Practice Patterns for Veinous Thromboembolism (VTE) Prophylaxis In Hospitalized Surgical Patients Who Developed VTE, A Retrospective Evaluation

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Background

Perioperative venous thromboembolism (VTE) events are a significant cause of morbidity and mortality for hospitalized patients[1]. Patients undergoing surgery are at elevated risk for VTE due to the provoked inflammatory response and unavoidable damage to the endothelial lining of blood vessels, putting patients in a hypercoagulable state[2]. In hospitalized surgical patients who developed veinous thromboembolism (VTE), chemo prophylaxis patterns were evaluated for appropriate weight-based dosing and interruptions in treatment. In combination with Caprini Score, this information is being used to implement new VTE prophylaxis protocols within the Department of Surgery, including incorporating the Caprini scoring tool within Epic into admission and discharge order sets.

Methods

Chart review was performed and inpatient prophylaxis practices were evaluated for 34 surgical patients who developed perioperative VTE from January 2023 to August 2024 at a single academic institution. Patient demographics, type of chemo prophylaxis used, whether the dose was appropriately weight-based, as well as interruptions in treatment prior to developing VTE were collected. Each patient's Caprini Score was calculated based on perioperative demographics to determine risk of VTE occurrence.

Results

34 surgical patients who developed VTE during hospital admission were included for review. One patient experienced a VTE at the site of surgical vessel repair and was excluded, five patients developed VTE prior to surgical intervention and were admitted to a medical service so were excluded, leaving 28 patients for evaluation. The average age was 52.3 years, 19 (67.9%) patients were male, and the average BMI was 31.4 kg/m^2. Eighteen (64.3%) patients experienced interruptions in prophylaxis prior to the VTE event. A large majority of those patients (n=17, 94.4%) missed three or more doses prior to the VTE event. Ten (35.7%) patients had inadequate dosing based on their BMI. A Caprini Score was calculated for each patient, with an average value of 7.1. Of the 26 patients considered "high risk" or "very high risk" for VTE with a Caprini Score $\geq$ 5, 61.5% (n = 16) experienced at least one interruption in prophylaxis therapy, 11.5% (n = 3) had inappropriately dosed prophylaxis therapy, and 17.9% (n = 5) experienced both interruption and an inadequate dose of prophylaxis.

Caprini Score	N	Inappropriate Dose N (%)	Interruptions N (%)	Missed ≥ 3 Doses N (%)
≥ 9 (Highest Risk)	6	2 (33.3%)	4 (66.7%)	4 (66.7%)
5 – 8 (High Risk)	20	8 (40.0%)	12 (60.0%)	12 (60.0%)
3 – 4 (Moderate Risk)	2	0 (0.0%)	2 (100.0%)	1 (50.0%)
1 – 2 (Low Risk)	0	N/A	N/A	N/A

Table 1. Patients with VTE who experienced inappropriate dosing based on BMI, experienced interruptions in dosing during hospitalization, and those who missed three or more doses prior to VTE event.

Conclusions

This evaluation identified modifiable practice patterns related to VTE prophylaxis that can potentially reduce the occurrence of VTE in the highest risk surgical patients. Missed dosing was frequently identified in these patients and is likely a contributing factor to developing VTE. The Caprini Score is easily calculated and helps identify patients at greatest risk of developing a VTE, and may prompt surgeons and other care providers to standardize their approach to VTE prophylaxis in hospitalized surgical patients.

Future Direction and Aims

Short-term Goals:

- Caprini risk assessment tool in Epic incorporated into admission and discharge order sets within the Department of Surgery
- "Hard stop" processes to encourage Caprini Score calculation and documentation for every admitted surgical patient
- Standardize chemo prophylaxis patterns for hospitalized patients

Long-term Goals:

- Ensure appropriate chemo prophylaxis during hospitalization and after discharge
- Decrease the incidence of VTE at LLUMC

References

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Acknowledgements:
Patient information was provided by the adult Patient Safety Indicator (PSI) 12 multidisciplinary team at Loma Linda University Medical Center.