ORIGINAL ARTICLE

Incidence of deep vein thrombosis in elderly patients suffering acute fracture neck of femur and treated with hemiarthroplasty

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Abstract

Objectives: To determine the incidence of deep vein thrombosis (DVT) among elderly patients suffering from acute fracture neck of femur in a teaching hospital.

Study Design: Descriptive case- series

Setting and Duration: Orthopaedic Surgery Unit Mardan Medical Complex Teaching hospital Bacha Khan Medical College Mardan KPK, from April 2010 to May 2011.

Methodology: A total of 18 consecutive fracture neck of femur patients with a mean age of 80 years were investigated serially using Doppler ultrasound of the both lower limbs preoperatively and at 1 week, 3 to 6 weeks, and 3 months postoperatively. No chemoprophylaxis or prophylaxis against DVT was given.

Results: 5(27.7%) patients completed 3 Doppler ultrasound during hospitalization; 1 (5.5 %) of them were found to have developed DVT over the ilio-femoral venous segment. Of the 13(72.2%) patients who had no DVT, were reassessed 3 months after operation; none of them was found to have developed DVT. No patient was found to have pulmonary embolism.

Conclusion: This study shows that the incidence of DVT developing after acute fracture neck of femur in geriatric patients was low (5.5 %) without prophylaxis. We therefore do not recommend routine chemoprophylaxis for elderly patients with fracture neck of femur.

Keywords: deep vein thrombosis, fracture neck of femur, hemiarthroplasty

Introduction:

Hip fracture represents the second leading cause of hospitalization for elderly people.[1] Incidence increases substantially with age, rising from 22.5 and 23.9 per 100,000population at age 50 to 630.2 and 1289.3 per 100,000 population by age 80, for men and women, respectively.[2–5] Surgical management of femoral neck or intracapsular fractures is dependent upon patient age, activity level, health status, and surgeon preference.[6-11] Lower-limb deep venous thrombosis (DVT) affects between 1% to 2% of hospitalized patients.[12] Venous thrombosis may occur in more than 50% of patients undergoing surgical procedures, particularly those involving the hip and knee; and 10% to 40% of patients who undergo abdominal or thoracic operations.[13] The factors that predispose to venous thrombosis were initially described by Virchow in 1856 and are called Virchow's triad. These factors are venous stasis, damage to the vessel wall and hypercoagulability.[14] The incidence of developing pulmonary embolism secondary to proximal DVT varies from 35 to 50%.[15] Approximately half of all cases of deep-vein thrombosis after orthopedic surgery involve proximal leg veins.[16,17] The incidence of symptomatic thromboembolic events is relatively low, around 5%, during the perioperative period.[18]The overall incidence of pulmonary embolism in patients undergoing hip fracture surgery has been estimated to be between 3% and 24%, while fatal pulmonary embolism has been reported in between 2.5% and 13% of patients.[16,17,19,20,21] The need for systemic thromboprophylaxis, especially in surgical patients is based on the high prevalence of postoperative

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DVT and pulmonary embolism (PE), the frequent silent presentation of VTE and the potential for major adverse clinical outcomes.[19]

Subjects and methods:

In this study, we recruited a total of 18 consecutive patients who had suffered acute fractures neck of femur and were admitted to Mardan Medical Complex Teaching Hospital both inpatient and outpatient from April 2010 to May 2011.The mean duration between injury and operation of the patients was 5.3 days (range, 1–15 days).

No chemoprophylaxis against DVT, elastic compression stockings, or foot pumps were used. All consenting patients of both genders, 70 years of age and above with fracture neck of femur less than 2 week duration were included in the study. Exclusion criteria were patients who had a history of DVT, who suffered pathological fracture, age less than 70 years, liver disease with a deranged coagulation profile, or who had a known coagulation disorder.

All patients with fracture neck of femur fulfilling the criteria were enrolled into the study on the day of their admission in our unit. The rationale was explained in accordance with the principles laid down by the Ethics Committee Mardan Medical Complex Teaching hospital and informed written consent was obtained. Relevant history and X-ray Pelvis both hip joints AP and lateral view obtained. Hemiarhroplasty with Austin Moore Prosthesis (AMP) under general anesthesia were carried out in all patients on the immediate elective operation list using direct lateral approach of Harding's. Doppler ultrasound was used as the screening test for venous thrombosis. Both the injured and the non-injured limbs were tested. The tests were done at the immediate preoperative period (1–2 days before operation), early postoperative period (5–7 days after operation), late postoperative period (3–6 weeks after operation), and follow-up period (3 months after operation). One trained doctor of the radiology department performed Doppler ultrasound of all the patients. A diagnosis of DVT was made if any of the following sonographic criteria was shown: sonographic visualization of thrombus in vein, loss of compressibility of vein by ultrasonic probe pressure, and loss of phasic flow signal or loss of augmentation of flow with distal compression. The patients were monitored clinically for any symptoms of pulmonary embolism.

The data was analyzed using SPSS version11. Mean, Mode, Median, Percentages, Frequencies and ratios were recorded where necessary. No statistical test was applied because the study design was descriptive.

R**esults:**

The study was conducted in Orhopaedic Surgery unit Mardan Medical Complex Teaching Hospital Bacha Khan Medical College Mardan. A total of 18 patients of fracture neck of femur were included in the study. Out of these 7(38.8 %) were male and 11(61.1 %) were female. The minimum age of the patient was 71 years while maximum was 92 years. The mean age was 80 years and the mode and median age was 78 years. 13(72.2 %) patients had right sided fracture while 5(27.7%) had left sided fracture neck of femur. Of the patients, 12(66.6%) patients suffered Garden type IV neck of femur fracture (completely displaced fracture on X-ray AP view) while 6(33.3%) patients had Garden type III fracture(minimally displaced fracture on X-ray AP view).The average time of surgery was 45 minutes. 5(27.7%) of our patients completed three Doppler ultrasound during hospitalization, one preoperatively (1–2 days before operation), while other at 1 week, and at 3 week postoperatively; and only 1 (5.5 %) of them (a female age 80 years) was found to have developed DVT over the ilio-femoral venous segment in the non operative side during hospitalization (10th post- op day); however, she had no pulmonary embolism clinically and radiologically. Of the remaining 13(72.2%) patients who had no DVT, were reassessed 3 months after operation; none of them was found to have developed DVT.

Discussion:

Following hip fracture surgery, patients are at increased risk of deep venous thrombosis (DVT)

with incidence rates of 27% for proximal DVT. Incidence rates for fatal pulmonary embolism(PE)range from 1.4% to 7.5% in the first 3 months following hip fracture surgery.[22,23] The annual incidence of venous thromboembolism is approximately 0.1%; the rate increases from 0.01% among people in early adulthood to nearly 1% among those who are at least 60 years old.[24] In our study only one patient is reported to be a victim of deep vein thrombosis on Doppler ultrasound while a study done in 19 centers across Asia[25] showed that rate of venographic thrombosis in the absence of thromboprophylaxis after major joint surgery in Asian patients was 41%, which is similar to that previously reported in patients in western countries. This study is further supported by another small study done on 88 patients[26] that showed the prevalence of post-operative DVT similar to that in western population (50% - 75%). But the diagnostic tool for DVT in that study was venography while we used Doppler ultrasound for diagnosis of DVT. Batool S and Shaukat A in a local study reported that 46% of the patients were having DVT, when examined through Doppler Ultrasonography.[27]

Another local study concluded that colour flow Doppler Sonography, the non-invasive technique, alone is enough to diagnose DVT as it has got a high sensitivity and specificity. This offers a clinician the most reliable and accurate method just short of Venography.[28] In one retrospective study, the incidence of VTE is reported to be 28%in South Indian population. [29] Another retrospective study also emphasized the significant (1.79 per thousand _ general population) incidence of DVT in India.[30]

Contrary to this, a subsequent small prospective study[31] has shown that incidence of DVT in Indian patients is very low and is not comparable with American and European populations. It is controversial whether the incidence of thromboembolic disease among Asian populations is as common as that among Caucasian populations.[32] Among Chinese patients suffering from hip fracture, a study using venography as the screening test reported that the incidence of DVT was 53.3% in 1980.[33] In that study, the majority of DVT were located in the calf, whereas DVT proximal to the popliteal vein occurred in only 8.3% of the patients. In a Malaysian study in 1996, a 50% incidence of DVT in patients suffering from hip fracture was reported.[26]

A prospective observational study on epidemiology of venous thromboembolism in Asian patients undergoing major orthopedic surgery without thromboprophylaxis (The SMART Study) done on 2420 patients reveals that the incidence of symptomatic VTE in Asian patients is not low and is consistent with the rate observed in western countries.[34]

In our study we did all of our surgeries on general anesthesia, but the type of anesthesia used can also influence thromboembolic risk. In patients undergoing hip fracture surgery, for example, the incidence of venographically documented deep-vein thrombosis is approximately twice as high with general anesthesia as with subarachnoid blockade.[35, 36] A systematic review of 22 trials (2,567 participants) demonstrated reduced risk of mortality at 1 month post fracture (RR=0.69 (0.50, 0.95)) and DVT (RR=0.64 (0.49, 0.95)) with use of regional anesthesia.[37] DVT was more common in patients who had received general rather than epidural anesthesia, with borderline significance ($p = .06$). The length of anesthesia and the joint involved (hip or knee) were not predictive of DVT ($p > .10$).[38]

In our study DVT was diagnosed on 10 th post operative day and no pulmonary embolism was recorded while one study reported deep venous thrombosis at a median of 24 days and pulmonary embolism at 17 days after surgery for hip fracture Venous thromboembolism was diagnosed after discharge from hospital in 70% of patients who developed this complication.[39]

In our study DVT was diagnosed in the non operative limb .This is in contrast to a study which noted that the odds of having DVT were 20 times higher in the leg that was operated upon than in the leg that was not and the odds of DVT rose by a factor of 1.5 per decade of life; and the odds of DVT were 3.4 times greater in men than

in women. The length of anesthesia and the joint involved (hip or knee) were not predictive of DVT ($p > .10$).[38]

Similar to our study one study conducted in Hong Kong in 2004 also reported a very low incidence of DVT(5.3%) without prophylaxis after hip fracture surgery in 100 consecutive patients and the authors do not recommend routine chemoprophylaxis for elderly patients with hip fractures.[40]

Conclusion:

Venous Thromboembolism (VTE) is an important healthcare problem the world over, resulting in significant morbidity, mortality and resource expenditure. As very little research data regarding prevalence/incidence of DVT and PE are available so far in this country, the need for more research cannot be over emphasized. Incidence and prevalence studies in various sub groups of patients would benefit in defining any alterations needed in the prophylactic methods published in western literature This would help to evaluate the true risk of VTE and suggest the best mode of prophylaxis. However based upon our study we concluded that the incidence of DVT developing after acute fracture neck of femur in geriatric patients with no prophylaxis was low (5.5%). We therefore do not recommend routine chemoprophylaxis for elderly patients with fracture neck of femur.

References:

1. Wilkins K. Health care consequences of falls for seniors. Health Reports. 1999;10:47–5.
2. Brainsky A, Glick H, Lydick E, et al The economic cost of hip fractures in community-dwelling older adults: a prospective study. J Am Geriatr Soc.1997; 45:281–7.
3. Cooper C, Campion G, Melton LJ. Hip-fractures in the elderly—a worldwide projection. Osteoporosis Int. 1992; 2:285–9.
4. Gullberg B, Johnell O, Kanis JA. World-wide projections for hip fracture. Osteoporosis Int. 1997; 7:407–13.
5. Maggi S, Kelsey JL, Litvak J, Heyse SP. Incidence of hip fractures in the elderly: a cross-national analysis. Osteoporosis Int. 1991; 1:232–41
6. Bhandari M, Devereaux PJ, Swiontkowski MF et al. Internal fixation compared with arthroplasty for displaced fractures of the femoral neck: a meta-analysis. J Bone J Surg [Am] 2003;85:1673–81.
7. Masson M. Internal fixation versus arthroplasty for intracapsular proximal femoral fractures in adults. Cochrane Database Syst Rev. 2002 Issue 4.
8. Parker MJ, Blundell C. Choice of implants for internal fixation of femoral neck fractures—meta analysis of 25 randomised trials including 4925 patients. Acta Orthop Scand. 2002;69:138–43.
9. Parker MJ. Arthroplasties (with and without bone cement) for proximal femoral fractures in adults. Cochrane Database Syst Rev. 2004 Issue 2.
10. Parker MJ. Internal fixation implants for intracapsular proximal femoral fractures in adults. Cochrane Database Syst Rev. 2001 Issue 4.
11. Tidermark J, Ponzer S, Svensson O, Soderqvist A, Tornkvist H. Internal fixation compared with total hip replacement for displaced femoral neck fractures in the elderly. A randomised, controlled trial. J Bone Jt Surg [Br] 2003;85:380–8.
12. Line BR. Pathophysiology and diagnosis of deep venous thrombosis. Semin Nucl Med. 2001;31(2):90-101.
13. Creager MA, Dzau VJ. Vascular diseases of the extremities, in-Fauci AS, Martin JB, Braunwald E, et al (ed): Harrisons Principles of Internal Medicine 14 edition, 2001;pp 1403.
14. Agarwala S, Bhagwat A, Sharma A, et al. Local and general factors are the likely cause of venous thrombosis in lower limb arthroplasty. Thromb Haemost 2004;92:1167-9.
15. Moser KM, LeMoine JR. Is embolic risk conditioned by location of deep venous thrombosis? Ann Intern Med 1981;94:439–44.
16. Paiement GD, Mendelsohn C. The risk of venous thromboembolism in the orthopedic patient: epidemiological and physiological data. Orthopedics. 1997; 20 Suppl:7-9.
17. Nicolaides AN, Breddin HK, Carpenter P V et al. Prevention of venous thromboembolism. International Consensus Statement. Guidelines compiled in accordance with the scientific evidence. Int Angiol. 2001; 20:1- 37.
18. Anderson FA Jr, Spencer FA. Risk factors for venous thromboembolism. Circulation. 2003; 107(23 Suppl 1):I9-I16.
19. Geerts WH, Bergqvist D, Pineo GFet al.Prevention of venous thromboembolism. Chest. 126;2004:338S-400S
20. Edelsberg J, Ollendorf D, Oster G. Venous thromboembolism following major orthopedic surgery: review of epidemiology and economics. Am J Health Syst Pharm. 2001; 58 Suppl 2:S4-S57.
21. Gillespie W, Murray D, Gregg PJ, Warwick D. Risks and benefits of prophylaxis against venous thromboembolism in orthopaedic surgery. J Bone Joint Surg Br. 2000; 82:475-479.
22. Todd CJ, Freeman CJ, Camilleri-Ferrante C et al. Differences in mortality after fracture of hip: the east Anglian audit. BMJ. 1995; 310:904–8.
23. Anderson FA, Jr, Wheeler HB, Goldberg RJ et al. A population-based perspective of the hospital incidence and case-fatality rates of deep vein thrombosis and pulmonary embolism. The Worcester DVT Study. Arch Int Med. 1991; 151:933–8.
24. Lindblad B, Bergqvist D, Nordstrom M et al [A survey in Malmo. The frequency of venous thromboembolism has not changed during the last 30 years] Lakartidningen 1992;89:2941-2.
25. Piovella F, Wang CJ, Lu H et al. Deep-vein thrombosis rates after major orthopedic surgery in Asia. An epidemiological study based on post-operative screening with centrally adjudicated bilateral Venography. J Thromb Haemost 2005;3:2664-70.
26. Dhillon KS, Askander A, Doraiswamy S. Post Operative DVT in Asian Patients is not a rarity: A prospective study of 88 patients with no Prophylaxis. J Bone Joint Surg Br 1996; 78:427-30.
27. Batool S, Shaukat A, Ahmad KK, Khan TQ, Qureshi A, Anjum MN. Is it always DVT? evaluation of leg swelling with color Doppler Sonography. Ann King Edward Med Uni 2005;11(3):277-8.
28. Zahid M,Tahir M,Sadaf R,Khan MN,Khattak I. Appraisal of clinical features and color flow Doppler studies in diagnosing deep vein thrombosis in clinically suspected cases of DVT J Med Sci 2005;13(2):157-60.
29. Shead GV, Narayan R. Incidence of Post Operative VTE in South India. British Journal of Surgery 1980;67:813-4.
30. Vijayraghavan KS, Sharma S, Pai VM, et al. DVT in South Indi-

an Population. Indian Journal of Surgery 2001; 63:199-201.
31. Jain V, Dhoan BK, Jaiswal A, V Nigam, J Singla. DVT after Total Hip and Knee Arthroplasty in Indian Patients. Post Graduate Medical Journal 2004;80:729-731.
32. Nandi P, Wong KP, Wei WI, Ngan H, Ong GB. Incidence of postoperative deep vein thrombosis in Hong Kong Chinese. Br J Surg 1980; 67:251–3.
33. Mok CK, Hoaglund FT, Rogoff SM, Chow SP, Yau AC. The pattern of deep-vein thrombosis and clinical course of a group of Hong Kong Chinese patients following hip surgery for fracture of the proximal femur. Clin Orthop 1980; 147:115 -20.
34. Leizorovicz A, Turpie AG, Cohn AT, Wong L, Yoo MC, Dans A. For the SMART Study Group. Epidemiology of venous throboembolism in Asian patients undergoing major orthopedic surgery without thromboprophylaxis. The SMART Study. J Thromb Haemost 2005;3:28-34.
35. Kahn SR. The clinical diagnosis of deep vein thrombosis: integrating incidence, risk factors, and symptoms and signs. Arch Intern Med. 1998; 158:2315-2323.
36. McKenzie PJ, Wishart HY, Gray I, Smith G. Effect of anaesthetic technique on deep vein thrombosis. A comparison of subarachnoid and general anaesthesia. Br J Anaesth. 1985; 57:853-857.
37. Parker MJ, Handoll HH, Griffiths R. Anaesthesia for hip fracture surgery in adults. Cochrane Database Syst Rev. 2004 Issue 4.
38. Davidson HC, Mazzu D, Gage BF, Jeffrey RB. Screening for deep venous thrombosis in asymptomatic postoperative orthopedic patients using color pler sonography: analysis of prevalence and risk factors. AJR Am J Roentgenol. 1996; 166(3):659-62.
39. Bjornara BT, Gudmundsen TE, Dahl OE. Frequency and timing of clinical venous thromboembolism after major joint surgery. J Bone Joint Surg Br. 2006; 88(3):386- 91.
40. Chan YK, Chiu KY. The incidence of deep venous thrombosis in elderly Chinese suffering hip fracture is low without prophylaxis: A perspective study using serial duplex ultrasound. Journal of Orthopaedic Surgery 2004;12(2):178-183.