

INCIDENCE OF POST-OPERATIVE DEEP VEIN THROMBOSIS IN PATIENTS WITH LOWER LIMB OPEN FRACTURE

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Summary

Background: Venous thromboembolic (VTE) disease with its high morbidity and mortality is currently one of the most serious postoperative complication, (DVT) can lead to fatal pulmonary embolism (PE). or the development of post thrombotic syndrome.

Patients and methods: This is a prospective study which was carried on 85 patients had single lower limb open fracture with no other major injuries in other sites of body (with the exception of superficial wounds or bruises) .They were divided into groups according to age, gender, weight, type of fracture, methods of immobilization, duration of hospitalization, duration of operation. All the patients including asymptomatic patients were subjected by the fourth postoperative day for duplex untrasonography study.

Results: The total number of patients with DVT that documented by Duplex study was 27 patients with in incidence of (31.76%), the incidence of DVT is higher in proximal lower extremity fractures as around hip (45.45%) Versus (12.5%) in lower tibial fractures. the incidence of DVT increased with increasing severity of open fracture; (50% in Gustilo type III B. 10% in Gustilo type I).

Conclusion: Age, weight, female gender, and severe open fracture proximal part of the lower limb, long hospitalization, prolong surgery are risk factors in the development of (DVT).

Keywords: Post operative deep Venous thrombosis. Open fractures lower limb . Duplex ultrasound.

Introduction :

Deep vein thrombosis (D.V.T) and its sequels are major health problem that often result in a significant postoperative morbidity and mortality(1).

Venous thromboembolic disease occurs for the first time in approximately 100 per 100.000 persons each year and increases exponentially with age from a negligible rate for those younger than 15 up to 500 per 100.000 in individuals older than 60 years. Two thirds of symptomatic venous thromboembolic diseases present as a D.V.T whereas one third present with pulmonary embolism (P.E) (2).

The risk of venous thromboembolic disease varies depending on the surgical procedure been performed, as total hip and knee joint replacements, or surgical procedures for fractures around the hip or the knee where reported D.V.T rates vary from 20.40% and increase when surgery is delayed by two days or longer (2) (7).

Patients undergone foot and ankle surgery the reported D.V.T rate was 0.22% with a 0.15%, rate of nonfatal pulmonary embolism (3)(16). Patients with hip fractures who are not treated prophylactically face a 3% to 12% mortality rate.

Patients suffered lower limb fractures of various age groups subjected in this study to reveal the incidence of postoperative D.V.T by means of sonography examination as well as clinical signs and symptoms.

Patients Methods:

This is a prospective study that was carried on (85) patients 27 female & 58 male from those who where admitted in the orthopedic unit in the hospital of surgical specialties Medical City (Teaching) hospital during the period form August 2006 to the end of August 2007.

The patients selected for the study are those having single lower limb open fracture with no other major injuries at other sites of the body apart form superficial wounds or bruises.

The patients were divided in to eight groups according to the site of fracture, methods of treatment and the type of open fracture according to Gustillo classification excluding type III C. and bilateral lower limb fracture, and injuries associated with pelvic, or abdominal, or spinal, head, or chest injuries.

All patients were subjected to wound excision, meanwhile the fracture delt with by various methods of immobilization e.g. external fixation or plaster casting (P.O.P) or conservatively by skeletal traction.

Full data including history & mode of injury, clinical examination weight & hight recording. calf pain or tenderness, limb erythema, pallor or cyanosis. Tender palpable vein. All patients subjected postoperatively for Duplex ultrasonography study of lower limb's veins after the fourth post-operative day. Duplex study was done by using Siemens (Elegram)* SSN, 7933, under supervision of specialist radiologists.

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Results:

Eighty five patients included in this study, 27 patients (31.8%) had developed D.V.T, 12 female patients and 15 male. With female: male ratio of 1.7:1.

The incidence of D.V.T among the younger age group (10- 39y) was (17.49%) and among the patients > 60 was (58.33%).Table (1).

Table (1): age and gender distribution of patients and the incidence of DVT.

Age	No. of female patient	No. of female patients with DVT	No. of male patient	No. of male patients with DVT	No. of patients in both sex	No. of DVT patients in both sex and % to age group
10- 39	11	4	28	3	39	7 (17.4%)
40- 59	11	5	23	8	34	13 (38.2%)
> 60	5	3	7	4	12	7 (58.33)
Total	27	12	15	15	85	27 (31.8%)

Eleven patients designated as thin (BMI value18-20) one patient developed D.V.T (9.09%), thirty two patient of normal weight (BMI- value (20-25), ten patients developed D.V.T., the incidence was 41.66% in the over weight patients; ten out of (24) patient.

D.V.T incidence was 50% in (18) obese patients (BMI above 27), as 9 patients developed D.V.T .

Table 2 site of fracture and D.V.T incidence

Level of fracture	No. of patents	No. of patient with D.V.T	%
Around hip and femoral shaft	26	11	42.5%
Around the knee	29	8	42.1%
Tibial shaft	18	3	16.7%
Ankle & foot	14	1	12.5%
Both femur & tibia	8	4	50%

Ten patients out of 85 patient had Gustillo type I open fracture, one patient developed D.V.T (10%). thirty one patients with Gustillo type II, eight patients (25.8%) developed D.V.T., thirty two patients with Gustillo type III A, 12 patients (37.5%) developed D.V.T. Twelve patients with Gustillo type III B, 6 patients (50%) developed D.V.T. Thirteen patients had procedure that lasted more than 60 min. 7 patients (53.9%) developed D.V.T.

Forty eight patients had procedure lasted between 30-60 minutes. 18 (37.5%) patients developed D.V.T.

Twenty four patients had procedure lasted less than 30 minutes, 2 patient (21.4%) developed D.V.T.

Hospitalization period was more than one week for 36 patients, 17 patients developed D.V.T (47.3%), 49 patients stay in hospital for less that one week 10 patients developed D.V.T (20.4%).

Table (3): Incidence of D.V.T in relation to the methods of fracture immobilization.

Method of fracture immobilization	No. of patients	No. of pat. with D.V.T	%
Skeletal traction	14	8	57.14%
External taxation	61	18	29.5%
Plaster casting	10	1	10%
Total	85	27	(31.76%)

Discussion:

Deep vein thrombosis represents one of the most Commonly occurring and serious medical condition following hospitalization for serious illness or major surgery(4).

The incidence of D.V.T increased with age, as patients over 40 years has significant risk compared with younger age group. (2) (5), this study showed that the incidence of D.V.T is increased in both male & female with increasing age, it is 3 times more in those older than 60 year than those younger than 40 years (58.33%) versus (17.49%) .

It is well documented that no sex prevalence exists, except in women using birth control pills (5), where male to female ratio around 1.2:1 (6)(12)(17). In this study there is increased risk of D.V.T in female even without pills with female to male ratio 1.7:1.

Obesity increases the risk of D.V.T because Obesity may be associated with longer period of immobility postoperatively than those with normal weight or thin patients.

The incidence of D.V.T varies with the anatomical site of the surgical procedure; where it is 25% in general surgery, 50% after hip or knee arthroplasty 43% after fracture of femur and 24% after neurosurgery(4). This study showed that the incidence of D.V.T varies also with the site of the fracture in the lower limb with higher risk of D.V.T in femoral fracture compared with tibial fracture, this may be related to prolonged bed confinement post operatively, this is further more noticeable in patients with fractures around the hip (21). Where the highest incidence in our patient was (42.5%), in addition to the high rate of limitation of movement, there is difficulty in performing sitting or standing not to mention walking up by crutches.

The incidence of D.V.T as shown by this study is more in patient with fractures around the knee than tibial shaft or fractures around the ankle joint or foot. 42% and 12% respectively it is obvious that it is related to the prolonged immobilization based upon painful hoemarthrosis of the knee joint especially when the external fixation had crossed the knee joint. (11) (15)

The incidence of D.V.T increased in more severe open fracture it is 5 times more in Gustillo type III B patient (50%) than Gustillo type I open fracture patients(10%).

This results corroborate with other studies by Dahl & koopman that enforce and support our findings (7) (13), the reasons of increased incidence related to the fact that the more extensive soft tissue damage, the more damage to venous system in addition that with severe injury there is usually need for multiple operations e.g wound excisions & wound Coverage, therefore longer hospitalization secondly that patients with less severe injury as

Gustillo type I will permits early mobilization from the bed(16) (17).

This study showed too, a high incidence of D.V.T in patients treated with skeletal traction in comparison with those treated by external fixation with early mobilization, less venous stasis, less chance of D.V.T formation. Table (3)

Most D.V.T occur in patients with long duration of operative procedure (weinmann). (19), in this study the incidence is about two times more in patients with surgical procedure lasted more than 60 minute (53.9%) than those patients underwent surgical procedure lasted less than 30 minutes (21.4%).

The bed side diagnosis of venous thrombosis is insensitive and inaccurate, many non thrombotic conditions produce signs and symptoms suggestive of D.V.T., studies have repeatedly documented this inherent difficulty of the clinical diagnosis of lower extremity's D.V.T. (8)(11)(18)

However, this study show that patients with fractures of lower limb show signs & symptoms similar to that of D.V.T and because of non specificity of those signs & symptoms and because the consequence of missing diagnosis is serious, it must be with efforts to exclude whenever it is feasible to establish the diagnosis, by duplex study post operatively (19) (20).

Conclusions:

D.V.T represent one of the most commonly occurring and serious medical condition following hospitalization for serious illness or major surgery.

The incidence of D.V.T increases with age in both sexes with a highest incidence in patients over 60 years of age.

Incidence of postoperative D.V.T increase with weight, and it is higher in patients with Gustillo type III B open fractures.

Also higher in proximal lower limbs fracture than distal fractures.

Procedures lasted more than 60 minutes had higher risk D.V.T than those procedures lasted less than 60 minutes.

skeletal traction for fractures of the lower limb is associated with a highest incidence of D.V.T (60%).

Duplex ultrasonography may became the standard detection of D.V.T, its advantages are that it is non-invasive, painless, portable, and readily repeatable.

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