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A Comprehensive Study on the Incidence and Risk Factors of Deep Vein Thrombosis in Asymptomatic Patients Following Prolonged Surgery

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Abstract
Deep vein thrombosis (DVT) is a significant postoperative complication, associated with substantial morbidity and mortality. This study aims to investigate the incidence and risk factors of DVT in asymptomatic patients following extended surgical procedures at our institution. A prospective, time-bound study was conducted involving 100 patients in the Department of General Surgery at the PES Institute of Medical Sciences and Research, Andhra Pradesh, from November 2023 to August 2024. The study included patients who underwent elective or emergency surgeries lasting more than two hours, admitted through the emergency department or outpatient services. Among the 100 patients, the incidence of asymptomatic DVT was found to be 2 percent. The incidence of asymptomatic DVT was 2 percent among the 100 patients studied. In both cases, the duration of surgery exceeded three hours, and the patients experienced immobilization for three days. The identified risk factors were prolonged surgical duration and immobilization.

INTRODUCTION

Deep vein thrombosis (DVT) is a highly concerning complication in postoperative patients due to its significant morbidity and death rates[1]. The incidence of DVT in different studies of Western populations varies from 15% to 40% in patients undergoing major general surgical procedures[2].

Autopsy investigations indicate that 50% of all individuals who die in hospitals have deep vein thrombosis (DVT). Approximately 10-30% of these patients exhibit pulmonary embolism as a consequence of proximal deep vein thrombosis (DVT). Three The majority of patients with surgical deep vein thrombosis are asymptomatic. Complications such as pulmonary embolism might be fatal. Following deep vein thrombosis (DVT), venous valves may become ineffective or obliterated, leading to chronic venous hypertension and the eventual emergence of varicose veins, lipodermatosclerosis, and venous ulcers, which can cause significant disability. Four DVT is thought to be less common among Indians and Asians. Five Limited research has been conducted on deep vein thrombosis in the postoperative phase among Asian patients. This study aims to demonstrate the incidence and risk factors of deep vein thrombosis in asymptomatic patients following lengthy surgery.

Prolonged surgical procedures, particularly those lasting more than two to three hours, are associated with a heightened risk of venous stasis, endothelial injury, and activation of the coagulation cascade-collectively described by Virchow's triad. These factors significantly increase the likelihood of thrombus formation in postoperative patients. The incidence of DVT in asymptomatic patients following prolonged surgery varies widely in the literature, influenced by factors such as patient demographics, type of surgery, intraoperative duration, perioperative prophylaxis, and existing comorbidities like obesity, malignancy, or cardiovascular disease.

Despite the advancements in perioperative care and thromboprophylaxis, the silent nature of asymptomatic DVT presents a diagnostic challenge, as routine clinical examinations may fail to detect subclinical thrombotic events. Consequently, many cases progress unnoticed, only to manifest later as severe complications. Therefore, a thorough understanding of the incidence and risk factors associated with asymptomatic DVT is vital for risk stratification, enhancing early detection through appropriate screening protocols, and tailoring prophylactic strategies for high-risk groups.

This study seeks to determine the true incidence of DVT in asymptomatic patients subjected to prolonged surgical procedures and to analyze the contributory risk factors that predispose individuals to this complication. Such data are essential to guide evidence-based clinical practice aimed at reducing postoperative thromboembolic events and improving overall patient outcomes.

Aims and Objectives: To study incidence and risk factors of the deep vein thrombosis in asymptotic patients after prolonged surgery in our institution.

MATERIALS AND METHODS

This is a prospective time bound study conducted on 100 patients in the department of General surgery, PES institute of medical sciences and research at Andhra Pradesh. Nov 2023 to Aug 2024. All patients who underwent elective or emergency operations with duration more than 2 hours, admitted in emergency and out patient of department of general surgery were taken into study. Patient who underwent cardiac or vascular operations, Patients who have symptoms suggestive of DVT such as unilateral lowerlimb edema and calf muscle pain, Patients who ever took anticoagulant such as warfarin, aspirin and clopidogrel during one week before hospital admission, Patients who suffered from pre-operation DVT, Uncorrectable coagulopathy and Patients who were on heparin ruled out from the study. Detailed history was taken. Hematological investigations were done.

Preoperative assessment included a detailed history and clinical examination focusing on DVT risk factors such as age, obesity, smoking status, hormonal therapy, history of malignancy, cardiovascular comorbidities, and prior episodes of thromboembolism. Baseline laboratory investigations including complete blood count, coagulation profile, and D-dimer levels were performed.

All patients underwent elective surgeries lasting more than 3 hours. Intraoperative parameters like type and duration of surgery, intraoperative blood loss, and use of intraoperative prophylaxis (e.g., sequential compression devices, pharmacological anticoagulants) were documented.

Postoperatively, all patients were clinically assessed for signs of DVT (limb swelling, pain, tenderness, and Homan's sign) daily. However, irrespective of clinical symptoms, bilateral lower limb venous Doppler ultrasonography was performed between postoperative days 5 to 7 to detect asymptomatic DVT.

Data Collection: The following variables were recorded:

- Demographic data (age, sex, BMI)
- Comorbidities (diabetes, hypertension, cardiovascular diseases)
- Surgical variables (type and duration of surgery)
- Perioperative thromboprophylaxis measures
- Doppler ultrasonography findings
- Laboratory parameters (D-dimer levels)

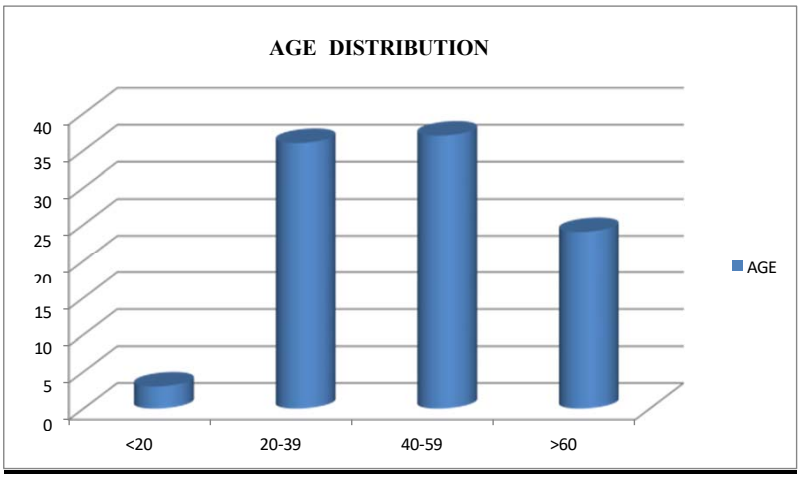

Fig. 1: Age distribution

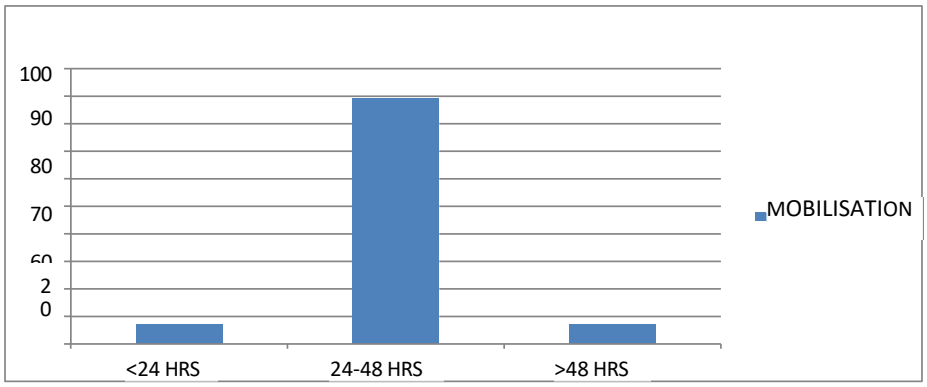

Fig. 2: Mobilisation

All the patients are subjected to hand held doppler study of deep venous system of both lower limb and ileac system on post operative day 2, day 5 and day 7. Statistical analysis was done using the statistical package for social sciences (SPSS).Different statistical methods were used as appropriate. Mean ± SD was determined for quantitative data and frequency for categorical variables. The independent t- test was performed on all continuous variables. The normal distribution data was checked before any t-test. The Chi-Square test was used to analyze group difference for categorical variables A p- value < 0.05 was considered significant.

Table: 1 Comorbid Conditions

Conditions	No of Patients
Diabetes	31
Hypertension	17
CAD	2
COPD	2
Renal Diseases	3
Liver Disease	2
Psychiatric	1

Tab. 2 Clinical Findings

Nature of Anaesthesia	No.	%
Spinal	16	16%
ETGA	68	68%
ETGA-CV	16	16%
Nature of Surgery		
Elective	74	74%
Emergency	26	26%
Duration (min.)		
120-180	85	85%
180-240	13	13%
>240 mts	2	2%

RESULTS AND DISCUSSIONS

In our study we included equal number of male and females.

The predominant age group was 40-59 years constituting 37%.Followed by 20- 39 years constituting 36%.

31% of patients were diabetic on insulin and 17% were hypertensive on treatment.

In our study 74% elective cases and rest were emergency. 85% surgeries were finished within 3 hours. 2% surgeries prolonged more than 4 hours. In 25% surgeries intra operative blood transfusion was given. 33% received injection low molecular weight heparin as prophylaxis.

Two patients out hundred developed asymptotic DVT on POD 7.

Of the 100 individuals, 21 were diagnosed with malignancies. The predominant types were breast and gastrointestinal cancers. Of the 74 elective cases,

25.67% were laparoscopic procedures. In our facility, the primary laparoscopic procedure is laparoscopic cholecystectomy. My study revealed that 84.21% of laparoscopic operations were laparoscopic cholecystectomies.

In our investigation, two patients had asymptomatic deep vein thrombosis on day seven. In all instances, the duration of operation exceeded three hours, and the patient was immobilised for three days, consistent with earlier research. Six to eight The particulars were:

A 27-year-old male patient was admitted to the emergency department with acute abdominal pain. Upon evaluation, he was diagnosed with ileal perforation accompanied by pyoperitoneum and subsequently had primary closure with a covering ostomy. The patient received ventilator assistance postoperatively for three days and was thereafter weaned off progressively. Meanwhile, the patient has improved from sepsis and is recovering. On the seventh postoperative day, a handheld Doppler examination of both lower limbs was conducted as part of the study, which indicated thrombosis of the right popliteal vein, subsequently verified by duplex scan. The patient was already receiving DVT prophylaxis, which was subsequently adjusted to therapeutic levels following a vascular consultation. The patient experienced a pulmonary embolism on the 10th postoperative day and received appropriate treatment.

A 76-year-old diabetic patient underwent bilateral hernioplasty. The surgical duration was 180 minutes, with an estimated blood loss of 150 ml. The patient was immobilised for 48 hours without any DVT prophylaxis. Thrombosis was identified in the venous system of the right lower limb, extending to the femoral veins. The patient commenced treatment following a vascular consultation and recovered without complications.

Recommendations: Patients undergoing prolonged surgical procedures (particularly exceeding 3 hours) and extended immobilisation (greater than 2 days) should be screened for deep vein thrombosis (DVT) using Doppler ultrasound, in conjunction with appropriate DVT prophylaxis during the postoperative period, to mitigate morbidity and mortality associated with undetected and asymptomatic DVT.

CONCLUSION

In our study incidence of asymptomatic DVT was found to be 2 percent. The risk factors were found to be prolonged duration of surgery and immobilization in both the cases.

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