JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH

How to cite this article:
TAURO L F, GEORGE C, RAO B S S, SHENOY D H, AITHALA P S, HEGDE B R. THE INCIDENCE OF DEEP VEIN THROMBOSIS IN POST OPERATIVE PATIENTS IN A LARGE SOUTH INDIAN TERTIARY CARE CENTRE. Journal of Clinical and Diagnostic Research [serial online] 2010 October[cited: 2010 October 14]; 4:3120-3127.

Available from
http://www.jcdr.in/article_fulltext.asp?issn=0973-709x&year=2010&volume=&issue=&page=&issn=0973-709x&id=947

ORIGINAL ARTICLE

The Incidence Of Deep Vein Thrombosis In Post Operative Patients In A Large South Indian Tertiary Care Centre

TAURO L F*, GEORGE C**, RAO BSS SHENOY D H***, AITHALA P S****, HEGDE B R*****

ABSTRACT

Objective: To determine the incidence of deep vein thrombosis (DVT) in postoperative patients after major abdominal, orthopaedic and neurosurgical procedures, which require long term postoperative hospital stay and to identify the risk factors for DVT in these patients.

Materials and Methods: This is a prospective study done in our medical college's hospital from July 2004 - June 2006. The patients were chosen from all the major branches of surgery, provided they were selected to undergo major surgical procedures requiring prolonged hospital stay after surgery. They were all over the age of 30 years and were routinely assessed for deep vein thrombosis by duplex scan pre and post operatively.

Results: A total number of one hundred patients were studied. Out of them, 60 were males and 40 were females. The patients were between the age groups of 30 – 91 years (the mean age was 53 years). Out of 100 postoperative patients, deep vein thrombosis was observed in 14 patients; out of these, 7 were from general surgery, 4 were from neurosurgery and 3 were from orthopaedics. In this study, out of 76 patients who underwent surgery under general anaesthesia, 9 patients developed DVT and out of 24 patients who underwent surgery under spinal anaesthesia, 5 developed DVT.

Conclusion: In this study, the incidence of deep vein thrombosis in postoperative patients was found to be 14 % (as compared to 34-63% in the Western population). The incidence of DVT in our study (14%) is significant enough to advocate prophylactic anticoagulant therapy to those who have to undergo major surgical procedures and those who have risk factors.

Key words: Deep vein thrombosis, venous thromboembolism, pulmonary embolism, Postoperative complications, Fibrinolysis.

*M.S, Addl. Professor, **M S, Asst. Professor, ***MS, MRCSEd, Assoc. Professor, ****M S, Professor, *****MS, FICS, Professor, ******M S, FRCS, Professor, Department of General Surgery, Fr. Muller Medical College Hospital, Kankanady, Mangalore – 2, Karnataka, India
Corresponding Author

Dr. Leo F. Tauro
Department of General Surgery
Fr. Muller Medical College Hospital
Kankanady, Mangalore – 2. D.K.
Karnataka, India
Ph.No: Hosp: (0824) 2436301, Res: (0824) 2224911
E-Mail – drlftauro@rediffmail.com

Introduction

Deep vein thrombosis (DVT) remains a common and serious medical condition, frequently complicating the post operative recovery of surgical patients or manifesting denovo in patients with recognized risk factors. Thromboembolism remains a serious preventable cause of postoperative morbidity and mortality in the western world. It is estimated that 20 million cases of lower extremity deep vein thrombosis occur in the USA alone [1]. Routine postoperative venography has shown an incidence of 60% in patients undergoing orthopaedic surgery, with the highest rates seen in patients undergoing total knee arthroplasty [2]. Undiagnosed and untreated DVT of the lower extremities accounts for the vast majority of the 600000 cases of pulmonary embolism in USA each year [1]. The incidence of Deep vein thrombosis varies in different parts of the world, for reasons that are not yet completely understood [3].

The prevalence of DVT in surgical patients is 10% to 80%, depending on the type of surgery and the individual patient risk factors. It is generally accepted that postoperative DVT is rare in Asians [4]. However, sufficient data on the prevalence of DVT in the population is still lacking. A review of literature revealed very few studies, mainly from the South East Asian countries and all of them have placed the incidence in the range of 6% to 75% [2].

Objectives

To study the incidence of Deep Vein thrombosis after major abdominal, orthopaedic and neurosurgical procedures requiring long-term post operative hospital stay and to identify the risk factors for DVT.

Materials And Methods

This study included 100 patients who were admitted in the departments of general surgery, orthopaedics and neurosurgery in our hospital during the period of July 2004 to June 2006. Ethical committee clearance and informed consent was taken. The patients were chosen from those who were selected to undergo major abdominal, orthopaedic and neurosurgical procedures. None of these patients were taking aspirin, aspirin containing compounds or other anticoagulant medications.

Inclusion criteria: (1) Patients over 30 years scheduled for major abdominal, orthopaedics and neurosurgeries. (2) Expected operating time of more than 60 minutes. (3) Estimated post operative stay of more than 7 days.

Exclusion Criteria: (1) Patients on anticoagulant therapy, immediately prior to admission. (2) Patients with a known history of bleeding diathesis, with prolonged prothrombin time and prolonged bleeding and clotting time. (3) Patients who had suffered a single or multiple haemorrhagic episodes within the previous 3 months, which were unrelated to the surgical procedure. (4) Patients with thrombocytopaenia. (5) Septicaemic patients. (6) Patients with disseminated intravascular coagulation (DIC).

Method: A detailed history regarding diseases like diabetes mellitus, hypertension, varicose veins, cardiac diseases, peripheral vascular disease, lower limb paralysis, cerebrovascular accidents, malignant diseases, leg oedema, etc, was taken. Information

regarding smoking and alcohol intake, the prolonged use of steroids, hormones, and contraceptives and obstetric history was also obtained. Details of the operative procedure, duration of the surgery, position of the patient, the amount of intra operative blood loss, postoperative immobilization and the type of anaesthesia used were recorded. A thorough clinical examination of the patient was performed, with particular attention to note anaemia, nutritional status, cardiac status, the calf circumferences and pain or swelling over the calves. Apart from the routine investigations, bleeding and clotting profiles, renal profiles, ECG, chest X ray, etc, were obtained one day prior to surgery. The Duplex Scan of both lower limbs and coagulation profiles were repeated on the 5th post operative day.

The parameters which were assessed were age, sex and anaesthesia time. Intra operative bleeding was assessed subjectively and was classified as mild, moderate and severe. Any amount of bleeding that necessitated intra and post operative blood transfusion was considered to be severe.

Post operative period: During the immediate post operative period

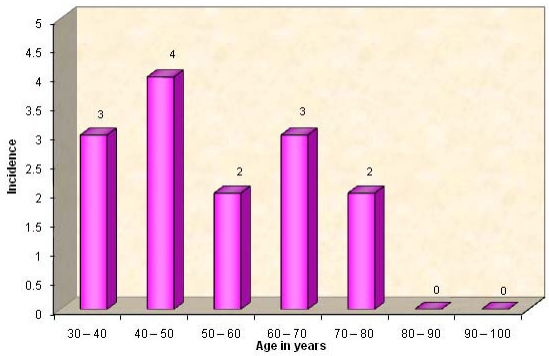
- Observation was done for temperature and tachycardia. The calf circumferences of both lower limbs were measured. Any pain or swelling of the calves was noted.
- Patients were instructed on techniques of deep breathing, leg exercise; especially isometric ankle flexion exercises which were encouraged post operatively. All patients received physiotherapy from the first post operative day.

Duplex scanning was used as the definitive test for venous thrombosis. It was done a day before the operation, during the immediate post operative period, during the early post operative period and 7-14 days after the operation.

The diagnosis of DVT was made if any of the following Sonographical criteria were seen: Sonographical visualization of the thrombus in the vein, loss of compressibility of the vein by ultrasonic probe pressure, loss of phasic flow signal or loss of augmentation of the flow with distal compression.

Observations And Results

A total number of one hundred patients were studied; out of them, 60 were males and 40 were females. The patients were between the age groups of 30 – 91 years, the mean age being 53 years [Table/Fig. 1].



Out of 76 patients who underwent general anaesthesia, 9 patients (11.8%) developed DVT and out of 24 patients who underwent spinal anaesthesia, 5 developed DVT (20.8%).

DVT was observed in 14 patients in our study, the occurrence being 14% in 7 male and 7 female patients [Table/Fig 2].

Table: 1.Incidence of DVT among Gender

			DUPLEX		Total
			NORMAL	POSITIVE	
SEX	Female	Count	33	7	40
		%	38.4%	50.0%	40.0%
	Male	Count	53	7	60
		%	61.6%	50.0%	60.0%
Total		Count	86	14	100
		%	100.0%	100.0%	100.0%

a. χ^2=.678 P=.41 NS

[Table/Fig 2]: Incidence of DVT among Gender

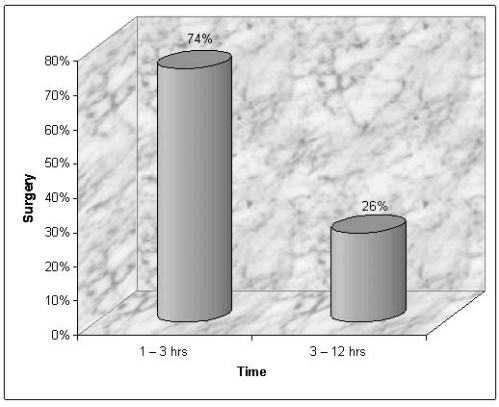
Out of these 14 positive cases, 7 were from general surgery (2- abdomino-perineal resection, 1- laparotomy for intestinal obstruction, 2- anterior resection, 1- hemicolectomy and 1- whipple's operation), 4 were from neurosurgery (all brain tumours) and 3 were from orthopaedics (2 total hip replacement and 1 multiple bones fracture with pelvic fracture) [Table/Fig 3].

			DUPLEX		Total
			NORMAL	POSITIVE	
TYPE OF SURGERY	General Surgery	Count	55	7	62
		%	88.7%	11.7%	100.0%
	Neuro Surgery	Count	12	4	16
		%	75.0%	25.0%	100.0%
	Orthopaedic	Count	19	3	21
		%	86.3%	13.7%	100.0%
Total		Count	86	14	100
		%	86.0%	14.0%	100.0%

a. χ^2=2.046 P=.359 NS

[Table/Fig 3]: Incidence of DVT under different type of Surgery

Out of 14 patients, 8 patients had platelet count > 3.5 lakhs (57%) and 6 had platelet count < 3.5 lakhs (43%).



[Table/Fig 4]: Duration of anaesthesia wise distribution

Out of 100 cases, 74 surgeries were completed within one to three hours, while 26 procedures took more than 3 hours; the maximum time being 12 hours [Table/Fig 4].

The average stay of those who proved positive for post operative DVT was 25 days, the minimum being 11 days and the maximum being 76 days. The average anaesthesia time for those who developed DVT was 3.45 hours, with a minimum 1.30 hours and a maximum of 12 hours. One of our patients expired in the early postoperative period. The clinical features were strongly suggestive of pulmonary thromboembolic disease. This patient was 70 years of age and he had undergone laparotomy for intestinal obstruction.

Discussion

Venous thromboembolic disease is a major cause of morbidity and mortality in general surgery, orthopaedics and neurosurgery. In the Western countries, the incidence of DVT was reported to be 34- 63% in patients after total hip arthroplasty [5] and 41-88% after total knee arthroplasty [6]. The thromboprophylaxis is routinely used due to the high incidence of DVT and its harmful consequences. In contrast, thromboprophylaxis has rarely been used in major surgeries in Asian patients. The incidence of DVT has traditionally been considered to be low in Asian countries, presumably because of ethnic and environmental factors. There is a paucity of studies in Asia on post operative DVT. Hip replacement is associated with a 51% incidence of DVT in operated limbs according to Stamatakis [7]. Knee replacement is confirmed to carry a high risk with ipsilateral DVT in 56.4% and symptomatic pulmonary embolism in

1.9% of the patients. By contrast, arthroscopy was associated with a low incidence of DVT. Meniscetomy, arthrotomy, patellotomy, synovectomy and arthrodesis were all high risk procedures, particularly in patients over 40 years of age and were associated with DVT rates of 25% to 67% [7]. Recent studies from Asia have shown a higher incidence of DVT (10-64%) in patients after Total Hip Arthroplasty (THA) and 22.6 – 76.5% after Total Knee Arthroplasty (TKA) [8], [9]. The increased incidence in the Asian population may be related to the increasing number of TKA procedures in this region and the influence of western dietary habits. Another reason for the increased incidence is the diagnostic criteria. In considering the main risk factors of DVT such as age, major surgery, prolonged immobility, malignancy, prior venous thromboembolism and oral contraception, Asian people have a similar risk as the westerners [10].

In the present study, some relationship was found between the main risk factors and DVT. No difference was found in the mean age and sex. There was some correlation with the type of anaesthesia, the time of anaesthesia, malignancy and prolonged immobility. The incidence of DVT in brain tumour patients has been reported to be high. Ruff and Posner [11] reported a 25% incidence of venogram proven DVT in a retrospective series of 264 unprophylaxed patients who were diagnosed to have glioblastoma multiforme or malignant astrocytoma, up to 6 weeks post craniotomy.

Our results suggest that the incidence of post operative DVT in our patients with brain tumour is lower than the rate that is reported in the populations of North America and Europe. However, the occurrence of DVT in neurosurgery patients is more as compared to that in patients of orthopaedics and general surgery. Age is uncertain as a risk factor. Borrow and Goldson [12] found an increasing incidence of thrombosis with greater age, but Stulberg et al [2] found no correlation. We found no age difference in the mean ages between the patients with and without DVT. In our study, 2/3 of patients who developed DVT were operated under general anaesthesia, thus showing a significant difference between general and spinal anaesthesia. However, it has been suggested that the incidence of DVT is lower after surgery under spinal anaesthesia as compared to that after surgery under general anaesthesia [13]. We too found a statistically significant correlation between the type of operation and the incidence of DVT, with the highest incidence after craniotomy and the lowest incidence after abdominal surgeries. Patients with supratentorial tumours, suprasellar tumours, meningiomas and malignant glioma have been suggested to be at an increased risk [11]. From our study, we found that the type of anaesthesia, the extent of surgery and post-operative stay alter the incidence of deep vein thrombosis. Patients with brain tumours are acknowledged to be in the high risk group [14].

In the present study, out of 14 cases of DVT, 4 patients had craniotomy, of which three had glioma and one had meningioma. Duplex ultrasonography is increasingly being used in combination with colour Doppler flow imaging and is accepted to be highly sensitive and specific for venous evaluation between the pelvis and the knees in patients with localizing signs and symptoms [5], [10]. Ultrasonography is highly dependent on the operator's skill and

experience. In our study, we used Duplex as a definitive study, 14 out of 100 patients were found with DVT and 3 of the patients with leg swelling and calf tenderness showed normal duplex. The frequency found in our study was significantly less than that found in a similar study in the Malaysian population, where the comparable figure was 62.3% [15]. The equivalent figures from Hong Kong and Singapore were 37% [16] and 3%[17] respectively and it was 4% in Thai patients [18]. The figure here is quite low as compared to our study. In another study from South India, the incidence was found to be 28% [19], which was much higher than our series.

Agarwala and colleagues [20] conducted a prospective randomized study in 104 Indian patients undergoing major orthopaedic lower limb surgery, which has shown a 60% incidence of DVT in patients who did not receive prophylaxis and a 43.2% incidence in patients receiving prophylaxis with LMWH. Ishtiaq [21] conducted a Cohort study on patients of both genders over the age of 40 years and reported that out of 177 patients, post operative DVT was observed in 16 patients with the frequency of DVT after high risk surgery being 12.82%, which is lower than that cited in western literature. Chan, Chiu and Cheng [22] did a prospective study on the incidence of DVT in elderly Chinese people suffering from hip fracture. The study on a total of 100 consecutive Chinese hip fracture patients with a mean age of 80, showed that 5 (5.3%) of them developed DVT and it was concluded that the incidence of DVT in Chinese geriatric patients was low. In 1979, Mok [23] reported the incidence of DVT to be 53.3% in Hong Kong. In 1988-89, a few reports showed a very low incidence of DVT in Asian Countries, ie 10% in Korea, 9.7% in Singapore and 4% in Thailand [9], [24] and these results correspond to our results (14%). Some recent Asian clinical trials have shown a high incidence 15% - 70 % of DVT [8], [9], [16], [25].

Pearsall EA at al [26] concluded that many patients do not receive adequate thromboprophylaxis when they are admitted for acute abdominal conditions. Pedersen AB et al [27] have reported 1.02% of venous thromboembolism in patients undergoing total hip replacement in spite of receiving routine thromboprophylaxis. Kapoor A et al [28] have conducted a nationwide in-patient survey (2003-2006) and have recommended thromboprophylaxis for older patients. Fleming FJ ET AL [29] have reported 0.47% post discharge incidence of venous thrombosis in colorectal surgeries.

Limitations Of The Study

This study is from a single centre with a small sample size.

Conclusion

From this study, we conclude that the incidence of deep vein thrombosis in postoperative patients is 14% as compared to 34 – 63% among the Western population. Longer operating time, prolonged hospital stay and malignancy correlate with an increased incidence of DVT. If it occurs, diagnosis and treatment must be made as soon as possible, so that the fatal complications of pulmonary embolism can be avoided. There is a need to provide prophylactic anticoagulant therapy to those who have to undergo neurosurgery and major orthopaedic surgery, or to those who have risk factors. Many further extensive studies

on Indian patients need to be undertaken.

Bibliography:

[1] Cronan JJ, Dorfman GS., Grusmark J. Lower-extremity deep vein thrombosis; Further experience with and refinement of US assessment. Radiology 1988; 168: 101-7.

[2] Ghelman B Insall JN, Stulberg BN, Williams GW. Deep vein thrombosis following total Knee replacement. An analysis of six hundred and thirty-eight arthroplasties. J Bone joint surg Am 1984; 66; 194-201.

[3] Coon WW, Epidemiology of venous thromboembolism. Ann Surg 1977; 186: 149-64.

[4] Chan J, Chan HT, Nandi PL, Li WS, Leung R, Deep vein thrombosis and pulmonary embolism in the Chinese population. HK. M.J. 1988; 4: 305-10.

[5] Marder VJ, Rogers PH, Walsh PN. Controlled trail of low dose heparin and sulfinpyrazone to prevent venous thromboembolism after operation on the hip. JBJS 1978; 60A: 758 - 62.

[6] Antony J. Comerota, Vascular surgery, Clinical and diagnostic evaluation of deep vein thrombosis 5th. Edition Vol. II 1937-41.

[7] Bentely PG, Kakkar VV, Stamatakis JD, Sugar S, Lawrence D, Nairn D. Femoral vein thrombosis and total knee replacement. Br. Med J 1997; 11: 223-5.

[8] Fugitas, Hirot AS, Oda T, . Deep vein thrombosis after total hip or total hip or total knee arthroplasty in patients in Japan. Clin Orthop 2000; 375: 168 - 74.

[9] Kim YH, Suh JS. Low incidence of deep vein thrombosis after cement less total hip replacement. J. Bone Joint Surg 1988; 704: 878-81.

[10] Bourne RB, Lynch AF, Rorabeck EH. Deep vein thrombosis and continuous passive motion after total knee arthroplasty. JBJS 1988: 70A: 11-4.

[11] Posner JD, Ruff RL. Incidence and treatment of peripheral venous thrombosis in patients with glioma. Ann Neurol 1983: 13: 134 – 5.

[12] Goldson H, Tinckler. Postoperative venous thrombosis: evaluation of five methods of treatment. Am J. Surg 1981; 141: 245-51.

[13] Piamik SE, Wagner FH. Pulmonary Embolism as a cause of death. JAMA 1986; 255: 26.

[14] Kumar K, Thomas J, Tang K.K. Is post operative deep vein thrombosis. A problem in neurosurgical patients with Brain tumours in Singapore? Singapore Med.J. 2002 Vol. 43(7): 345 – 49.

[15] Askander A, Doralsamis, Dhillon KS. Post operative deep vein thrombosis in Asian Patients is not a rarity. J Bone Joint surgery [Br] 1996; 78 – B: 427-30.

[16] Dravey IC, Hosy, Fung KC, Kew J, Lee YL. Deep vein thrombosis in elderly Hong Kong Chinese with hip fractures detected with compression ultrasound and Doppler imaging. Arch Orthop Trauma Surgery 1999; 119: 156-8.

[17] Eu KW, Ho YH, Seow Choen P, Leang A, Nyam U. Controlled trail of low molecular weight heparin vs. no deep vein thrombosis prophylaxis for major colon and rectal surgery in Asian patients. Dia colon rectum 1999; 42:196-2023.

[18] Atihartakarn V, Keorochana S, Pathepohotiwong K. Deep vein thrombosis after hip surgery among Thai. Arch Inter. Med. 1988; 148:134-53.

[19] Shead GV, Narayanan R. Incidence of post operative venous thromboembolism in South India. Br.J Surg 1980: 67: 813-4.

[20] Agrawala S, Bhagwat AS, Madhe J. Deep vein thrombosis in Indian patients undergoing major lower limb surgery. Ind J. Surg 2003. 65; 159-102.

[21] Ishtiaq A. Frequency of post-operative deep vein thrombosis in high-risk surgical patients. J.CPsf 2005; 14 : 299-301.

[22] Cheng KK, Lqist, Yut J. Postoperative deep vein thrombosis in Taiwanese Chinese population. Am J surg 1987; 153: 302- 5.

[23] Hoaglund FT, Mok CK, Rogoff SM. The incidence of deep vein thrombosis in Hong Kong Chinese after hip surgery for fracture of the proximal femur. Singapore Med J 1989; 30: 530 – 4.

[24] Kakkar VV. Diagnosis of deep vein thrombosis using the 125 lodine Fibrinogen test. Arch Surg 1972; 104: 152.

[25] Chen LM, Wang CJ, Wang JW. Deep vein thrombosis after knee arthroplasty. J formos Med – Assoc 2000; 99: 848 – 53.

[26] Pearsall EA, Sheth U, Fenech DS,

McKenzie ME, Victor JC, McLeod RS. Patients admitted with acute abdominal conditions are at high risk for venous thromboembolism but often fail to receive adequate prophylaxis. J Gastrointest Surg 2010 Sep 27. [Epub ahead of print]

[27] Pedersen AB, Sorensen HT, Mehnert F, Overgaard S, Johnsen SP. Risk factors for venous thromboembolism in patients undergoing total hip replacement and receiving routine thromboprophylaxis. J Bone Joint Surg Am 2010: 92:2156-64.

[28] Kapoor A, Labonte AJ, Winter MR, Segal JB, Silliman RA, Katz JN et al. Risk of venous thromboembolism after total hip and knee replacement in older adults with comorbidity ond co-occuring comorbidities in Nationwide inpatient sample(2003-2006). BMC Geriatr 2010; 10:63. [Epub ahead of print]

[29] Fleming FJ, Kim MJ, Salloum RM, Young KC, Monson JR. How much do we need to worry about venous thomboembolism after hospital discharge? A study of colorectal surgery patients using the National surgical quality improvement program database. Dis Colon Rectum 2010; 53:1355-60.