

Prevalence of Deep Vein Thrombosis in Hip Fracture in Geriatric Patients with Delayed Hospital Admission

Dr. Shubhranshu Choudhary¹, Dr. Raja Babar Bashir Rather²,

Prof. Altaf Ahmad Kawoosa³, Dr. Jaspreet Singh⁴

⁴Corresponding Author

Abstract: ***Purpose:** Patients with hip fractures frequently experience deep vein thrombosis (DVT), which is linked to a high rate of morbidity and mortality. This study sought to characterize the preoperative DVT prevalence in patients seeking care ≥ 48 hours following a hip fracture. **Methods:** We included elderly patients admitted ≥ 48 h after sustaining a hip fracture, between January 2022 and December 2022. Patients with pathologic fractures, anticoagulation therapy, previous DVT episodes, and cancer treatment were excluded. Out of the 273 patients, 59 had their admission within 48 hours of the fracture. Upon hospital admission, a Doppler ultrasound of both lower extremities was performed to screen for DVT. We documented the following: age, sex, ASA score, fracture type, duration since injury, time between admission and surgery, and overall hospital stay. **Results:** A total of 41 patients, aged 81 (± 13.34), were examined. 110 hours had passed between the injury and admission (46–676 hours). Upon admission, five patients (12.19%) had a DVT. Regarding the duration of the hospital stay overall or the time from admission to surgery, there were no appreciable differences between patients with and without DVT. In conclusion, 12.19% of patients admitted ≥ 48 hours following a hip fracture had DVT. The time needed for surgery or hospital stays was not prolonged by the diagnosis or treatment of DVT. Our findings recommend routine DVT screening in patients who seek medical attention within 48 hours of an injury.*

Keywords: Thromboprophylaxis, Hip fracture, Deep vein thrombosis, Orthogeriatric

1. Introduction

Elderly adults frequently suffer from hip fractures [1]. One of the primary causes of morbidity and death in these patients is deep vein thrombosis (DVT), a common complication. Depending on the length of time before surgery, whether prophylaxis was taken, ethnicity, coexisting conditions, and other variables, the prevalence of preoperative DVT in patients with hip fractures can reach up to 62% [2, 3].

Delays in accessing emergency care are associated with longer preoperative immobilization, one of the major risk factors for thromboembolic disease [4]. The few available Research on the subject indicate that up to 55% of patients who seek care within 48 hours of an injury develop deep vein thrombosis (DVT); however, these findings are based on incredibly small sample sizes [5, 6].

The purpose of this study was to characterize the prevalence of DVT in patients admitted ≥ 48 hr after suffering a hip fracture because there is a dearth of information on preoperative DVT in patients with hip fractures and delayed access to healthcare.

2. Methods

The institutional review board granted approval for this study. Between January 2022 and December 2022, we conducted a cross-sectional analysis of patients who presented with a hip fracture at a Bone and Joint hospital, Srinagar emergency room ≥ 48 hours after the injury. Through our emergency department, we recruited patients from among all those hospitalized to our health centre with a diagnosis of hip fracture. Patients with subtrochanteric,

intertrochanteric, and femoral neck fractures were among them.

We only considered patients who had been injured more than 48 hours ago. We excluded from our study individuals using prophylactic or therapeutic anticoagulation medication (ACT), patients with pathologic fractures or receiving cancer treatment, patients with a history of DVT, and patients unable to have a Doppler ultrasonography. A radiologist used Doppler ultrasonography on both lower limbs to confirm the diagnosis of DVT.

Unless surgery was scheduled within twelve hours of admission, all patients in the emergency department received antithrombotic prophylaxis with enoxaparin or non-fractionated heparin in case enoxaparin use is contraindicated). Every patient who had been injured for more than 48 hours was required by our policy to have a Doppler ultrasound of both lower limbs performed when they were admitted. A vascular surgeon assessed patients who had been diagnosed with DVT by ultrasound to see if an inferior vena cava filter (IVCF) should be inserted prior to surgery.

Medical records were searched for demographic data, the kind of fracture, the duration of hospital stay, the time from injury to admission, the ASA score, medication history, complications, and the time from admission to surgery.

Depending on the distribution of the variable, which was examined using the Kolmogorov-Smirnov test, quantitative variables were reported using either the mean and standard deviation or the median and range. To compare means, the Student's t-test was employed, while the Mann-Whitney test was utilized to evaluate medians for non-parametrically

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distributed variables. Fisher's exact test was utilized to determine whether there were any differences in distributions for categorical variables, which were defined as frequencies. The software used for all statistical studies was IBM SPSS Statistics 21.

3. Results

Of 223 hip fracture patients admitted during the study period, 65 were admitted \geq 48 hours after sustaining a hip fracture. We omitted eight patients who were too agitated or in pain to have a Doppler ultrasonography, two patients who had previously been diagnosed with DVT, three patients who had a pathologic fracture, and eleven patients who were on anticoagulant treatment.

Following the application of exclusion criteria, the final sample consisted of 41 patients (32 females), aged 81 (\pm 13.34). There were 25 fractures (60.97%) of the femur neck, 14 intertrochanteric fractures (34.14%), and 2 subtrochanteric fractures (4.87%). Table 1 displays demographic information.

In patients with delayed admission, the prevalence of DVT was 12.19% (5 out of 41 patients). All the patients experienced unilateral DVT that always happened ipsilateral to the fracture (Table 2). When the patients were diagnosed, none of them had any DVT symptoms. Before undergoing hip surgery, a vena cava filter was implanted in all the

patients. There were no recorded deaths in the DVT-free group and DVT group.

The median time from hip fracture to hospital admission was 110 (46–676) hours. Hospital admission was delayed 161 h in patients with DVT (98–676 h), while in patients without DVT, it was delayed 110 (46–498) hours (p-value 0.06). For the group with DVT, the time from admission to surgery was 55 h (46–98 h); for the group without DVT, it was 41 h (24–300 h) (p value 0.58). The length of hospital stay was 150 h (113–310 h) for patients with DVT, versus 162(60–625 h) for those without DVT (p value 0.80) (Table 3). There were no significant differences between patients with and without DVT regarding age, gender, ASA and fracture type.

Table 1: Demographic characteristics of hip fracture patients with delayed hospital admission (n=41)

Age [median (min–max)]	79 (56–97)
Female [% (n)]	78.04 (32)
ASA [% (n)]	
II	63.4 (26)
III	34.14 (14)
IV	2.44 (1)
Fracture type [% (n)]	
Femoral neck	60.97 (25)
Intertrochanteric	34.14 (14)
Subtrochanteric	4.87 (2)

Table 2: Characteristics of DVT patients

S.no.	Sex	Age	DVT localisation	Laterality	PE	Treatment
1	Female	85	Distal	Ipsilateral	No	IVCF+ACT
2	Female	87	Distal	Ipsilateral	No	IVCF+ACT
3	Male	83	Distal	Ipsilateral	No	IVCF+ACT
4	Female	75	Distal	Ipsilateral	No	IVCF+ACT
5	Male	68	Proximal	Ipsilateral	No	IVCF+ACT

PE pulmonary embolism, IVCF inferior vena cava filter, ACT anticoagulant therapy

Table 3: Length of time from injury to hospital admission, from admission to surgery, and total length of the hospital stay

Variable	DVT		P value
	Yes (n=7) Median (min–max)	No (n=34) Median (min–max)	
Time to admission (h)	161(98–676)	110(46–498)	0.06
Time to surgery (h)	55(46–98)	41(24–300)	0.58
Length of hospital stay (h)	150(113–310)	162(60–625)	0.80

4. Discussion and Conclusion

The preoperative prevalence of DVT in patients who were admitted to emergency rooms after 48 hours following a hip fracture was examined. A prevalence of 12.19% (5/41 patients) was discovered. Consistent with earlier research, none of the patients displayed DVT symptoms or clinical signs [2, 3], a finding that might have been obscured by the severe hip fracture symptoms and signs. All the DVT patients had vena cava filters inserted before undergoing surgery. The duration of the hospital stay or the time to surgery was unaffected by the filter's implantation or the initiation of anticoagulation therapy that followed. There were no appreciable demographic variations between DVT-positive and DVT-negative patients. Hip fracture patients

are more likely to experience morbidity and mortality when they have thromboembolic disease. Up to 80% of patients with femoral fractures who do not receive thromboprophylaxis experience DVT postoperatively, most of the time without any symptoms [16]. When thromboprophylaxis is used, symptomatic DVT is less common, occurring in only 1.3–6% of patients with hip fractures [17–21]. There is, however, a dearth of research on preoperative DVT. According to an available series conducting universal screening upon admission, patients admitted prior to 48–72 hours had a DVT prevalence of 1.4–6% [5, 6].

Even though DVT is typically asymptomatic, it can co-occur with a pulmonary embolism, which is also typically asymptomatic, in as many as 40% of cases [22]. The prognosis is good with treatment for DVT, with only a 0.4% chance of dying from a pulmonary embolism in three to six months. There is a 3.8% chance of getting another DVT or a non-fatal pulmonary embolism. [23]

Two hip fracture cases that received emergency care more than a week later were reported by Brooks et al. [24]. One had a fatal massive pulmonary embolism during surgery, while the other had a vena cava filter implanted before the procedure. 10% (13/1133) of hip fracture patients examined

by venography upon hospital admission had evidence of DVT, according to Hefley et al. Just seven of them were examined and admitted less than 48 hours after the fracture. Six (55%) of the 11 patients admitted after 48 hours had a DVT at the time of admission [5]. Cho et al. discovered a preoperative prevalence of 2.6% (or 4/152 patients) for DVT in hip fracture patients in a study involving Korean patients. Patients with DVT had a mean time to admission of 237 hours, while patients without DVT had a mean time of 27.5 hours [6].

These patients have a high prevalence of DVT even in the absence of pertinent clinical symptoms. It is possible that DVT clinical symptoms and indicators are being obscured by the symptomatology of hip fractures. Regardless of the patient's clinical presentation, our findings imply that the interval between an injury and hospital admission should be taken into account as a risk factor for thromboembolic disease. Even in cases where patients are receiving antithrombotic prophylaxis during their hospital stay, delays in surgical care have been reported to be relevant factors [3], a factor that our study did not examine. When a patient has a diagnosed case of venous thromboembolism but is not a candidate for anticoagulation, the use of a vena cava filter is recommended [25–27]. It provides a safe and efficient preoperative treatment that can be used, particularly in individuals in need of surgery who are actively mobilizing the limb in question [3, 24]. In our investigation, vena-cava implantation filter had no impact on the duration or timing of the procedure. during the hospitalization.

Our research has certain shortcomings. Patient follow-up is inherently restricted by the cross-sectional study design. Doppler ultrasonography is an operator-dependent technique (applied in this study by qualified radiologists. Furthermore, it is possible that additional risk factors were overlooked by our study design because we did not include patients with medical admissions lasting less than 48 hours.

In summary, DVT is more common in hip fracture patients who experience delayed hospital admission. The time needed for surgery or hospital stays was not prolonged by the diagnosis or treatment of DVT. Our findings imply that DVT screening should be done on a regular basis for hip fracture patients who consult ≥ 48 hours after the injury. The current guidelines recommend that the preoperative implantation of a vena cava filter be taken into consideration in the event of a positive result and a contraindication to anticoagulation, such as surgery. In medically optimized patients, attempts should be made to reduce the amount of time that passes between an injury and surgical treatment.

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