

POST OPERATIVE DEEP VEIN THROMBOSIS: A STUDY OF 150 CASES

Mohammad Abu Kawsar Sarker¹ Md Abdullah Al Amin² A K M Nuruzzaman³ Avisak Bhattacharjee⁴

Summary

Thromboembolism is a wide spectrum entity of which post operative Deep Vein Thrombosis (DVT) is a part. At present there is inadequate information available regarding the incidence of DVT in Bangladesh. The aim of this cross-sectional study was to see the incidence of post-operative DVT at BIRDEM Hospital from March to December 2008. It was performed on 150 patients who had any operation of more than one hour of duration. Among 150 patients, 102 were male and 48 were female. The incidence of DVT in male was 36.3% and in female it was 27.5%. One-fifth of the DVT patients were smokers. Thirty two patients underwent amputation of which 14 (43.7%) developed DVT. Among the DVT cases, only 3 were clinical DVT and the rest were sub-clinical. In half of the Laparotomy patients (10/20) DVT developed. About one-fourth (34/8) of the hernioplasty patients and half of the APR patients (4/8) developed DVT. The occurrence of the condition in diabetes mellitus (36.7%) and cancer (33.3%) was high. Forty percent of the obese patients developed the condition. DVT in Bangladesh is not that much rare event. Further in-depth studies are necessary to extract other relevant information in this regard.

Key words : Deep vein thrombosis; Venous stasis; Hypercoagulability; Endothelial blood vessel.

1. Assistant Professor of Surgery
International Medical College, Dhaka
2. Professor of Surgery
Bangladesh Institute of Research for Diabetic Endocrine and Metabolic Disorders (BIRDEM) Dhaka
3. Senior Consultant of Anaesthesia
Narayangonj Hospital, Narayangonj
4. Assistant Registrar of Surgical Oncology
National Institute of Cancer Research and Hospital (NICRH) Dhaka

Correspondence: Dr. Mohammad Abu Kawsar Sarker
E-mail: kawsarsarkedr@yahoo.com
Cell : 01710 271600

Introduction

Deep Vein Thrombosis (DVT) is the formation of a blood clot within a deep vein, predominantly in the legs. The three factors of Virchow's triad venous stasis, hypercoagulability, and changes in the endothelial blood vessel lining (such as physical damage or endothelial activation) contribute to DVT and are used to explain its formation [1,2]. Other related causes include activation of immune system components, the state of micro particles in the blood, the concentration of oxygen, and possible platelet activation [3]. In Bangladesh it is commonly believed that DVT is rare. At present there is inadequate information available regarding the incidence of DVT. Moreover in post-operative deaths in our country, autopsy evidence of cause of death is lacking due to Asian aversion to diagnostic postmortem examination. The diagnostic tests like venography and color doppler for DVT are not available in many centers and are expensive in those centers where available. Venous thromboembolism remains a common cause of morbidity and sometimes cause of death in surgical practice. In developed world about 10% of hospital deaths are due to pulmonary embolism resulting from DVT [4]. The pooled data incidence of DVT following general surgery in Europe is 30% and in North America is 60% [5]. Without prophylactic anticoagulant, the frequency of DVT after total hip replacement is high, in the range of 50-60%. According to Royal College of Surgeons of England in every 1000 operations 100 develop DVT, 10 pulmonary embolism, 1 death [6]. One study conducted by K S Dhillon et al. in Malaysia suggest that DVT in Asian countries is not a rare condition and it was also found that 62.5% patients showed venographic evidence of postoperative DVT [7]. Postoperative DVT remains silent in 80% of the cases. Recent study in Malaysia and Korea shows that the incidence of DVT following total hip and

knee replacement in the absence of thromboprophylaxis is approaching that in Western populations. The clinical diagnosis of DVT is less reliable and needs to be confirmed by the objective tests. Venography is considered to be the gold standard but has been replaced in years by colour doppler study as the routine imaging modality in many centres [8-11].

The current study was conducted with the aim to know the incidence of post-operative DVT that would greatly influence our outlook regarding the prophylaxis and management of DVT in post-operative patients.

Materials and method

This cross-sectional study was carried out at BIRDEM Hospital from March 2008 to December 2008. Purposive sampling technique was applied to select cases for this study. Total number of patients was 150. Any emergency or elective operation of more than one hour of duration was considered for inclusion. The other inclusion criteria were age > 20 years, and both general and spinal anesthesia. Past histories of DVT or patients on anti-coagulant therapy were the notable exclusion criteria. Clinical findings data on leg pain and calf tenderness, fever, prominence of superficial veins, leg and retromalleolar oedema were collected. Duplex scan was performed on 3rd to 8th post operative day to see compressibility, absence of signals on colour flow imaging and diminished or absence of velocity of flow on pulse analysis. Categorical data were expressed as number and percentage and were compared via the Chi-squared test. Logistic regression was performed to ascertain the effects of co-morbid condition on the likelihood of developing DVT, p value of 0.05 was considered as significant.

Results

It is evident from the study findings that chance of having venous thrombosis in age group above 50 yrs is quite high (43.3%) in contrast to other age groups. Among 150 study population, 102 cases were male and 48 cases were female. The incidence of DVT in male was 36.3% while among females it was 27.5%. One-fifth of the DVT patients were smokers. No significant difference

was noted between patients' occupation and development of DVT (Table I) Thirty two patients underwent amputation (above knee and below knee) of which 14 (43.7%) developed DVT. Among the DVT cases, only 3 were clinical DVT and the rest were sub-clinical. Incidence of DVT was higher in above knee amputation than that of below knee. Laparotomy was done in cases of 20 patients of which 10 (50.0%) patients developed DVT. About one-fourth of the hernioplasty patients developed DVT. Half of the APR patients (4/8) eventually developed the condition. The operation related percentages is shown in table II. It is clear from the table that longer duration of operation procedure was correlated with development of DVT and development of DVT was little higher in emergency operation than elective one. This inference was also applicable to patients who underwent spinal anesthesia. The occurrence of the condition in some co-morbid states especially diabetes mellitus (36.7%) and cancer (33.3%) is noteworthy. Forty percent of the obese patients developed the condition in question (Table III). Out of 51 DVT patients more than 84% developed sub-clinical DVT. Those who had higher platelet count suffered more from the condition (Table IV).

Older patients aged > 50 years suffered more from DVT. Incidence of DVT was higher in male than female patients. But no such difference was statistically significant. This statement was also true for occupation.

No significant differences were noted between types of operation, choice of operation and types of anaesthesia and development of DVT. Although percentage of DVT was more in lengthy operation than shorter duration operation this difference was also not significant.

A logistic regression was performed to ascertain the effects of diabetes, malignancy, obesity, pregnancy, presence of COPD, smoking and history of contraceptive use on the likelihood that patients have DVT. The logistic regression model was statistically significant ($\chi^2(df=6)=19.754$, $p<0.0005$). The model explained 34.0% (Nagelkerke R) of the variance in DVT. Pregnant women were 3.82 times more likely to exhibit DVT than non-pregnant females. Presence of diabetes, obesity, malignancy and COPD was also associated with an increased likelihood of exhibiting DVT.

More patients with raised platelet count developed DVT. Regarding types of DVT significantly more patients developed silent variety than clinical type ($p < 0.05$).

Table 1: Demographic characteristics of the patients

Variables	No. of patients	DVT (%)	p-value*
Age group			
20-30 years	42	12 (28.6)	0.049
30-50 years	78	26 (33.3)	
>50 years	30	13 (43.3)	
Sex			
Male	102	37 (36.3)	0.543
Female	48	14 (27.5)	
Occupation			
Service	52	22 (42.3)	0.124
Businessman	24	9 (37.5)	
House wife	41	12 (29.3)	
Driver	8	3 (37.5)	
Day Labor	10	2 (20.0)	
Student	5	1 (10.0)	
Farmer	10	2 (20.0)	

* χ^2 test

Table II : Operation related variables

Variables	No. of patients	DVT (%)	p-value*
Name of operation			
Amputation	32	14 (43.7)	0.337
Laparotomy	20	10 (50.0)	
Hernioplasty	34	8 (23.5)	
APR	8	4 (50.0)	
Rt. hemicolectomy	14	6 (42.8)	
Partial gastrectomy	8	3 (37.5)	
Lap. Cholecystectomy	24	4 (16.7)	
Open Cholecystectomy	10	2 (20.0)	
Duration of operation (min)			
60-90	68	14 (20.6)	0.031
91-180	64	28 (43.7)	
181-240	18	9 (50.0)	
Type of operation			
Elective	130	39 (32.5)	0.456
Emergency	30	12 (40.0)	
Types of anaesthesia			
General	108	33 (30.5)	0.325
Spinal	42	18 (42.9)	

* χ^2 test APR= Abdominal Perineal Resection

Table III : Distribution of the patients by risk factors

Risk factors	No. of patients having risk factors	No of patients with DVT (%)	p-value	OR (95% CI)
Diabetes	60	22 (36.7)	0.049	2.071 (1.021-2.9123)
Malignancy	30	10 (33.3)	0.051	1.322 (0.974-2.104)
Obesity	20	8 (40.0)	0.022	2.324 (1.021-4.001)
Pregnancy	2	1 (50.0)	0.031	3.820 (1.892-6.785)
COPD	5	2 (40.0)	0.031	2.312 (1.251-4.024)
Smoker	24	5 (20.8)	0.081	1.089 (1.030-1.151)
Contraceptive	9	3 (33.3)	0.054	1.289 (0.962-1.872)

Table IV : Some clinico-pathological findings of the patients

Characteristics	No of patients with DVT (%)	p-value*
Platelet count		
< 4 lacs	32 (30.5)	0.52
>4 lacs	19 (42.2)	
Types of DVT		
Silent	43 (84.3)	0.031
Clinical	8 (15.7)	

* χ^2 test

Discussion

The current study was designed to see the frequency of postoperative DVT in general surgical patients in BIRDEM Hospital where DVT prophylaxis is not a routine practice. Total 150 patients over 20 years of age have been studied irrespective of sex, type of anaesthesia, type, duration, nature of operation, whether elective or emergency. The incidences of DVT reported in some studies on orthopaedic patient were 53.3% (Hong Kong) 4% (Thailand) 10% (Korea) and 9.7% (Singapore). Estimated incidence of DVT following general surgical procedure is 30% in Europe and 60% in North America [5]. The current study shows that 51 patients out of 150 developed postoperative DVT. The incidence of postoperative DVT here in this study is 34%. This study has revealed that the incidence of postoperative DVT is approaching to western findings. It is found that DVT remain silent in about 80% cases in western set up [12]. Here in this study 8 cases developed DVT (15.7%), whereas the 43 cases were silent (84.3%) which correlates with the western findings [12].

Many factors contribute to high incidence in this study. There was a significant association between increasing age and a higher incidence of DVT in the present study, similar association was noticed between duration of operation and a higher incidence of DVT. The current study shows that the postoperative DVT in age group above 50 years is 43.3% and 30-50 years age group 33.3% and 20-30 years age group 28.6%. So with the increasing of age, incidence of DVT is also increased. Clarke pearson et al. at Duke University Medical centre revealed that patient age was among the most important risk factors for development of post operative DVT [13]. They showed that women aged 60 faced almost twice the risk of women aged 40. Duration of operation is considered an important risk factors for development of DVT. Clarke pearson et al [13]. showed in their study, when operation is more than 300 minutes, the risk is 32%, the risk is 14% for operations with duration of 120 to 300 minutes. Current study shows incidence of DVT is 50% (9 out of 18) when operation time is 180-240 minutes, 43.7% (28 out of 64) when time is 90-180 minutes and 20.6% (14 out of 68) when duration is 60-90 minutes. So it can be said the incidence increases with increase duration of operation. Type of surgery is another influencing factor for DVT. Lee et al. has shown a study in China that incidence of DVT after abdominal perineal resection (APR) is 41.1% and 20% after partial gastrectomy and 25.8% after amputation [14]. Clarke-pearson et al. had shown 88% risk after pelvic exenteration and 40-80% after radical prostatectomy. In our study, higher incidence of DVT has been seen in APR (50%), laparotomy (50%), amputation (43.7%), right hemicolectomy (42.8%), partial gastrectomy (37.5%) and lower incidence seen in hernioplasty (23.5%), cholecystectomy (20%). In this study, incidence of DVT in male patients is 36.3% and in female patients 27.5% i.e. higher incidence is seen in male patients. According to this study, higher incidence is seen after emergency operation (40.1%) than elective operation (32.5%). Emergency patients have had prolonged immobility, multiple risk factors which have contributed higher incidence. In this series, incidence of DVT after spinal anaesthesia is 42.6% and after general anaesthesia is 30.5%. Higher incidence is seen in spinal anaesthesia group. In this series, incidence of DVT in diabetic patients 36.7%, in malignancy 33.3%, in obesity

40%, in pregnancy 50%, in COPD 40%, in smoker 20.8%, in patients taking contraceptive 33.3%. On logistic regression pregnant women were 3.82 times more likely to exhibit DVT than non-pregnant females. Presence of diabetes, obesity, malignancy and COPD was also associated with an increased likelihood of exhibiting DVT ($p < 0.05$). In this series, one patient died due to pulmonary embolism.

Conclusion

In Bangladesh it is assumed that DVT is rare. But the current study reveals that the incidence of postoperative DVT in our country is not that much rare event. In fact around one-third of the post-operative study patients developed DVT. However most of them were suffering from silent type. It was most common among elderly patients over 50 years of age. Statistically significant association was found between increasing age and lengthy operation and higher incidence of DVT ($p < 0.05$). Higher incidence is noted among patients underwent emergency operation and in the patients getting spinal anesthesia. Incidence of DVT among various co-morbid diseases was high and most of the differences were significant statistically ($p < 0.05$).

Disclosure

All the authors declared no competing interest.

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