



A STUDY TO EVALUATE THE PROPORTION OF DEVELOPMENT OF DEEP VEIN THROMBOSIS IN PATIENTS UNDERGOING MAJOR SURGERIES IN TERTIARY CARE CENTRE

General Surgery

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ABSTRACT

Introduction: Deep vein Thrombosis occurs due to formation of blood clot in deep venous system mainly in the lower limbs. It may cause severe life threatening complications such as Pulmonary Embolism.

Objectives: To evaluate proportion of development of deep vein thrombosis among patients undergoing major surgeries and to estimate the risk factors for development of DVT among those undergoing major surgeries.

Methods: A total of 85 patients over a period of 18 months who underwent major surgeries were studied. All patients were subjected to bilateral lower limb Venous Doppler study pre-operatively and post-operatively. Number of patients who develop DVT post-operatively were evaluated along with the risk factors associated with them.

Results: The study group contains 85 patients (53 Males, 32 Females). 5 patients (2 Males, 3 Females) developed DVT post-operatively. All patients were above the age of 40 years and had associated co-morbid conditions such as obesity, Diabetes mellitus or Hypertension. The duration of surgery in all these patients was between 2-4 hours.

Conclusion: The study shows that 5.9% of the patients with associated co-morbid conditions who were asymptomatic before undergoing major surgeries, developed DVT post-operatively.

KEYWORDS

Deep vein thrombosis, Major surgery, Diabetes mellitus, Hypertension

INTRODUCTION

Deep vein thrombosis is defined as the formation of a thrombus that blocks a deep vein¹. Normally blood flows through intact vessels at a steady pace. However any altered blood flow, like venous stasis, wall injury, or the presence of a hypercoagulable state, known as Virchow's triad, are considered the primary mechanisms for the development of DVT. If untreated, patients who develop DVT are prone to episodes of recurrent venous thromboembolism (VTE), as well as the development of the pulmonary embolism and post-phlebotic syndrome (PTS)¹. Surgical patients are at a particularly high risk for DVT as surgery itself is very traumatic and frequently requires bed rest that increases venous stasis. The concept of VTE prophylaxis is based on the fact that two-thirds of DVT cases are asymptomatic, and pulmonary embolism (PE) is most often clinically silent. Execution of treatment should be before the complete clinical picture has occurred, as the first manifestation of the disease may be a fatal PE. Therefore, prevention is the most effective way of reducing death and morbidity from VTE, and risk factor analysis (RFA) is the most effective way of determining appropriate prophylaxis².

OBJECTIVE

1. To evaluate proportion of development of deep vein thrombosis among patients undergoing major surgical procedures.
2. To evaluate risk factors for development of DVT among those undergoing major surgical procedure

MATERIALS AND METHODS

Study design and setting

This is a case series study conducted on patients undergoing major surgical procedures in HSK Hospital Bagalkot over a period of 18 months from January 2017 to June 2018. All patients undergoing surgery will be assessed for risk of DVT on the basis of hospital chart review including medical history, current medical conditions, type of surgery.

INCLUSION CRITERIA:

Patients aged 18 years or older undergoing major surgical procedures including gastrosurgery and Oncosurgery. Patients willing to participate in the study.

EXCLUSION CRITERIA:

Patients undergoing surgical procedures under local anaesthesia. Those patients already diagnosed as DVT and on treatment. Patients not willing to participate in the study. Patients with Orthopaedic surgery and neurosurgery are not included.

SAMPLE SIZE CALCULATION AND STATISTICAL ANALYSIS

Sample size calculation was done using open epi software version 2.3.1 at 95% confidence level and 10% absolute precision. At proportion of DVT in major surgeries according to various studies = 30% and hence sample size calculated is 85.

All characteristics were summarized descriptively. For continuous variables, the summary statistics of mean $\pm$ standard deviation (SD) were used. For categorical data, the number and percentage were used in the data summaries and diagrammatic presentation. Chi-square (χ^2) test was used for association between two categorical variables.

In cases of more than 30% cell frequency < 5 , Freeman-Halton Fisher exact test was employed to determine the significance of differences between groups for categorical data.

If the p-value was < 0.05 , then the results were considered to be statistically significant otherwise it was considered as not statistically significant. Data were analyzed using SPSS software v.23.0. and Microsoft office 2007.

RESULTS

In this study with a sample size of 85 cases, majority of the patients who underwent major surgical procedures were between 40-49 (25.9%) years and 60-69 (21.2%) years. 53 (62.4%) patients were male and 32 (37.6%) patients were female.

Table: Association Of Age And Sex

AGE(YRS)	MALE		FEMALE		p value
	N	%	N	%	
20-29	10	18.9%	3	9.4%	0.456
30-39	6	11.3%	3	9.4%	
40-49	14	26.4%	8	25.0%	
50-59	5	9.4%	8	25.0%	
60-69	11	20.8%	7	21.9%	
≥ 70	7	13.2%	3	9.4%	
Total	53	100.0%	32	100.0%	

Out of the 85 patients included in the study 5 (5.9%) patients whose bilateral lower limb Venous Doppler study was found to be normal pre-operatively, developed DVT post-operatively. Remaining 80 (94.1%) cases were found to be normal on Venous Doppler study evaluated between 5-7 days post-operatively.

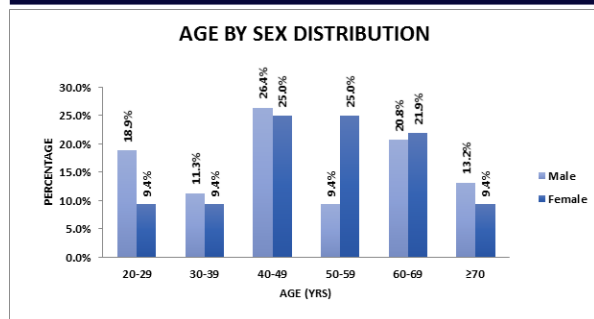


Figure: Association Of Age And Sex

Table: Distribution Of Cases According To Colour Doppler Report

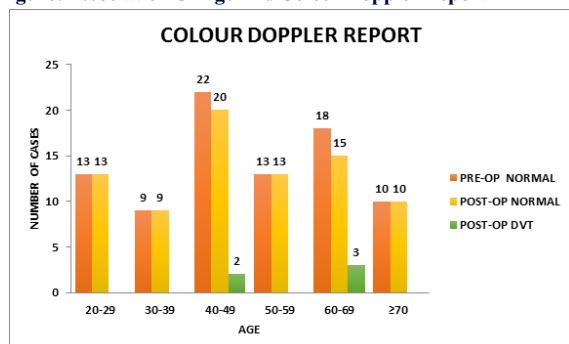
COLOUR DOPPLER REPORT		N	%
PRE-OP	NORMAL	85	100
	DVT	5	5.9
POST-OP	NORMAL	80	94.1
	DVT	5	5.9

In 5 cases with post-operative DVT, 2 patients were in the age group of 40-49 years and 3 patients were in the age group of 60-69 years. Among them 3 patients were found to be females and 2 patients were males.

Table: Association Of Age And Colour Doppler Report

AGE(YRS)	COLOUR DOPPLER REPORT		
	PRE-OP	POST-OP	
	NORMAL	NORMAL	DVT
20-29	13	13	0
30-39	9	9	0
40-49	22	20	2
50-59	13	13	0
60-69	18	15	3
≥70	10	10	0
Total	85	80	5

Figure: Association Of Age And Colour Doppler Report



Total number of 85 patients who underwent major surgical procedures, most of them were abdominal procedures like exploratory laparotomies for duodenal perforations, gastro-jejunostomy for gastric outlet obstruction, few cases being salphingo-oophorectomy for carcinoma ovary, APR(Abdomino-perineal Resection) for carcinoma Rectum.

Some of the major procedures also included Right lobe Hepatectomy for Hepatocellular carcinoma of Liver and Ivor Lewis operation for carcinoma oesophagus.

Other major procedures included in the study were Thyroid surgeries, Modified radical mastectomy for carcinoma of Breasts and Trendelenberg's procedure for varicose veins of lower limbs.

The 5 cases who developed DVT post operatively underwent major surgeries such as right lobe Hepatectomy for HCC, Ivor Lewis operation for Ca Oesophagus, omentectomy with bowel adhesiolysis following incisional hernia, APR for Ca Rectum and open Cholecystectomy for cholelithiasis respectively. All of them were above 40 years of age and associated co-morbidities with duration of surgery between 2-4 hours. None of them had DVT preoperatively.

42.3% of the total cases who underwent major surgical procedures had atleast one of the co-morbidities such as Hypertension(11.8%), Diabetes mellitus(12.9%), obesity(12.9%) or Oral contraceptive pills(4.7%) consumption. Among them 5 patients who developed DVT post-operatively, 1(20%) patient had hypertension, 1(20%) patient had diabetes mellitus and 1(20%) patient was obese. None of the female patients were on OCP's who developed DVT post-operatively. All the 5 positive cases were above the age of 40 years.

Table: Associated Co-morbid Conditions Among Dvt Cases

ASSOCIATED CO-MORBID CONDITIONS AMONG DVT CASES	N	%
AGE>40	5	100%
OVERWEIGHT/OBESE	1	20%
HYPERTENSION	1	20%
TYPE 2 DM	1	20%
OCP	0	0%

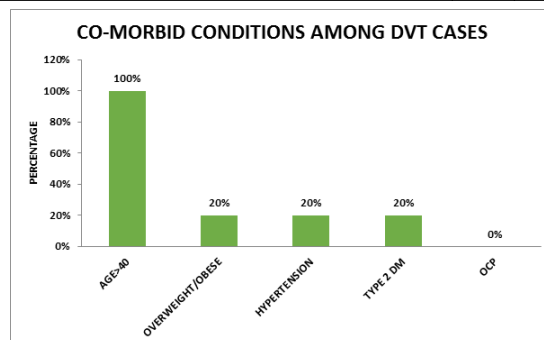


Figure: Associated Co-morbid Conditions Among Dvt Cases

DURATION OF SURGERY

45(52.9%) cases who underwent surgical procedures were less than 1 hour, 23(27.1%) cases were between 1-2 hours, 13(15.3%) cases between 2-3 hours and 4(4.7%) cases between 3-4 hours duration.

Among them 2 patients with 2-3 hours of duration of surgery developed DVT and 3 patients with 3-4 hours of duration of surgery developed DVT.

Table: Duration Of Surgery According To Dvt Positive Cases

DURATION OF SURGERY	POST-OP		p value
	NORMAL	DVT	
1 HOUR	45	0	<0.001*
1-2 HOURS	23	0	
2-3 HOURS	11	2	
3-4 HOURS	1	3	
Total	80	5	

Note: * significant at 5% level of significance (p<0.05)

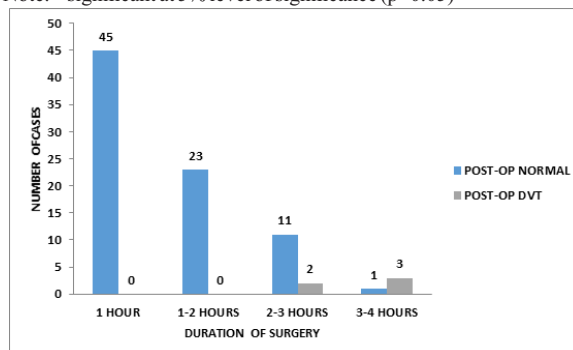


Figure: Duration Of Surgery According To Dvt Positive Cases

DISCUSSION

Venous thromboembolism (VTE) is a preventable disease which contributes to morbidity and mortality among patients hospitalized for acute medical and surgical illnesses.

Incidence of acute DVT is complicated by the silent nature of most thromboses in hospitalized patients as well as by the nonspecific signs

and symptoms. The incidence depends on the population studied, the intensity of screening, and the accuracy of the diagnostic test employed³.

The incidence of DVT in India as reported is one percent of the adult population after the age of forty and is 15-20% in hospitalized patients. One out of 100 patients who develop DVT die, usually from pulmonary embolism⁴.

The American College of Chest Physicians (ACCP) is the foremost body in DVT prophylaxis, using evidence-based consensus guidelines. According to the latest ACCP recommendations, based on the Eighth ACCP Consensus Conference, pharmacologic therapy includes Low Molecular Weight Heparin (LMWH) 40 mg subcutaneously daily, Low Dose Unfractionated Heparin (LDUH) 5000 Units subcutaneously 2-3 times daily, or fondaparinux 2.5mg subcutaneously daily. Patients with renal insufficiency (creatinine clearance [CrCl] <30mL/min) should not receive fondaparinux. However, LDUH and LMWH can be used with caution and careful monitoring of the levels or their anticoagulant effects to avoid bioaccumulation⁵.

Mechanical methods of thrombo-prophylaxis are recommended in patients at high risk for bleeding, or possibly as an adjunct to anticoagulant-based thromboprophylaxis⁵.

Patients undergoing surgery involving low-risk procedures and who have no associated risk factors for DVT, do not require specific thrombo-prophylaxis. However these patients should be encouraged to ambulate early and frequently.

The objectives of treatment in patients with VTE are to prevent death from PE, to prevent recurrent VTE, to prevent the post-thrombotic syndrome⁶. The 1-week survival rate after a PE is only 71%, and almost 25% of all cases of PE essentially manifest as sudden death. Mortality among patients with an appropriate diagnosis and treatment has been reported to be only 8-9%. Among the survivors, early resolution of abnormal lung scans has been documented in several series employing routine follow-up studies. Chronic cor pulmonale is rare after PE, generally occurring after repeated, often silent, emboli³.

Post-thrombotic Syndrome is responsible for a greater degree of chronic socioeconomic morbidity. Up to 29-79% of patients may have long-term manifestations such as pain, edema, hyperpigmentation, or ulceration, after an episode of acute DVT.

The present study is being undertaken to determine the risk of developing DVT in surgical patients, the adequacy of prophylaxis being administered and thus the awareness of surgeons regarding the same.

CONCLUSION

Out of 85 patients included in this study, incidence of DVT was found to be 5.9% (5 cases).

In all the 5 cases with DVT, duration of surgery was found to be more than 2-4 hours. The risk factors were found to be prolonged duration of surgery and associated co-morbidities such as Diabetes mellitus, Hypertension and Obesity. Old age group were more prone to develop DVT postoperatively.

Recommendations: For patients who undergo surgery for prolonged duration (especially > 3 hours) it is recommended to mobilize the patients as early as possible and do screening with Venous Doppler study for incidence of DVT along with appropriate DVT prophylaxis in the pre-operative period and management of co-morbid conditions to avoid morbidity & mortality associated with deep vein thrombosis.

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