RESEARCH ARTICLE

# The frequency of Deep Vein Thrombosis in patients with hip fractures

Mansoor Ali Khan, Sateesh Pal, Muhammad Amin Chinoy, Syed Kamran Ahmed

## Abstract

**Objective:** To find out the frequency of deep vein thrombosis in hip fracture patients.
**Methods:** The prospective, cross-sectional study Was conducted at Indus Hospital, Karachi, from November 2016 to September 2017, and comprised patients with hip fractures who were scanned for the presence of deep vein thrombosis on both lower limbs preoperatively at the time of presentation and postoperatively on post-op day 3 and day 28. No thrombo-prophylaxis was provided to the patients. Risk factors for deep vein thrombosis were also assessed. Data was analysed using SPSS 21.
**Results:** Of the 109 patients, 50(46%) were male and 59(64%) were females. The overall mean age was 64.59 ± 9.82 years. Deep vein thrombosis was found in 4(3.66%) patients; 2(50%) preoperatively and 2(50%) in the early postoperative period. No deep vein thrombosis was found in any patient on post-op day 28.
**Conclusion:** The frequency of deep vein thrombosis in Pakistani geriatric patients with hip fractures was found to be low compared to the western population.
**Keywords:** Hip fracture, Complications, Mortality. (JPMA 69: S-21; 2019)

## Introduction

Deep vein thrombosis (DVT) is a medical condition characterised by formation of thrombi within the deep veins of the body.[1] It is a common complication in orthopaedic surgery that can lead to life-threatening pulmonary embolism (PE) since DVT is usually present in more than 90% of PE cases. Studies revealed that venous function was significantly reduced after surgical procedure involving proximal femur which correlated with the occurrence of DVT.[2]

DVT and resulting PE are the major causes of mortality and morbidity in elderly patients who have undergone a hip fracture surgery.[3] A combination of old age, lower limb trauma, hospitalisation, immobility and orthopaedic surgery puts hip fracture patients at a high DVT risk.[4]

Pharmacological thromboprophylaxis is not routinely used in Asian patients because postsurgical DVT is thought to be low in incidence. However, in a multinational and multi-ethnic study on Asian population, Piovella et al. concluded that the incidence of DVT in the absence of thromboprophylaxis after arthroplasty and hip fracture surgery is equivalent to that in Western countries.[5]

DVT diagnosis should be established by special investigations as symptoms and signs are non-specific and may be entirely lacking.[6] Though contrast venography is considered standard method for DVT diagnosis, its widespread use is hampered mainly due to the invasive nature of the test, cost issues, limited availability, and the side effects associated with the use of the contrast material.[7]

Doppler ultrasound has a sensitivity of 100% and a specificity of 97%. It is a safe, effective and quick technique for diagnosing venous thrombosis in patients. It is well accepted by both patients and staff and is without any inherent risk, but it can be operator-dependent.[8]

Though much work has been done on DVT following arthroplasty, there is comparatively less literature about DVT and its consequences in the setting of hip fractures.[9] Although major orthopaedic surgery is inclusive of total hip replacement (THR), total knee replacement (TKR) and hip fracture surgery, majority of the literature has done very little evaluation of hip fracture surgery.[10]

Though routine chemoprophylaxis is provided to all patients of major trauma in Western countries, its routine use in the Asian population is still lacking because only a few reports are available on this topic from Asian countries, and majority of them report low incidence of DVT compared to Western countries.[11]

Department of Orthopedics, The Indus Hospital, Karachi, Pakistan
**Correspondence:** Mansoor Ali Khan. e-mail: makbonedoc65@gmail.com

**Table-1:** Demographics of the enrolled patients with Deep Vein Thrombosis (DVT)assesment preoperatively.

| | | DVT Positive Pre-operatively n (%) | DVT Negative Pre-operatively n (%) | *p*-value |
|---|---|---|---|---|
| **Gender** | | | | |
| Male | | 0 (0) | 46 (42.9) | 0.16 |
| Female | | 2 (100) | 61 (55.9) | |
| **Body Mass Index** | ≤ 25 | 2 (100) | 97 (89) | 0.71 |
| | > 25 | 0 (0) | 10 (9.2) | |
| **Preambulatory status** | I | 1 (50) | 86 (80.4) | 0.15 |
| | II | 1 (50 | 21 (19.6) | |
| **Type of fracture** | | | | |
| Intertrochanteric | | 1 (50) | 60 (56) | |
| Neck of femur | | 1 (50) | 43 (41) | 0.35 |
| Subtrochanteric | | 0 (0) | 4 (3.8) | |

A study done in India in 2006 reported 8.6% incidence of venous thromboembolism in THR patients, 6.8% in hip fracture surgery group and none in TKR. Overall incidence of venous thromboembolism was 6.12%.[12] A study done in Singapore reported 8% incidence of DVT after total hip arthroplasty (THA)[13] Another study done in India reported 43.2% incidence of DVT in THA patients who had received thromboprophylaxis and 60% incidence of DVT in those who did not receive thromboprophylaxis. Overall incidence of DVT in THA patients was reported as 52.1%.[14]

The current study was planned to assess the frequency of pre-operative and postoperative incidence of DVT in patients with hip fractures.

## Subjects and Methods

The prospective, cross-sectional study Was conducted at Indus Hospital, Karachi, from November 2016 to September 2017, and comprised patients with hip fractures who were scanned for the presence of DVT on both lower limbs preoperatively at the time of presentation and postoperatively on post-op day 3 and day 28.

Those included were patents aged 50-80 years of either gender with duration of fracture less than 15 days. Approval was obtained from the institutional ethics review board, and informed consent was taken from all the subjects. Those who declined to participate were excluded.

Those included were scanned for the presence of DVT with the help of Doppler ultrasound by an experienced radiologist.

No thromboprophylaxis was provided to the patients during study period. Risk factors for DVT were also assessed. Data was analysed using SPSS 21.

**Table-2:** Demographics of the enrolled patients with Deep Vein Thrombosis (DVT) assessment on 3rd Post-Op Day (POD).

| | | DVT Positive on 3rd POD n (%) | DVT Negative on 3rd POD n(%) | *p*-value |
|---|---|---|---|---|
| **Gender** | | | | |
| Male | | 0 (0) | 46 (43.8) | 0.16 |
| Female | | 1 (100) | 59 (56.2) | |
| **Body Mass Index** | ≤ 25 | 2 (100) | `95 (90.5) | 0.71 |
| | >25 | 0 (0) | 10 (9.5) | - |
| **Preambulatory status** | I | 2 (100) | 85 (81) | 0.15 |
| | II | 0 (0) | 20 (19) | - |
| **Type of fracture** | | | | |
| Intertrochanteric | | 2 (100) | 58 (55.2) | |
| Neck of femur | | 0(0) | 43 (41) | 0.35 |
| Subtrochanteric | | 0 (0) | 4 (3.8) | |

## Results

Of the 109 patients, 50(46%) were male and 59(54%) were females. The overall mean age was 64.59 ± 9.82 years (Table 1). Deep vein thrombosis was found in 4(3.66%) patients; 2(50%) preoperatively and 2(50%) on post-op day 3 (Tables 2-3). Mean duration of surgery post-fracture was 7.66 ± 3.43 days. Majority of fractures were femur intertrochanteric fractures 60(55%).

All 4(3.66%) patients with DVT had proximal DVT in the affected lower limb. All were asymptomatic and no patient developed signs and symptoms of PE.

**Table-3:** Demographics of the enrolled patients with Deep Vein Thrombosis (DVT) on colour doppler on 3rd Post-Op Day (POD).

| | | DVT Positive on 3rd POD n (%) | DVT Negative on 3rd POD n(%) | *p*-value |
|---|---|---|---|---|
| **Age** | ≤ 65 years | 1 (50) | 57 (54.3) | 0.15 |
| | >65 | 1 (50) | 57 (54.3) | 0.15 |
| **Co-morbid** | No co-morbid | 0 (0) | 63 (60) | |
| | Diabetes | 2 (100) | 24 (22.8) | |
| | Hypertension | 0 (0) | 34 (32.3) | |
| | Ischaemic Heart Disease | 0 (0) | 2 (1.9) | 0.77 |
| | COPD | 0 (0) | 0 (0) | |
| | Pre-existing Renal disease | 0 (0) | 0 (0) | |
| **ASA** | I | 0 (0) | 57 (54.3) | |
| | II | 2 (100) | 39 (37.1) | 0.20 |
| | III | 0 (0) | 9 (8.6) | |
| **Type of fracture** | Intertrochanteric | 2 (100) | 58 (55.2) | |
| | Neck of femur | 0(0) | 43 (41) | 0.11 |
| | Subtrochanteric | 0 (0) | 4 (3.8) | |

ASA: American Society of Anaesthesiologists

## Discussion

DVT is a major health problem in Western countries necessitating the use of thromboprophylaxis. Not many studies are available regarding incidence of DVT in Pakistani patients which results in uncertainty regarding the use of thromboprophylaxis in our patients. The available data on DVT incidence in Asian patients is limited due to the lack of clinical trials which makes use of thromboprophylaxis controversial.[15]

Interestingly, community surveys have found that Asian people living in the United States appear to have comparatively lower DVT rates and PE than Americans of European origin, suggesting that genetic and cultural traits may contribute to thrombosis.[16] Cho et al. found 2.6% incidence of pre-operative DVT in patients with hip fractures in Korean population.[3]

In most studies on DVT in hip fracture patients, no pre-operative screening investigations were done, so pre-operative DVT was not assessed separately. Therefore, those studies were not able to identify whether DVT was pre-existing or a development following surgical trauma. The current study scanned all the hip fracture patients for DVT before the surgery, and those who did not have DVT on pre-operative assessment were scanned further for post-operative DVT assessment.

Doppler ultrasound was used for screening of DVT before and after hip surgery. Doppler ultrasound is a safe, effective and quick technique for diagnosing venous thrombosis in patients.[8]

Use of chemo-thromboprophylaxis is effective in preventing DVT, but is associated with the risk of major bleeding complications, so the use of chemo-thromboprophylaxis should be selective. Gent et al. found bleeding complications in 4% hip fracture patients during treatment with orgaran and aspirin.[17]

The current study did not use any mechanical or chemo-prophylaxis for DVT. The frequency of DVT was 3.66% which is relatively low compared to that observed in Western population.

In our study, the frequency of DVT was found to be higher in the injured limb than the non-injured limb, higher incidence of proximal DVT than distal DVT, and higher in patients suffering intertrochanteric femoral fracture than the femoral neck fracture.

The duration of fracture was greater among patients with DVT, which suggests that immobility increases the risk of DVT. However, the differences were not statistically significant.

Both of our post-operative DVT cases occurred during the early post-operative period (within 1 week of surgery). This correlates with the findings that DVT is much more common in the early postoperative period compared to the late rehabilitation period.

Preventive measures to reduce venous thromboembolic complications in orthopaedic surgery is a common practice in Western countries, but it is highly controversial in Pakistan as available reports show low incidence of DVT. However, thromboprophylaxis for our patients with risk factors for DVT should be considered individually. Large-scale multi-centric study on the incidence of DVT in hip fractures in Asian countries is needed to confirm the findings of the current study.

## Conclusion

The frequency of DVT in Pakistani geriatric patients with hip fractures both pre-operatively and post-operatively was found to be low compared to Western population. Thromboprophylaxis for patients with risk factors for DVT can be considered individually.

**Disclaimer:** None.
**Conflict of Interest:** None.
**Source of Funding:** None.

## References

1. Lee SY, Ro du H, Chung CY, Lee KM, Kwon SS, Sung KH, et al. Incidence of deep vein thrombosis after major lower limb orthopedic surgery: analysis of a nationwide claim registry. Yonsei Med J 2015;56:139-45.
2. Chotanaphuti T, Foojareonyos T, Panjapong S, Reumthantong A. Incidence of deep vein thrombosis in postoperative hip fracture patients in Phramongkutklao Hospital. J Med Assoc Thai 2005;88(Suppl 3):S159-63.
3. Cho YH, Byun YS, Jeong DG, Han IH, Park YB. Preoperative incidence of deep vein thrombosis after hip fractures in Korean. Clin Orthop Surg 2015;7:298-302.
4. Protty MB, Aithal S, Hickey B, Pettit R, Johansen A. Mechanical prophylaxis after hip fracture: what is the risk of deep vein thrombosis? A retrospective observational study. BMJ Open 2015;5:e006956. doi: 10.1136/bmjopen-2014-006956.
5. Piovella F, Wang CJ, Lu H, Lee K, Lee LH, Lee WC, et al. Deep-vein thrombosis rates after major orthopedic surgery in Asia. An epidemiological study based on postoperative screening with centrally adjudicated bilateral venography. J Thromb Haemost 2005;3:2664-70.
6. McCollum P, Chetter I. Venous Disorders. In: Williams N, Bulstrode CJK, O'Connell PR, editors. Bailey & Love's short practice of surgery. 26th Ed. Boca Raton, FL: CRC Press; 2013. pp 915.

7. Cogo A, Lensing AW, Koopman MM, Piovella F, Siragusa S, Wells PS, et al. Compression ultrasonography for diagnostic management of patients with clinically suspected deep vein thrombosis: prospective cohort study. Obstet Gynecol Surv 1998;53:284-5.
8. Mavalankar AP, Majmundar D, Rani S. Routine chemoprophylaxis for deep venous thrombosis in Indian patients: is it really justified? Indian J Orthop 2007;41:188-93.
9. Anand S, Buch K. Post-discharge symptomatic thromboembolic events in hip fracture patients. Ann R Coll Surg Engl 2007;89:517-20.
10. Sobieraj DM, Coleman CI, Tongbram V, Lee S, Colby J, Chen WT, et al. Venous thromboembolism prophylaxis in orthopedic surgery. [Internet] Rockville, MD: Agency for Healthcare Research and Quality (US); 2012 [cited 2016 January 09] Available from: https://www.ncbi.nlm.nih.gov/books/NBK92319/
11. Sen RK, Kumar A, Tripathy SK, Aggarwal S, Khandelwal N, Manoharan SR. Risk of postoperative venous thromboembolism in Indian patients sustaining pelvi-acetabular injury. Int Orthop 2011;35:1057-63.
12. Bagaria V, Modi N, Panghate A, Vaidya S. Incidence and risk factors for development of venous thromboembolism in Indian patients undergoing major orthopaedic surgery: results of a prospective study. Postgrad Med J 2006;82:136-9.
13. Wong KL, Daguman R, Lim KH, Shen L, Lingaraj K. Incidence of deep vein thrombosis following total hip arthroplasty: a Doppler ultrasonographic study. J Orthop Surg (Hong Kong) 2011;19:50-3.
14. Agarwala S, Bhagwat A, Modhe J, Dastur FD, Patil S. Incidence of deep vein thrombosis in Indian patients: a prospective study in 104 patients. Indian J Orthop 2003;37:5.
15. Liew NC, Chang YH, Choi G, Chu PH, Gao X, Gibbs H, et al. Asian venous thromboembolism guidelines: prevention of venous thromboembolism. Int Angiol 2012;31:501-16.
16. Stein PD, Kayali F, Olson RE, Milford CE. Pulmonary thromboembolism in Asians/Pacific islanders in the United States: analysis of data from the National Hospital Discharge Survey and the United States Bureau of the Census. Am J Med 2004;116:435-42.
17. Gent M, Hirsh J, Ginsberg JS, Powers PJ, Levine MN, Geerts WH, et al. Low-molecular-weight heparinoid orgaran is more effective than aspirin in the prevention of venous thromboembolism after surgery for hip fracture. Circulation 1996;93:80-4.