

Assessment of Influencing Risk Factors of Deep Venous Thrombosis in Cases Undergoing Surgery at Tertiary Care Hospital**G. Sashikalyan¹, Bal Singh²**¹Assistant Professor, Department of General Surgery, MNR Medical College and Hospital, Sangareddy, Telangana, India.²Assistant Professor, Department of General Surgery, MNR Medical College and Hospital, Sangareddy, Telangana.

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Conflict of interest: Nil

Abstract**Introduction:** Deep venous thrombosis (DVT) is a considerable reason of morbidity and mortality in surgical cases. There is lack of evident information on the incidence of DVT and standard guidelines for facilitating thromboprophylaxis in Indian populations. The present study was designed to assess the risk factors favoring the deep venous thrombosis in surgical cases.**Materials and Methods:** A total of 168 patients undergoing surgery at surgery department were assessed for risk factors favoring deep vein thrombosis. The risk factors such as sociodemographic including age and smoking, clinical profile factors including history of DVT, family history, history of varicose veins, medical illness, connective tissue disorders, cancers and its treatment, and Surgical factors including type of anaesthesia technique, duration of surgery, immobilization period and risk assessment score were assessed.**Results:** The duration of surgery was up to 60 min in 31.49%, between 61-180 min in 68.62% and above 180 min in 3.70% of DVT cases. The duration of immobilization was 70.37%, 22.22% and 7.40% in ≤ 7 , 8-14, and >14 days respectively. The risk score was low (1-6) in 18.52%, moderate (7-12) in 33.33% and high (>12) in 48.14% of cases.**Conclusion:** Health care professional should be trained on standardized diagnostic tools in DVT risk assessment and prophylaxis. Preoperatively, thromboprophylaxis is must in moderate and high-risk category of DVT patients undergoing surgery with postoperative follow-up.**Keywords:** Deep Venous Thrombosis, Duration of Surgery, Age, Risk Assessment Score.

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Introduction

Deep venous thrombosis is kindled by coagulation of blood in deep veins, that impede lumen, causes venous blood reflux disorder which gives rise swelling, pain and pulmonary embolism in severe cases [1-4]. The incidence of DVT in European region was 70-140/100000 people per year [5]. The exact incidence rate of DVT was uncertain in

India [6]. However, the reported incidence was 29-43% without any pharmacological prophylaxis in neurosurgical cases with 5% risk for pulmonary embolism and 9-50% risk of mortality [7]. The risk of DVT is advances with age and no specific gender predominance, however, men are more likely affected [8].

The risk factors of DVT were categorized into acquired or inherited and often multiple risk factors were observed in 80% of the reported DVT patients [9-11]. Lack of accurate risk factor assessment tools, Asymptomatic representations, misdiagnosis, incomplete documentation, and inadequate postoperative follow up are hitches in identifying the burden and magnitude of DVTs. It is important to assess for possible influencing risk factors and suitable management options for the formation DVT. With above reference, the present study was designed to assess the risk factors favoring the deep venous thrombosis in surgical cases.

Material and Methods

The present cross sectional cases control study was conducted in the Department of General surgery, MNR Medical College and Hospital during August 2021 to October 2022. A total of 168 patients undergoing surgery were assessed for risk factors favoring deep vein thrombosis above 21 years of age were recruited. Cases with obesity, under chemotherapy, cancer, and willing to participate were included. Cases

with neurological diseases, pregnancy and cases unwilling cases were excluded. Written informed consent was obtained from all the cases and study protocol was obtained from all the cases.

Among the 168 participants, deep venous thrombosis was observed in 54 cases. The criteria for the diagnosis of deep venous thrombosis were followed based on the studies by Bernardi *et al.* (2018) and Maufus *et al.* (2018). The following risk factors were assessed for deep venous thrombosis such as sociodemographic factors including age, smoking status, history of DVT, family history of DVT, history of varicose veins, history of medical illness, connective tissue disorders, cancers and its treatment, Surgical factors including type of anaesthesia technique, duration of surgery, immobilization period and risk assessment score.

The collected data was analysed by using SPSS version 23.0. categorical variables were presented in frequency and percentage. Chi-square test was used to compare variables. A p-value <0.05 was considered as statistically significant outcome.

Results

Table 1: Socio demographic details of study participants

Parameters	Participants (n=168) Frequency (%)	DVT		p-value
		Present (n=54)	Absent (n=114)	
Age (In years)				
21-40	31	04	27	0.0241
41-60	94	31	63	
>60	43	19	24	
Gender				
Male	126	38	88	0.0380
female	42	16	26	
BMI (Kg/m²)				
<25	134	43	91	0.0352
25-30	22	09	13	
>30	12	02	10	
Status of smoking				

With	104	39	65	0.0448
With out	64	15	49	
Details of travelling long distance				
Yes	28	25	03	0.0740
No	140	29	111	
History of DVT				
With	08	05	03	1.851
With out	160	49	111	
Family history of thrombosis				
With	12	03	09	1.968
With out	156	51	105	

Table 2: Clinical profile of study participants

Clinical profile	Participants (n=168)	DVT		p-value
	Frequency (%)	Present (n=54)	Absent (n=114)	
Status of cancer				
With	21	09	12	0.001
With out	147	45	102	
Under radiotherapy				
Yes	13	07	06	0.0195
No	155	47	108	
History of varicose veins				
With	22	09	13	0.0544
With out	146	45	101	
History of connective tissue disorders				
With	18	03	15	0.0423
With out	150	51	99	

Table 3: Surgical profile of study participants

Surgical profile	Participants (n=168)	DVT		p-value
	Frequency (%)	Present (n=54)	Absent (n=114)	
Under spinal anaesthesia				
With	98	22	76	0.001
With out	70	32	38	
Under General anaesthesia				
Yes	70	32	38	0.0218
No	98	22	76	
Time period of surgery (In minutes)				
Up to 60	96	17	79	0.001
61-180	52	35	17	
>180	20	02	18	
Time period of immobilisation (In days)				
Up to 7 days	121	38	83	0.0462
7-14 days	28	12	16	

>14 days	19	04	15	
Risk score				
Low (1-6)	78	10	68	0.001
Moderate (7-12)	54	18	36	
High (Above 12)	36	26	10	

Discussion

A source of 168 patients underwent various surgeries, among that 54 cases were developed with postoperative deep vein thrombosis. Among the total participants, deep venous thrombosis was observed in 32.14% of cases. In that, majority participants were between 41-60 years (57.40%) showed DVT, followed by above 60 years (35.18%). 73.37% of participants with DVT was males and 29.62% were females. The BMI was <25 Kg/m² in 79.62%, between 25-30 Kg/m² in 16.66% and above 30 Kg/m² in 3.70% of participants with DVT. The DVT was seen in 72.22% of smokers 27.78% of non- smokers. Around 90.74% of participants had no previous history of DVT, while 9.26% were previously suffered from DVT. 94.44% of participants had no family history of DVT, while 5.56% had positive family history (Table 1).

In current study, the cancer (12.5%), connective tissue disorders (10.71%), history of varicose veins (13.1%) was observed (Table 2). A study by Irmak B *et al.*, on 377 patients undergoing surgery found that 19.1% were smokers, 10.3% have sedentary life style, 20.4% were travelling long distance and 2.7% had history of DVT [12]. A study by Tian Q *et al.*, on 355 cases undergone gynaecological laparoscopic surgery found that 41 cases were diagnosed as DVT after surgery [13]. A study by Wu L *et al.*, noticed preoperative incidence of DVT was 26.71%, which was higher than postoperative incidence of DVT of 17.22% [14].

The duration of surgery was up to 60 min in 31.49%, between 61-180 min in 68.62% and above 180 min in 3.70% of DVT cases. The

duration of immobilization was up to 7 days in 70.37%, 22.22% and 7.40% of DVT cases. The risk score was low (1-6) in 18.52% of cases, moderated in (7-12) in 33.33% of cases and high (above 12) in 48.14% of cases with DVT (Table 3). A study by Irmak B *et al.*, reported that the duration of surgery was 137.87 min, 73.5% were under general anaesthesia and 26.5% were under local anaesthesia. As per ADVTRAS scores, 91% were in low-risk category preoperatively and 39.2% were in moderate risk category after surgery. As per RAM scores, 39% were in moderate risk category before surgery, while 70.6% were in high-risk category after surgery. [12]. A study by Tian Q *et al.*, reported that duration of surgery was <60 min in 26.83% and >60 min in 73.17% of DVT cases [13].

Irmak B *et al.*, stated that cases undergoing surgery are at a high risk of DVT in the post operative period than preoperative period [12]. Tian Q *et al.*, reported that age above 50 years, hypertension, prolonged duration of surgery, intraoperative pneumoperitoneum pressure above 15 mm of Hg, duration of hospitalization were independent risk factors for DVT in cases undergone gynaecological surgery [13]. A study by Wu L *et al.*, stated that chronic obstructive pulmonary disease (COPD), anaemia, hypoproteinaemia, non-anticoagulation before surgery, delayed anticoagulation after trauma and admission, multiple injuries, and alcoholism, were independent risk factors for perioperative DVT. While, intraoperative blood transfusion, postoperative blood transfusion, pulmonary infection, preoperative non-anticoagulation, postoperative delayed

anticoagulation, preoperative waiting time > 7 days, operative time > 2 h, platelet count 1 day after surgery, and haemoglobin levels 3 days after surgery were risk factors after surgery (14). A study by Wang T *et al.*, stated that factors including old age, female cases, high energy injuries, prolonged time from injury to admission and surgery, cases with cardiovascular diseases, thrombosis, smoking, fibrinogen, c-reactive protein and albumin <35g/l were associated with preoperative DVT [15]. Various category of surgeries including major orthopaedic and neurovascular surgeries and patients with old age, history of DVT and other comorbidities are significantly associated with higher risk of deep venous thrombosis. In addition, prolonged surgical duration and post-surgical immobilization times are further associated with higher risk of DVTs [16]. Immobilization along with prolonged travel increases 2-4folds risk of DVTs and hemiplegia due to stroke also enhances the risk of DVTs [17]. Other risk factors including stroke or paralysis, cancer treatment, obesity, cardiac dysfunction, history of varicose veins, presence of central venous catheter, inflammatory bowel disease, pregnancy, estrogen use, and nephrotic syndrome are responsible for DVT [18,19]. Similarly, the current study found that advanced age, smoking, BMI (>25 kg/m²), prolonged surgical duration, and duration of immobilization are key risk factor for the development of DVT. The present study has limitations in terms of limited sample size and less duration of follow-up. Further long-term follow-up studies are required to assess risk factors that lead to DVT with more participants undergoing various surgical procedures.

Conclusion

Knowledge on the risk factors that trigger deep venous thrombosis are crucial for early diagnosis, prompt management, and prevention of high-risk factors.

Preoperatively, thromboprophylaxis is must in moderate and high-risk category of DVT patients undergoing surgery.

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