SHORT REPORT

Early post-operative mobilisation to prevent Venous Thromboembolism in laparoscopic surgery: a clinical audit

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Abstract

Venous thromboembolism (VTE) is a recognised post-operative complication following laparoscopic surgery. For its prevention, the American College of Chest Physicians (ACCP) and the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) recommend various prophylactic measures based on the patient's risk, calculated using the Caprini and Rogers scoring systems. Of the proposed recommendations, early mobilisation is a practical and cost-effective VTE prevention strategy in a resource-limited setting like ours.

This audit aimed to assess the risk of venous thromboembolism in patients undergoing laparoscopic surgeries and their compliance to early post-operative mobilisation. The key objective was to identify and address the limiting factors to improve patient outcome.

Using the Caprini score, the VTE risk for 30 post-laparoscopy patients was assessed and their mobilisation times recorded. The results revealed that while 53% of the patients were at "moderate risk", making early mobilisation crucial, only 7% mobilised within the recommended two to three hours. The majority (63%) did not mobilise until more than six hours post-surgery.

These findings highlight the need for improved compliance with early mobilisation protocols, adherence to which can effectively reduce the prevalence of VTE, leading to enhanced patient outcomes and shorter hospital stays.

Keywords: Early mobilisation, Venous thromboembolism, Laparoscopic surgery, Clinical audit.

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Introduction

Venous thromboembolism (VTE) is a well-recognised and preventable post-operative complication, carrying significant morbidity and mortality. Laparoscopic surgeries, although associated with lower VTE rates as compared to open surgeries, still carry a substantial risk. There are several factors that contribute to the risk of developing VTE in laparoscopic surgeries, including carbon dioxide insufflation during pneumoperitoneum, reverse Trendelenburg position, prolonged operative periods, and the effects of vasodilation caused by general anaesthesia, all of which lead to venous stasis.[1]

In a meta-analysis done on venous thromboembolism after laparoscopic cholecystectomy, the overall prevalence of clinically evident deep vein thrombosis (DVT) was observed to be 1.6% in the absence of prophylaxis.[2] In another study conducted in 2007 that utilised data from the University Health System Consortium Clinical Database, analysing records of 138,595 patients, the prevalence of venous thromboembolism was noted to be 0.28% (259 cases). In this study, 92,490 (67%) patients underwent laparoscopic surgery and the population was predominantly female (67%), with 42% of the patients aged between 31 and 50.[3] Notably, this retrospective analysis did not report whether these patients received any VTE prophylaxis during their admission. Additionally, significant positive correlation has also been established between VTE events and post-operative mortality, emphasising the critical need for effective preventive measures.[4]

To prevent such detrimental complications, the American College of Chest Physicians (ACCP) published guidelines, in 2012, outlining the prophylactic strategies for post-operative patients based on their risk score.[5] These guidelines were further endorsed by the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) in 2017.[2] The guidelines use Caprini and Rogers scoring systems to score the patients according to their risk factors and outline prophylactic strategies based on the calculated risk.[6,7] For patients classified as "very-low" risk, ambulation alone is recommended, while "low-risk" patients are advised to receive mechanical prophylaxis with intermittent pneumatic compression (IPC). Patients at "moderate-risk" of developing VTE are recommended to receive either chemical or mechanical prophylaxis with IPC.

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It should be noted, however, that specific considerations apply. A 2021 prospective randomised study observed that while chemoprophylaxis is beneficial in some laparoscopic procedures, such as laparoscopic bariatric surgery, its routine use in laparoscopic cholecystectomy is not recommended. This is due to the increased risk of bleeding associated with chemoprophylaxis, which may be equivalent to the risk of developing VTE. Consequently, it is preferable to consider individual risk prediction, procedure type, and patient preferences to determine the best course of action. This approach was corroborated in a systematic review and meta-analysis of abdominal surgeries published in 2023.[8-10]

Considering the challenge of precisely balancing the VTE vs bleeding risk and the significant financial limitations that affect access to mechanical chemoprophylaxis, early mobilisation and ambulation are the most adaptable and low-risk strategies in our setting. Moreover, they provide additional benefits in counteracting detrimental effects of prolonged bed rest, such as insulin resistance, muscle atrophy, and compromised pulmonary function.[11] Therefore, prioritising early mobilisation can not only reduce VTE occurrences significantly, but also escalate post-op patient recovery. Hence, this study aimed to address inadequate compliance with early mobilisation protocols with the ultimate goal to improve patient outcomes, minimise complications, and reduce hospitalisation.

Methods and Results

The audit was conducted at the Surgical Unit VI at Dr Ruth K. M Pfau Civil Hospital Karachi over a period of three months from March 2023 to May 2023. It included 30 post-operative patients who had undergone laparoscopic surgery. The collected data encompassed four sections: patient information, procedure specifics, Caprini score calculation, and post-surgery mobilisation details. Patient information included name, age, gender, body mass index (BMI), and hospital registration number for easy identification. Procedure details, acquired from the operative notes, included the surgery date, type, duration, start and end times, and per-operative VTE prophylaxis, if any. Caprini scores were calculated using patients' medical records and patients' interviews. The post-operative mobilisation period was calculated by subtracting the extubating time (documented on anaesthesia notes) from the time of first mobilisation (self-reported by patients). Additionally, patients' reported reasons and influencing factors for the post-surgery mobilisation times were recorded.

Among the 30 patients who were evaluated, 24 (80%) were females and 6 (20%) males. The most common age group was between 30-50 years, making up a total of 67% of the patient population. Patients' BMI were calculated using the height and weight which had been recorded during data collection. It was noted that 18 (60%) patients had a BMI of over 25. The details of the population demographics are given in the Table.

Table: Demographic profile and Caprini risk assessment.

Characteristic	All Patients(N=30)
Demographics, No. of Patients (%)	
Male	6 (20)
Female	24(80)
Ages (years);	
</= 40	23(76.7)
41-60	7(23.3)
61-74	0(0)
Risk Categories, No. of Patients (%)	
Very low	0(0)
Low	8(26.7)
Moderate	17(56.7)
High	5(16.7)
Caprini Risk Assessment, Mean ± SD	
Mean Caprini Score	3.47 ± 1.38

Regarding the surgeries, 28 out of 30 surgeries were laparoscopic cholecystectomy, and the remaining two were laparoscopic appendectomy. The duration of all surgeries exceeded 45 minutes, with the average time being 75 minutes. This resulted in a baseline Caprini score of 2 for all patients.

An additional point was added if the patient was between

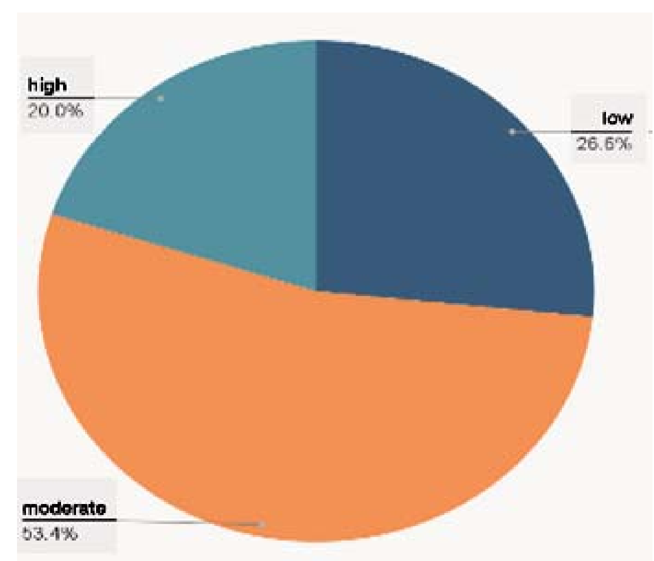

Figure-1: Risk stratification of patients.

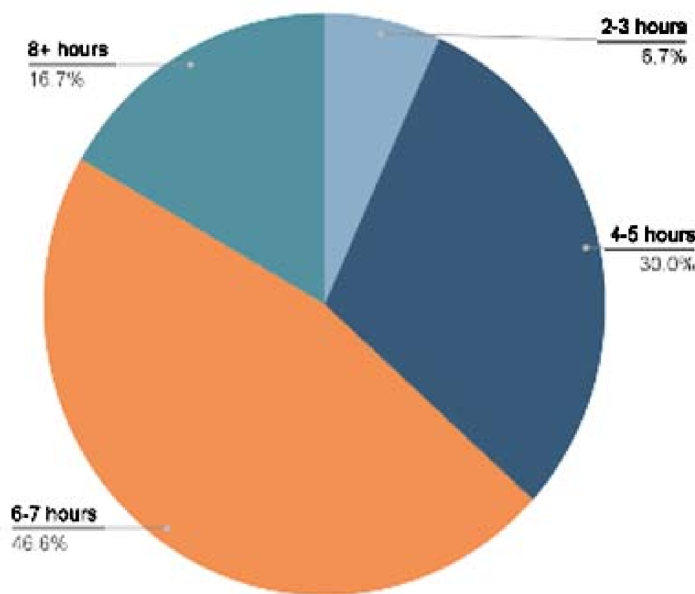

Figure-2: Time of mobilisation post-surgery.

41 to 60 years of age, had a BMI greater than 25, history of inflammatory bowel disease (IBD), or was pregnant/postpartum. After calculating the Caprini score, 8 (27%) patients were classified as "low risk", 16 (53%) as "moderate risk", and 6 (20%) as "high risk" for developing VTE. None of the patients were categorised in the "very low risk" group. [Figure 1]

When assessing post-operative mobilisation, only 2 (6.7%) patients mobilised within the recommended first two to three hours after surgery; 9 (30%) mobilised four to five hours post-surgery, while 20 patients, an alarming 63.3% mobilised six hours after their surgery. Of these, 5 (16.7%) did not mobilise until more than eight hours post-operatively. [Figure 2] The primary reasons for delayed mobilisation were post-operative symptoms such as pain, nausea, and vomiting, that were not managed adequately, as well as a lack of awareness regarding the importance of early mobilisation. Additional barriers included psychological factors such as fear of falling or damaging stitches, cultural beliefs promoting post-operative bed rest, and the limitation of hospital staff availability for guiding and assisting mobilisation. As an intervention to address these issues, a meeting was organised with the department heads, trainees, and interns to share the findings of this audit and provide education on the significance of early mobilisation alongside practical recommendations.

Conclusion

Early mobilisation is a cost-effective and convenient strategy in preventing post-operative VTE events, particularly in very low to moderate risk patients. While VTE events are less common in laparoscopic surgeries, taking the steps to prevent even one event is worth incorporating simple cost-free measures into practice. The current study highlighted a critical need and ample opportunity to address the low compliance with early mobilisation.

We recommend that patients should be educated on the benefits of early post-op mobilisation as part of their pre-operative patient guidance session, addressing fears and cultural misconceptions. Moreover, adequate management of post-operative symptoms should be ensured, using scheduled anti-emetics and analgesics where appropriate. Adoption and strict adherence to the Enhanced Recovery After Surgery (ERAS) protocol should be done, with each patient given a clear post-operative ambulation goal that is graded. For example: sit up in bed at X hours, mobilise into a chair at Y hours, and walk a few steps at Z hours. This clear, phased target will ensure that each patient has a goal to achieve and makes early mobilising less optional. Additionally, having dedicated staff or a physiotherapist to guide patients in mobilising post-surgery would prevent burdening the routine staff with additional duties, which might otherwise be prioritised over ambulation. Implementing these changes will enhance patient recovery and shorten hospital stays through early, guided mobilisation.

This study had several limitations. Due to the unavailability of routine ultrasound Doppler facilities, it was not possible to identify any subclinical deep vein thromboses (DVTs). Additionally, post-discharge venous thromboembolism (VTE) events could only be documented if patients reported them. Lastly, it was not possible to implement the ideal prophylactic methods for each risk score due to financial and resource constraints.

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AB, SZJ & MB: Concept, design, data acquisition, analysis, interpretation, drafting, revision, final approval and agreement to be accountable for all aspects of the work.