Section: General Surgery

Original Research Article

PROSPECTIVE STUDY OF "ASSESSING THE RISK FOR DEVELOPMENT OF DEEP VEIN THROMBOSIS IN SURGICAL PATIENTS USING ADAPTED CAPRINI SCORING SYSTEM"

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ABSTRACT

Background: Deep vein thrombosis (DVT) is a significant cause of morbidity and mortality, with venous thromboembolism (VTE) being a serious complication. Although traditionally considered rare among Asians, recent Indian studies reveal a higher incidence than previously believed. Challenges such as inadequate risk assessment and misdiagnosis contribute to underreporting. **Aim**: To determine the incidence, morbidity, and mortality due to DVT in surgical patients and to assess the validity and reliability of the Adapted Caprini Scoring System for risk stratification and prophylaxis. **Materials and Methods:** A prospective observational study over a period of two years on surgical patients undergoing elective or emergency procedures under regional or general anaesthesia were assessed using the Adapted Caprini Scoring System. **Result:** Among 100 patients assessed, the incidence of DVT was 3.1% in patients aged 41–60 years and 14% in those above 60 years. DVT occurred in 7.2% of male patients and 4.4% of female patients, a difference that was statistically insignificant (p=0.6877). Of 8 patients with Caprini scores >7, 4 developed DVT, showing significant correlation (p<0.0003), whereas only 3 of 92 patients with scores <7 had DVT. Pain in the leg was reported in 4 out of 6 patients diagnosed with DVT. Malignancy was present in 40% of DVT cases, a statistically significant association (p<0.0007). **Conclusion:** The adapted Caprini RAM is a practical, economical, and effective tool for perioperative DVT risk stratification among general surgical patients. The study suggests that within high-risk patients (score >5), those with scores >7 are at significantly higher risk, recommending prophylaxis be targeted specifically to this subgroup to optimise outcomes.

INTRODUCTION

Deep vein thrombosis (DVT) is a common condition where blood clots form in deep veins, primarily in the legs, and can lead to serious complications like venous thromboembolism (VTE) and post-thrombotic syndrome. While VTE is often considered rare in the Asian population, recent studies in India show its incidence is higher than previously believed. Challenges in identifying high-risk patients, inadequate risk assessments, and misdiagnosis contribute to the underreporting and increased burden of DVT. Proper prophylaxis is crucial but must be balanced to avoid complications like bleeding and unnecessary healthcare costs. VTE risk can be assessed through group or individual methods, with recent studies favouring individualised risk assessments. Notable risk assessment models (RAMs) include those developed by Caprini, Cohen, Kucher, Roger, and the NICE guidelines. The Caprini model, developed over a decade ago, combines clinical experience and data, offering risk stratification and prophylaxis recommendations. This study aims to evaluate the incidence of DVT in surgical patients and assess the validity of the adapted Caprini scoring for risk stratification and prophylaxis. Numerous studies had been conducted in risk stratification of DVT in surgical patients. A few salient studies have been reviewed here.

- Data by Caprini et al,[6] concludes that The Caprini RAM effectively risk- stratifies plastic and reconstructive surgery patients for VTE risk. Among patients with Caprini score 8, 11.3% have a postoperative VTE when chemoprophylaxis is not provided. In higher risk

patients, there was no evidence that VTE risk is limited to the immediate postoperative period.

- The results of the study published by Bahl et al. in surgical hospitalized patients were (relative risk >15 were) swollen legs (current), history of DVT and age >75. The relative risk of some of these factors, notably, swollen legs (current), history of DVT/PE, severe lung disease (<I month), age >75 were much higher than those assigned in the original Caprini RAM.
- Pannucci et al,[5] validated the Caprini RAM in plastic surgery patients and found that, compared to patients with a Caprini score of 3-4, patients with a Caprini score of 7-8 or more were significantly more likely to develop DVT p < 0.001.

MATERIALS AND METHODS

1. **Design of Study:** Prospective Observational Study.
2. **Period of Study:** September 2022 to September 2024.
3. **Selection of Study Subjects:** All patients satisfying the inclusion criterion for a period of 2 years.
4. Data Collection: All patients undergoing either elective or emergency operations under regional or general anaesthesia in general surgery department coming under eligibility criteria will be stratified for risk of developing DVT using Adapted Caprini Scoring System.
5. Consent – Individual written and informed consent.
6. Analysis – Statistical analysis using Fisher's exact test.
7. Financial Support – None.
8. Participants – Patients from Casuality and OPD.
9. **Inclusion Criterion**

a) All Patients undergoing elective operations under regional or general anaesthesia in the department of general surgery.

10) **Exclusion Criterion**

a) Patients who were diagnosed as having DVT at the time of admission.
b) Under the age of 18.
c) Pregnant.
d) Any surgical procedure during the admission.
e) Direct admission to an ICU.
f) Direct admission for end-of-life or comfort care.
g) Diagnosis of VTE in the 6 months prior to admission.
h) Admitted for presumed VTE.
i) Admitted under observation status.
j) Re-admitted within 90 days of discharge from an admission included in the registry.
k) Receiving systemic anticoagulation.

RESULTS

In the study, 100 patients were assessed for the risk of developing Deep Vein
Thrombosis using Adapted Caprini Scoring System and the following results were
Obtained.

Age Distribution

Majority of the patients were in the age group of 21–40 (40%) and 37% belonging to 41– 60 age group. Age >60 contributed to 19% of the total study size.
Age group Vs DVT: DVT among the age group of 41 -60 is 3.1%, whereas.
among the age group >60 is 14%.

Sex Distribution

45% are females and 55% are males.
Sex Distribution vs DVT: Incidence of male patients suffering from DVT among the total study sample was 7.2% and females was 4.4%. which is statistically insignificant (0.6877)

Symptomatic Patients

Among 100 only 6 developed symptoms suggestive of DVT like swelling of limb or pain. Only 8 patients were of score >7 and remaining majority were of score <7.

Doppler Confirmed Cases

Patients who developed symptoms of DVT (6) were subjected for doppler study of which all the 6 had DVT.
Out of the 8 patients with score >7, 4(50%) were diagnosed of having DVT which was statistically significant (<0.0003) and 3 out of 92(3.2%) patients with score <7 had DVT.

Score Distribution

No. of positive patients with score 3 - 4 was 1(16.6%), score 5 - 6 was 1(16.6),
score of 7 - 8 was 3 (50%) and >8 was 1(16.6%).

Score vs Swelling

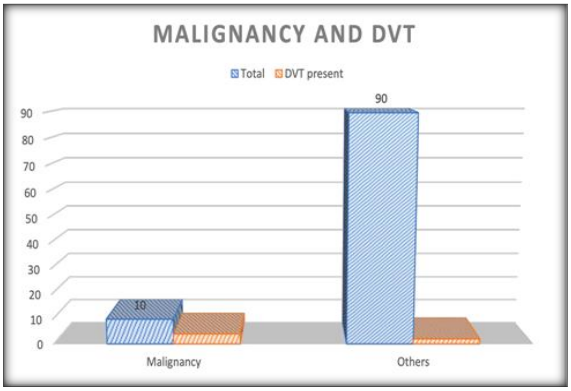
All 6 patients with DVT had swelling of the affected limb.

Score vs Pain

Out of 6 patients, 4 patients had pain in the leg (66%)

Malignancy vs DVT

40% (4 out of 10) of the patients who developed DVT had malignancy.
There is a statistical significance (<0.0007) between malignancy and occurrence of
DVT in this study.



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Smoking vs DVT

Among 21 smokers, 1 developed DVT which corresponds to 4.6% whereas among the 79 non-smokers, 5 developed DVT which corresponds to 63.3 %. But the incidence of smoking in DVT positive cases was around 16.6% and was statistically insignificant.

Table 1: Types of Surgeries vs DVT

Surgery	DVT Present	DVT Absent	Total
Cholecystectomy	0	18	18
Trendelenburg Procedure	0	12	120
Split skin Grafting	0	2	2
Meshplasty	0	20	20
Thyroidectomy	1	3	4
Gastrojejunostomy	0	3	3
Mastectomy	1	5	6
TAPP	0	3	3
TEP	1	0	1
Appendicectomy	0	4	4
Stoma Reversal	1	3	4
Lichtenstein Repair	0	4	5
Parotidectomy	0	1	1
Excision of Swelling	0	5	5
Adhesiolysis	0	1	1
Jaboulay's sac eversion	0	1	1
Diagnostic Laparotomy	0	3	3
Orchidectomy	0	1	1
Loop Colostomy	1	0	1
Cystogastrostomy	0	1	1

DISCUSSION

DVT is a relatively common complication among surgical patients, with many risk factors, which contribute to the disease. However, it was found that DVT prophylaxis.

was not used widely. The use of a risk assessment model may help improve the current situation. The present study intended to validate the adapted Caprini RAM, which can be used to stratify the risk of developing DVT in hospitalised patients based on their individual risk factors. In the present study it was found that a high adapted Caprini score and the cumulative risk level was associated with an increased risk of DVT. The incidence of DVT events in the low and moderate groups was one each. This is contrary to previous data by Caprini et al,[6] which described the incidence in low-risk group to be 2%, moderate risk group to be 20%. The highest group in their study was described as having an incidence of VTE of 80%. In the present study the incidence of VTE among the highest risk group was found to be 50%. In the original Caprini RAM, all patients with a score >5 were placed in the same group. Bahl et al,[11] modified the Caprini RAM and added a separate "super high risk" group >8 and recommended an extended duration of chemoprophylaxis for the same. Further splitting the highest risk category patients, it was observed that the difference in incidence of VTE among the patients with adapted Caprini score of 7-8 (50%) was statistically significant (P <0.0003), while among the score group of 5-6 it was statistically not significant. Of all the risk factors listed in the Adapted Caprini RAM, it was found that age, sex, major surgery, malignancy, patient confined to bed (>72 h) were associated with increased risk of DVT. All these factors are well recognised risk factors associated with development of VTE. However, as described in the study by Anderson et al. these risk factors are not of equal weight.

Malignancy was found to be an important risk factor in our study (40%) and statistically significant (<0.0007) which is similar to most of the studies and further risk stratification is required regarding the type and stage of cancer. In this study, relation between smoking and DVT was found insignificant. The present study had certain limitations. Firstly, only patients who had symptoms of DVT were evaluated for the same. Routine screening for asymptomatic DVT was not done, which may have resulted in a lesser incidence being reported. Secondly, all the parameters of thrombophilia were not evaluated on any of the patients and some established risk factors (mentioned above) were not reported in any of the patients in the study group and hence no information could be obtained about these relevant risk factors from the study population. As a result of this, the patient's risk level may be underestimated. Thirdly, no orthopaedic cases were included in the study, and hence most of the parameters, which are assigned a high-risk scoring of 5 points, were not studied.

CONCLUSION

Deep vein thrombosis is one of the significant, yet preventable causes of in-patient.

morbidity and mortality. It is important to raise awareness among medical fraternity.

regarding detection and prevention of the same. The adapted Caprini RAM is an economical, practical and

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effective tool to stratify general surgical patients for perioperative DVT risk.

Unlike the Western population, the present study found that within the high-risk group (score >5), the risk of developing DVT is not significant in the 5-6 score group, as compared to that in the group with a score of >7. Hence further stratification of this group to provide appropriate prophylaxis only to the patients with scores >7 is recommended, thereby reducing complications due to DVT prophylaxis. However, further multi-centric and larger scale validation studies for the use of this adapted score in this region population are recommended.

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