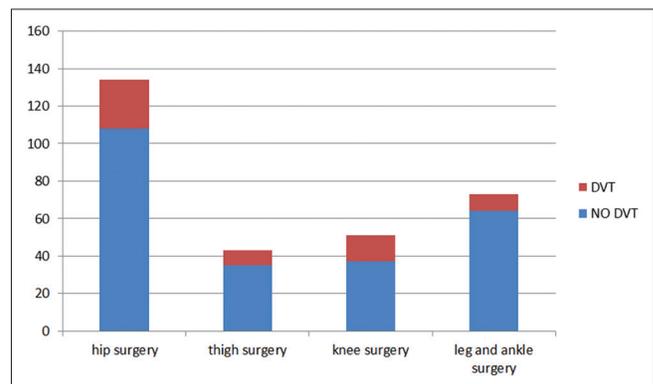
## DISCUSSION

DVT is known to occur frequently after surgery, particularly orthopedic surgery and cause pulmonary embolism, which often leads to a serious outcome. Without thromboprophylaxis, the rates of objectively confirmed DVT occurring within 7-14 days after lower extremity orthopedic surgery are around 40-60%. Most of these thrombi resolve spontaneously, but a small percentage (1-14%) will progress to symptomatic VTE. The incidence

**Table 1: Incidence of DVT as per age and sex of patients**

Age group	Patients			Evidence of DVT on USG Doppler								
	Male (M)	Female (F)	Total (T)	5 days			3 weeks			3 months		
				M	F	T	M	F	T	M	F	T
15-24	16	11	27	-	-	-	-	1	1	-	1	1
25-34	27	16	43	-	1	1	-	-	-	1	2	3
35-44	39	23	62	-	2	2	1	1	2	2	4	6
45-54	34	19	53	1	1	2	1	2	3	1	6	7
55-64	27	21	48	2	1	3	2	3	5	3	4	7
>65	35	33	68	-	3	3	2	4	6	4	6	10
Total	178	123	301	3	8	11	6	11	17	11	23	34

DVT: Deep vein thrombosis, USG: Ultrasonography



**Chart 1: Incidence as per the site of operative intervention**

of DVT has been reported to be 23.5% in overall, and to be 23-33% in patients after hip replacement and 44-58% in those after knee replacement.

A study spanning 19 Asian centers conducted by Piovella *et al.* revealed that DVT occurred in 41% of patients undergoing major joint surgery without thromboprophylaxis. In another study by Aggarwal *et al.* (2003). Thirty-two of 53 patients who underwent major orthopedic surgery without thromboprophylaxis had DVT which was proven on venography. An autopsy study on 1000 medical patients at the Postgraduate Institute of Medical Education and Research, Chandigarh (2008) 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.

In a study by Motahashi *et al.* (2012), the incidence of DVT was 19.3% in all, 12.1% in hip surgery, and 41.6% in knee surgery. In comparison, we had an overall incidence of with 19.4% occurring in hip surgeries and 27.45 occurring around knee. Old age is a well-known risk factor for DVT, was also confirmed by their study. Our study also confirmed the same. Moreover, as per them elderly individuals are more likely to require a major operation or may be immobilized due to medical problems. We also felt that this was a reason for higher incidence in elderly patients.

Our current findings also showed that females are at a greater risk for DVT and postoperative DVT; no consensus has been reached regarding differences in the incidence of DVT according to gender in previous studies. The incidence of fatal venous thromboembolism has been reported to be 1-2% in world literature. We had 4 deaths out of 301 patients making it 1.32%. In a study, similar to ours by Z Ali *et al.* (2014) had an overall incidence of 27% in comparison to our 21.26%. They had 35% symptomatic and 65% non-symptomatic patients in comparison we had 27.41% patients who were symptomatic. We had 58.06% proximal DVT, 37.09% distal, and 4.83%, above inguinal compared to their 79%, 17%, and 4%, respectively.

As recognized worldwide, we found that elderly patients particularly females with periarticular knee surgeries who were having comorbid conditions were more likely to have DVT postoperatively after lower limb surgery. The incidences we found were comparable to the world

literature, though our study had less number of patients and included only one mode of investigation.

We believe more such studies are needed to determine protocol for prophylaxis for DVT in our part of the world, however, we strongly believe that prophylaxis is must in patients who are in risk groups like elderly, females and patients undergoing periarticular knee surgeries and in whom mobilization will be delayed due to comorbid conditions. Thromboprophylaxis in such high-risk patients is now always considered in our institution.

## CONCLUSION

There is the comparable incidence of DVT in our patients as compared to the incidence found in world literature. There is a need to institute DVT prophylaxis in patients undergoing major lower limb surgeries, particularly in high-risk patients.

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