

Compliance with Deep Vein Thrombosis Prophylaxis in Critically Ill Patients: A Clinical Audit from a Tertiary Care Hospital

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ABSTRACT

Background: Deep vein thrombosis (DVT) is a significant cause of morbidity and mortality in critically ill patients. Early risk assessment and timely prophylaxis are recommended by the Indian Society of Critical Care Medicine (ISCCM) to prevent DVT. This clinical audit aimed to evaluate compliance with DVT prophylaxis standards in a tertiary care ICU.

Material and Methods: This prospective audit included 59 critically ill patients admitted to the ICU. Data on demographics, primary diagnoses, DVT risk factors, contraindications, and prophylaxis practices were collected. Risk assessment within 24 hours, type and timing of prophylaxis, and documentation of contraindications were compared against ISCCM guidelines.

Results: Patients ranged from 11 to 90 years, with the majority in the 61–70 years age group (25.42%). Male patients comprised 52.54%, and 28.81% had recent surgical interventions. Primary diagnoses included neurological (18.64%), respiratory (16.95%), and cardiovascular disorders (15.25%). Within 24 hours, 86.44% of patients had at least one risk factor for DVT; 13.56% had no risk factors, which were documented. Contraindications to pharmacological prophylaxis were present in 44.07% and to mechanical prophylaxis in 55.93% of patients. Prophylaxis was administered to 23 patients (30.51% pharmacological, 6.78% mechanical, 1.69% both), while 61.02% did not receive prophylaxis due to contraindications. Timing of prophylaxis initiation was within 24 hours in 22.03% and after 24 hours in 16.95%. All patients had documented risk assessment and clearly recorded contraindications, reflecting 100% compliance with ISCCM standards.

Conclusion: The audit demonstrates excellent adherence to ISCCM guidelines in risk assessment, prophylaxis administration, and documentation. Structured protocols effectively ensure safe and guideline-compliant DVT prevention in critically ill patients.

Key words: Deep vein thrombosis, ICU, prophylaxis, ISCCM guidelines, clinical audit

INTRODUCTION

Deep vein thrombosis (DVT) is a significant cause of morbidity and mortality in critically ill patients. The Indian Society of Critical Care Medicine (ISCCM) recommends that all critically ill patients receive pharmacological thromboprophylaxis for DVT prevention if the risk of DVT outweighs the risk of bleeding. Despite these guidelines, adherence to DVT prophylaxis protocols remains suboptimal in many healthcare settings. A study conducted in a tertiary care hospital in India found that only 69.9% of patients received appropriate thromboprophylaxis, indicating a gap in guideline adherence [1,2]. A systematic approach to venous thromboembolism (VTE) prevention, incorporating risk assessment upon hospital admission, has been shown to reduce morbidity and mortality. However, studies indicate that a significant proportion of hospitalized patients do not receive appropriate VTE prophylaxis within the recommended time frame. A multinational cross-sectional study revealed that only 58% of surgical patients and 37% of medical patients received recommended prophylaxis, highlighting the need for improved compliance [3-5].

Implementing quality improvement initiatives, such as standardized risk assessment protocols and staff education, has been effective in improving compliance with DVT prophylaxis guidelines. A study demonstrated that a quality improvement project increased compliance with perioperative thromboprophylaxis from 69.9% to 88.4%, emphasizing the importance of structured interventions [6].

Given the high risk of DVT in critically ill patients and the associated complications, it is imperative to evaluate and improve compliance with prophylaxis protocols. This study aims to assess adherence to ISCCM guidelines for DVT prophylaxis in a tertiary care ICU setting, providing insights into current practices and identifying areas for improvement.

MATERIAL AND METHODS

Study Design and Setting: This study was conducted as a prospective clinical audit in the intensive care unit (ICU) of a tertiary care teaching hospital. The audit was designed to evaluate compliance with the Indian Society of Critical Care Medicine (ISCCM) guidelines [7] for deep vein thrombosis (DVT) prophylaxis among critically ill patients.

Study Duration: The audit was carried out over a period of one month, preceded by one week of preparatory planning and followed by one week of data analysis.

Study Population: All adult patients admitted to the ICU during the study period were eligible for inclusion. Patients were excluded if their ICU stay was less than 24 hours or if they were already receiving therapeutic anticoagulation at the time of admission.

Data Collection

Data were obtained from patients' medical records using a structured data collection form developed in Google Forms. The form was designed to capture the following information:

- Demographic details (age, sex, and primary diagnosis).
- Date and time of ICU admission.
- Documentation of DVT risk assessment within 24 hours of ICU admission (Yes/No).
- Type of prophylaxis administered (pharmacological, mechanical, or none).
- Timing of initiation of prophylaxis.
- Documentation of contraindications, if present.

Audit Standards

Compliance was assessed against ISCCM standards, which specify that:

1. All ICU patients should undergo a documented DVT risk assessment within 24 hours of admission.
 2. Appropriate prophylaxis (either pharmacological or mechanical) should be prescribed and administered unless contraindicated.
 3. Contraindications to pharmacological prophylaxis must be clearly documented.
- The benchmark for each criterion was set at 100% compliance.

Data Analysis: Collected data were entered into Microsoft Excel and analyzed using descriptive statistics. Compliance rates were calculated as percentages and presented through charts and tables. These were compared against the ISCCM benchmark standards to identify gaps in practice.

RESULTS

A total of 59 critically ill patients were included in the study. The age of patients ranged from 11 to 90 years, with the majority falling in the 61–70 years age group (25.42%), followed by 71–80 years (20.34%). Gender distribution was slightly male-predominant. Among the participants, 17 patients (28.81%) had a recent history of surgical intervention. The primary diagnoses were diverse, with neurological disorders observed in 11 patients (18.64%), respiratory disorders in 10 (16.95%), cardiovascular disorders in 9 (15.25%), and hepatic/gastrointestinal disorders in 8 (13.56%) (Table 1).

Table 1: Basic profile of patients under study

| Age Group (Years) | n | % |
|-------------------|----|-------|
| 11-20 | 3 | 5.08 |
| 21-30 | 5 | 8.47 |
| 31-40 | 7 | 11.86 |
| 41-50 | 6 | 10.17 |
| 51-60 | 10 | 16.95 |
| 61-70 | 15 | 25.42 |
| 71-80 | 12 | 20.34 |

| | | |
|---|----|-------|
| 81-90 | 1 | 1.69 |
| Gender | | |
| Female | 28 | 47.46 |
| Male | 31 | 52.54 |
| Post op patient with history of recent surgical intervention | | |
| Yes | 17 | 28.81 |
| No | 42 | 71.19 |
| Primary Diagnosis | | |
| Neurological Disorders | 11 | 18.64 |
| Cardiovascular Disorders | 9 | 15.25 |
| Respiratory Disorders | 10 | 16.95 |
| Renal Disorders | 5 | 8.47 |
| Hepatic / Gastrointestinal Disorders | 8 | 13.56 |
| Hematological / Oncological Disorders | 5 | 8.47 |
| Trauma / Orthopedic Disorders | 5 | 8.47 |
| Obstetric / Gynecological Disorders | 3 | 5.08 |
| Infectious / Sepsis | 3 | 5.08 |

Within the first 24 hours of admission, 51 patients (86.44%) presented with at least one risk factor for DVT. Acute respiratory failure (20.34%), trauma (13.56%), and recent major surgery (13.56%) were the most frequently identified risk factors. Eight patients (13.56%) did not exhibit any identifiable risk factors (Table 2).

Table 2: Risk assessment within 24 hours

| Condition / Risk Factor | n | % |
|---------------------------------|----|--------|
| Acute kidney injury | 5 | 8.47 |
| Acute respiratory failure | 12 | 20.34 |
| Bleeding | 1 | 1.69 |
| Bronchoscopy | 1 | 1.69 |
| CML - Blast crisis | 1 | 1.69 |
| CV stroke | 2 | 3.39 |
| Heart failure | 1 | 1.69 |
| Major surgery | 8 | 13.56 |
| Pregnancy | 1 | 1.69 |
| Prior thromboembolism | 2 | 3.39 |
| Prolonged immobilization | 3 | 5.08 |
| Rapid progressive quadriparesis | 1 | 1.69 |
| Sepsis | 3 | 5.08 |
| Septic shock | 2 | 3.39 |
| Trauma | 8 | 13.56 |
| None | 8 | 13.56 |
| Total | 59 | 100.00 |

Among the patients, 26 (44.07%) had contraindications to pharmacological prophylaxis due to bleeding risk, whereas 33 patients (55.93%) had contraindications to mechanical prophylaxis (Table 3).

Table 3: Contraindications to DVT prophylaxis present in patients

| Contraindication | n | % |
|---|----|-------|
| Contraindication to pharmacological prophylaxis (Bleeding risk) | 26 | 44.07 |
| Contraindication to mechanical prophylaxis | 33 | 55.93 |

Prophylaxis was not administered in 36 patients (61.02%). Pharmacological prophylaxis alone was given to 18 patients (30.51%), mechanical prophylaxis alone to 4 patients (6.78%), and combined prophylaxis to 1 patient (1.69%). Regarding timing, prophylaxis was initiated within 24 hours of admission in 13 patients (22.03%) and after 24 hours in 10 patients (16.95%) (Table 4).

Table 4: Details of DVT Prophylaxis given

| Type of DVT Prophylaxis given | n | % |
|-------------------------------|----|-------|
| Pharmacological | 18 | 30.51 |
| Mechanical | 4 | 6.78 |
| Both | 1 | 1.69 |

| | | |
|----------------------------------|----------|----------|
| Not given | 36 | 61.02 |
| Total | 59 | 100.00 |
| Timing of DVT Prophylaxis | n | % |
| Within 24 hours | 13 | 22.03 |
| After 24 hours | 10 | 16.95 |

All 59 patients had documented DVT risk assessments within 24 hours of ICU admission, achieving 100% compliance. Prophylaxis was appropriately administered to 23 patients, while 36 patients did not receive it due to documented contraindications, reflecting full compliance. All pharmacological contraindications were clearly recorded, demonstrating complete adherence to ISCCM standards (Table 5).

Table 5: Comparison of Audit Results with Compliance Standards

| Compliance Standard | Requirement | Study Findings | Compliance (%) | Observations / Comments |
|--|---|--|----------------|---|
| 1. DVT Risk Assessment | All ICU patients should have a documented DVT risk assessment within 24 hours of admission. | All 59 patients (100%) had documented risk assessments within 24 hours. | 100% | Full compliance. Even patients without risk factors were documented as having none. |
| 2. Appropriate Prophylaxis | Pharmacological or mechanical prophylaxis should be prescribed and administered unless contraindicated. | 23 patients (38.98%) received prophylaxis; 36 patients (61.02%) did not receive prophylaxis due to documented contraindications. | 100% | Full compliance. Non-administration was justified by contraindications. |
| 3. Documentation of Contraindications | Contraindications to pharmacological prophylaxis should be clearly documented. | All contraindications were clearly documented for the patients concerned. | 100% | Full compliance. |

DISCUSSION

This study assessed adherence to the ISCCM guidelines for DVT prophylaxis in a tertiary care ICU setting. Our findings demonstrate exemplary compliance with the recommended protocols, aligning with previous studies that highlight the importance of structured interventions in improving prophylaxis practices. Notably, 100% of patients had documented DVT risk assessments within 24 hours of ICU admission, surpassing the 95% compliance observed in a multicenter study in India. This achievement underscores the effectiveness of standardized risk assessment protocols in enhancing adherence to guidelines.

Regarding prophylaxis administration, 38.98% of patients received appropriate prophylaxis, while 61.02% did not due to documented contraindications. This pattern is consistent with findings from a study in a tertiary care center, where 55% of ICU patients did not receive prophylaxis due to contraindications. The high percentage of non-administration due to contraindications reflects cautious clinical decision-making [7,8].

Furthermore, all contraindications were clearly documented, aligning with best practices emphasized in the ISCCM consensus statement. Clear documentation is crucial for ensuring patient safety and facilitating communication among healthcare providers [1,9]. In contrast, a study in a tertiary care hospital found that only 69.9% of patients received appropriate thromboprophylaxis, indicating variability in adherence to guidelines. Such discrepancies highlight the need for continuous monitoring and quality improvement initiatives to maintain high compliance rates [10].

Implementing educational interventions has proven effective in improving adherence to DVT prophylaxis guidelines. A study demonstrated that educational programs significantly enhanced critical care nurses' adherence to clinical practice guidelines for preventing venous thromboembolism. These findings suggest that ongoing staff education is vital for sustaining high compliance levels [11,12].

This study has several limitations. First, it was conducted in a single tertiary care ICU, which may limit the generalizability of the findings to other hospitals or healthcare settings. Second, the sample size was relatively small, restricting the statistical power for subgroup analyses. Third, the audit focused only on documented compliance and did not evaluate patient outcomes such as actual incidence of DVT or bleeding complications. Finally, data collection relied on medical records, which could be subject to documentation bias, although all contraindications and risk assessments were clearly

recorded. Future multicenter studies with larger sample sizes and longitudinal follow-up are warranted to better assess the clinical impact of DVT prophylaxis practices.

CONCLUSION

This clinical audit demonstrates that ICU patients in our study consistently underwent timely DVT risk assessment, with all contraindications to prophylaxis clearly documented. Pharmacological or mechanical prophylaxis was appropriately administered in accordance with individual patient risk and contraindications, achieving full compliance with ISCCM standards. The findings highlight the effectiveness of structured protocols in ensuring guideline-adherent DVT prevention in critically ill patients and underscore the importance of continued adherence to risk assessment and documentation practices to maintain patient safety.

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