

Prevalence Of Deep Vein Thrombosis In Individuals Suffering From Fractures Of The Intertrochantric Femur.

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Abstract

Introduction: The incidence of deep vein thrombosis (DVT) in trauma patients varies, and fatal pulmonary embolism (PE) may be the first manifestation. Trochanteric femoral fractures result from trauma in younger age groups and may require prolonged immobilization, associated with an increased risk of DVT. Therefore, we sought to determine the occurrence of DVT in patients with intertrochanteric femoral fractures.

Objectives: This study was initiated to assess the incidence of deep vein thrombosis (DVT) or pulmonary embolism (PE) in isolated Inter-Trochantric fractures and to determine the need for routine thromboprophylaxis in such patients

Methods: This was a prospective study conducted over a period of one and a half years. All patients with isolated femoral intertrochanteric fractures were included. Patients with other known risk factors for DVT were excluded, leaving Inter-Trochantric fracture as their only risk for DVT. All patients were evaluated clinically and by diagnostic methods such as Color Doppler, compression ultrasound, D-dimer analyzes and CT venography (when necessary). Patients were followed for 8 weeks after surgery.

Results: A total of 132 patients with Inter-Trochantric fractures were evaluated, of which 84 were men with a mean age of 46 years and 48 were women with a mean age of 57 years. A total of 18 cases of radiologically confirmed DVT were observed. Of these cases, 10 (54%) had clinical DVT. Complete thrombus resolution was observed in all patients, assessed by Color Doppler 6 weeks after diagnosis. Although the majority of cases (12) occurred in patients older than 50 years, this was not statistically significant. No incidence of PE was seen.

Conclusion: DVT occurs frequently in patients with intertrochanteric fractures, and all such patients should be routinely examined both clinically and radiologically. If surgery is delayed or the patient is bed ridden for long period, we recommend thromboprophylaxis for this subset of trauma patients.

Manuscript

Introduction : Deep vein thrombosis (DVT) may be a common preventable cause of morbidity and mortality in injury patients who survive the primary 24 hours [1] It incorporates deep venous thrombosis (DVT) in extremity, pelvic veins and their embolisation to the respiratory circulation (PE). Frequency of DVT changes from 10 to 77%; depending on the type of fracture, patient profiles and modalities of diagnosis. [1,4] DVT clinically presents with limb swelling, calf tenderness and positive Homan's sign. PE presents with tachypnoea, tachycardia, chest pain and dyspnea; these symptoms may be clinically silent in more than 50% of cases and fatal PE can be first manifestation of DVT. [1,3] Usually in fracture patients lower appendage swelling/pain, chest pain, breathlessness and fever can all happen due to trauma per se. [4] Chemoprophylaxis is detailed to be most successful in lowering the incidence of DVT in cases of injury and arthroplasties. [1,2,5] Chemoprophylaxis in addition to being expensive, is additionally related with side impacts like bleeding, wound hematoma and likely increment in infection. [6,9] In this way it is basic to recognize the subgroup among injury patients in whom good thing about DVT prophylaxis is likely to exceed the hazard. Intertrochanteric femur fractures result from high velocity trauma in more young age group. They may be related with injury to vascular structures around the hip and might require prolonged immobilisation. [1,6] Subsequent surgery may cause damage to the vascular endothelium. As per Western data on DVT in pelvi-acetabular fracture, it varies from 10% to 60%, and almost 50% of these thrombi include the proximal veins. [1,3,10,12] There's a wide variation in frequency of

DVT among Asian patients (0-65%). Whereas data on Asians patients undergoing surgeries (arthroplasties and pelvi-acetabular surgeries) report rate of DVT proportionate to the western writing (up to 62.5%); most studies report low frequency and counsel against schedule chemoprophylaxis in this population.[13-20] A few consider that built up thrombi in Asian patients resolve spontaneously without any long term consequences.[20,21] A few other report increasing rate of DVT in India, ascribed to changing life styles and better diagnosis.[22,23] however 100% thromboprophylaxis for injury patients isn't practiced in most hospitals.[24,26]. To know whether inter-trochantric femur fractures per se, constitute a major hazard figure for DVT, to require thromboprophylaxis in schedule, there's need of information from Indian population, to survey occurrence of DVT in patients having inter-trochantric femur fractures and the above study was conceptualised to assess the same.

Materials and methods: It was a prospective study conducted over a period of one and a half years. All patients with isolated inter-trochantric femur fractures presenting were included in the study. Patients below 18 years and above 70 years of age, those with renal failure or those allergic to the dye for angiography and patients with high risks for DVT; underlying medical conditions (myocardial infarction, cardiac or respiratory failure, nephrotic syndrome, underlying malignancy, collagen vascular disease); on oestrogen for contraception or on Hormone replacement therapy (HRT). Additionally, those with associated fractures at sites other than the inter-trochantric femur, spinal cord injury and blunt trauma to chest or abdomen, were all excluded. These patients were put on chemoprophylaxis. Patients with associated vascular injuries were also excluded, as they were likely to receive Heparin for treatment. In all included patients, monitoring was done for pulse rates, blood pressure and respiratory rates from the time of admission in the hospital. Adequate hydration was ensured and all patients were encouraged to perform active and passive physiotherapy as tolerated. After getting informed consents, patients were enrolled in the study. Routine investigations included haemoglobin level, renal function tests, arterial blood gases estimation, coagulogram and d-dimer assay, in all the patients. Delays between injuries and surgeries were recorded for all the patients; a record was also maintained about type of injury, type of anaesthesia used, position during surgery, and duration of surgery. All patients included in the study were encouraged for non weight bearing physiotherapy within 24 hours of surgery. No chemoprophylaxis for DVT was given to patients included in the study. They were evaluated daily for signs and symptoms of DVT and PE; recent onset lower limb swelling, calf tenderness, breathing problems and pleuritic chest pain. Those patients having evidence of DVT were treated with subcutaneous Enoxaparin followed by oral Warfarin. All patients underwent clinical examination daily from the first day onwards, during their stay at the hospital, therefore having close monitoring for DVT. Compression ultrasound, Color doppler study and d-dimer assay were done on day 1st, 7th and then after 2,4 and 8 weeks, post-operatively. In suspected cases for PE, CT angiography was done.

Results: A total of 132 patients with Inter-Trochantric fractures were evaluated, operated on and studied over a period of one and a half years. There were 84 men (average age 47 years) and 48 women (average age 58 years) in the research group. A total of 18 radiologically confirmed cases of DVT (12%) were observed during the study period, with no incidence of PE. Clinically DVT was found in 10 of these cases. DVT did not develop in 14 patients in the age group of 18-30 years. Of the 18 radiologically proven cases of DVT, 6 patients were in the age group of 31-50 years and 6 patients were older than 50 years. There were 8 males and 10 females. However, the difference between age group and gender was not statistically significant ($p < 0.19$). The median delay between injuries and surgery was 3 days. Many patients were referred to our center from peripheral centers, so admission took time. All but one patient was operated on under caudal epidural anesthesia. General anesthesia was administered due to failure of spinal anesthesia. Patients with either trochanteric femoral nailing or dynamic hip screw on the traction table. From the next day, non-weight bearing walking with crutches/physiotherapy was started for all patients. Thromboprophylaxis was not used in any patient. One patient died during surgery due to cardiac causes (DVT was negative before surgery). In the postoperative period, DVT was suspected for clinical reasons in 32 patients (24 - lower extremity swelling, 8 - calf pain), which led to an earlier radiological evaluation of these patients. Of these 32 patients, 10 were radiologically diagnosed with DVT. The remaining 8 DVT-positive patients without clinical symptoms were diagnosed on serial radiological evaluation. Of the 18 patients with a positive diagnosis of DVT, 12 were diagnosed by compression ultrasound and venous color Doppler. Two of the remaining three patients had a suspicious lesion in the proximal veins on Color Doppler. All these 6 cases were positive by CT venography. 12 of 18 patients who were radiologically positive for DVT had D-dimer values greater than 5. However, a total of 30 patients had values greater than 5; these were usually younger patients and had severe injuries. Other patients had values below 4. Also, 6 DVT patients were less than 4. 6 DVT patients underwent surgery within a week of admission, and 12 cases underwent surgery within 2-4 weeks. All radiologically proven DVT cases were started on subcutaneous enoxaparin and switched to oral warfarin when a therapeutic INR (2-3) was maintained for 24 hours. Warfarin was continued for 6 weeks when thrombus detachment was evident with normal venous flow by Doppler in all 9 patients initially diagnosed with DVT. All these patients showed complete resolution of thrombus by Color Doppler after 6 weeks..

Discussion: Deep vein thrombosis could be a common complication in post injury patients.[1,3] Chemoprophylaxis using low molecular weight heparin (LMWH) is the foremost drug against DVT.[5,6] Asians are considered to have lower risk of DVT than Caucasians, and a few considers on Asians living within the west bolster this.[27,28]. Incidence of DVT in orthopedic patients in this ethnic group, allow variable frequency of DVT.[7,15] A few thinks that most of the thrombi in this population are distal which resolve spontaneously without any long term results; whereas others report on the contrary.[13,21] There are exceptionally few who thinks about for DVT, in orthopedic patients in India and they don't clear the predicament. Whereas a few report high incidence rate (comparable to western thinks about), other report low frequency (0%-10%).[15,29-33] Most of these studies have been done on patients experiencing arthroplasties or pelvic surgeries. Not at all like in an elective surgery, pathogenesis of DVT in injury begins instantly after injury. Components of Virchow's triad like post traumatic hypercoagulability; generation of thrombin begins inside 24 hours of injury and seem active upto 14 days.[34] Injury patients too have diminished serum levels of Antithrombin III, due to release of tissue factor in circulation.[34,35] Lack of hydration, immobilization and numerous transfusions further add to the state of hypercoagulability.[1,5] The prothrombotic state after major injury isn't restricted to the location of injury, but the whole milieu in injury patients is hypercoagulable, as recommended by thrombi at location far off from the injury, sometimes indeed in the contralateral limb.[6,34,35] The same reason causes failure of thromboprophylaxis and increased necessity of heparin after injury. Up to 68% of thrombi related with injury are proximal, which are more likely for proximal proliferation and embolisation than distal thrombus.[1,36] The clinical signs are not confirmatory in determination of DVT in injury patients.[1,4,36,37] Fatal PE can happen without earlier caution in nonappearance of any clinical signs and symptoms.[4,36] Most injury cases require surgery, and during surgery can result in dislodgement of preformed thrombus.[5,35,37] It is detailed that predominance of DVT in trauma patients is higher than arthroplasty patients. The pathophysiology of DVT in injury patients is distinctive from patients experiencing elective surgeries, and most of thrombi in these patients are proximal.[1,3,6] Inter-trochantric femur fractures are related with high speed injury, but by trivial trauma in geriatric age group with osteoporotic bones; the chance of DVT are high. By examining Indian patients with isolated inter-trochantric femur fractures, we have gotten a noteworthy perception regarding occurrence of DVT in them. The rate of DVT in orthopedic patients shifts from 10% to 77% in different studies.[1-4] At whatever point CT Venography was utilized as diagnostic modality, exceptionally high rate of DVT has been detailed like by Aggarwala et al. (45.4%) and Dhillon et al. (50%).[13,15] The reason may be that, by CT venography unnoticeable thrombi are moreover recognized, which don't move proximally to cause PE and they dissolve up with time, subsequently requiring no active mediation. We moreover utilized CT venography in those cases where there was clinical doubt, but finding was not confirmed on compression ultrasound or Color Doppler. CT venography cannot be utilized as a routine diagnostic methodology as there's high radiation exposure and it is costly. We had 18 patient DVT positive, out of which as it were 6 confirmed by CT venography. We need conclusive protocol with respect DVT in patients with inter-trochantric femur fractures, and a screening plan, particularly for these patients.. We moreover had excluded all patients over 70 years of age considering the fact that advanced age is itself a predisposing factor. Applying these criteria we got patients who had no other risk factor other than inter-trochantric femur injury itself. Incidence of DVT in our country is considered within the range depicted by different studies. All patients who were DVT positive had proximal DVT, the significance of which lies that they are more inclined for PE, but none of the patients really had PE. Clinical signs, as a diagnostic tool for DVT were not effective. We did not discover any correlation between fracture type and occurrence of DVT. We moreover watched higher rate of DVT with increasing age. Increasing age is a figure most reliably related with DVT chance in injury patients.[1,3,37-39] 12 out of the 18 patients were over age of 50 years, but we had 6 patients within the age group of 30-50. In spite of the fact that indian patients are supposed to have low incidence, we found that in patients having inter-trochantric femur fractures have high chance for DVT. In previous studies only single diagnostic modalities was used. However we have used numerous modalities, in addition to the clinical evaluations, subsequently not taking off any stone unturned to reach our goal. Multiple modalities help in diagnosing DVT in all patients. Our study suggests that, patients having inter-trochantric femur fractures have high chances of DVT. Clinical criteria are not exceptionally valuable in diagnosing DVT; but when show, are suggestive for the same. It can happen indeed upto 4-8 weeks after damage and in patients of all age groups; in any case the hazard increases with age. However, larger number of patients and longer follow-ups will unquestionably include to our perceptions and we suggest encourage expansive scale multi centric thinks about to substantiate our finding.

5. Conclusion: The occurrence rate of DVT is high in patients with inter-trochantric femur fractures. The provision of its screening both clinically and radiologically, should be considered in all such patients. In patients above 50 years of age, monitoring should be done at more frequent intervals as these patients have higher incidence of DVT, and many patients have age related co-morbidities, thus increasing their morbidity. We recommend routine chemoprophylaxis for DVT in this subset of trauma patients.

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