

Evaluation of venous thromboembolism prophylaxis after the introduction of an institutional guideline: Extent of application and implementation of its recommendations

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Venous thromboembolism (VTE) includes deep vein thrombosis and pulmonary embolism. Although much is known about risk factors for VTE, there is failure in administration of appropriate prophylaxis to patients who are at risk for VTE. A paper-based reminder system is considered to be among the most effective methods of improving VTE prophylaxis in hospitalized patients. However, their success relies on choosing an evidence-based institutional guideline and implementation of its recommendations. This study was carried out to detect the extent of application of the institutional guideline (Caprini score risk assessment sheet). The study was carried out in the Jordan University Hospital; 354 patients were enrolled in the study and distributed among the following wards: nonorthopedic surgical (n = 119), medical (n = 220), and surgical orthopedic wards (n = 15). The risk assessment sheet was present in only 47.2% of the patient's files, and the scores in the files were estimated correctly in only 52.1% of cases. Prophylaxis received by patients matched the recommendation of the Caprini score in 67.1% of the patients. The degree of concordance of the VTE prophylaxis with the Caprini score was 59.9%. This study showed that the institutional guideline was poorly implemented in the hospital. (J Vasc Nurs 2015;33:72-78)

Venous thromboembolism (VTE) has been recognized as a serious health issue.¹ When discharged acute care hospitalized patients were assessed according to the seventh edition of the American College of Chest Physicians (ACCP) guidelines,¹ 31% of patients were at risk of VTE and should have received prophylaxis.² Factors that increase the risk of VTE include 1 of the 3 major categories discussed by Rudolf Virchow, a German pathologist, in 1856. These factors are known as Virchow's triad; they include changes in the vessel wall, changes in the constitution of blood, and alterations of blood flow.³

Several risk factors were observed in patients diagnosed with deep vein thrombosis (DVT)/pulmonary embolism, including major surgery, multiple trauma, hip fracture, or lower extremity paralysis as a result of spinal cord injury. Additional risk factors,

such as previous VTE, older age, cardiac or respiratory failure, prolonged immobility, presence of central venous lines, estrogens, and a number of inherited and acquired hematological conditions increase the risk for VTE.⁴ Factors associated with recent or current hospitalization or nurse home residency account for almost 59% of all cases of VTE in the community.⁵ The economic burden of VTE involves the cost of managing acute events and long-term complications, the management of an initial episode of DVT costs approximately \$7712-10,804, and for a pulmonary embolism event \$9566-16,644.⁶

Prophylaxis includes pharmacologic and nonpharmacologic methods, and can be used alone or in combination. Mechanical prophylaxis methods are intermittent pneumatic compression (IPC) and graduated compression stockings. Pharmacologic therapy includes low-dose unfractionated heparin, low-molecular-weight heparin, fondaparinux, dabigatran, apixaban, rivaroxaban, adjusted-dose vitamin K antagonist, and aspirin.⁷

Several strategies have been proposed to improve VTE prophylaxis in hospitalized patients. Any intervention needs to have ≥ 2 elements to significantly improve VTE prophylaxis. First, it should aid clinicians to remember to assess the VTE risk of patients, and second, it must help clinicians to prescribe the appropriate prophylaxis for the risk classification of the patient. The most effective strategy for improving adherence to guidelines and appropriateness of VTE prophylaxis with rate outcomes of almost 100% was computer-based clinical decision support systems and an alternative that may offer an equally effective solution is paper-based reminder system.⁸ The Jordan University Hospital used a paper-based reminder system that is an adaption of the Caprini score.⁹ This study was undertaken to evaluate the extent of application of the institutional guideline

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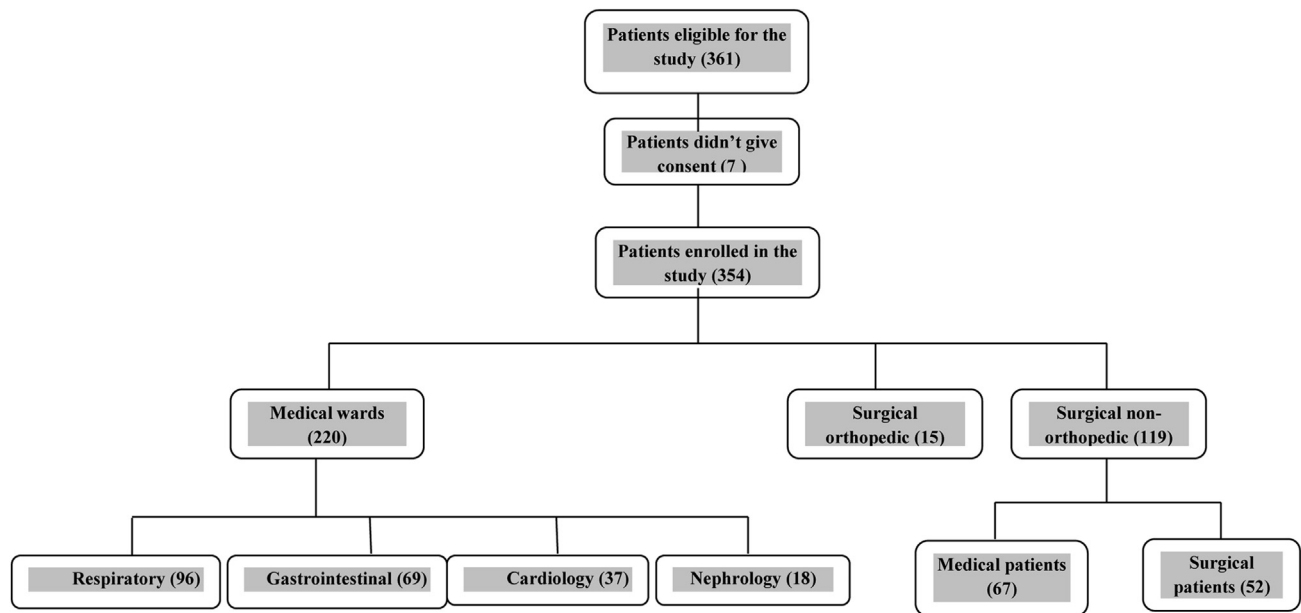


Figure 1. Study flow chart.

(Caprini score risk assessment sheet) on the general medical ward, as well as in the surgery department.

METHODS

This observational, cross-sectional study received Institutional Review Board approval from the Jordan University Hospital Institutional Review Board committee. The study was conducted in the surgical and medical wards of the Jordan University Hospital. VTE prophylaxis was evaluated in 2006¹⁰ and the sample size calculations for our study was based on the assumption that the rate of VTE prophylaxis at least doubled from 26% in 2006 to 52% in 2013; the target sample size was 350 patients. The study was carried out from September 27, 2013, to February 9, 2014. Patients were randomly selected from the wards by enrolling patients with admission identity numbers ending in odd numbers. Relevant data were collected in case reports. The data were assessed and analyzed in accordance with the institutional guidelines, which are an adaptation of the Caprini revised sheet.⁹

Nurses provided VTE prophylaxis based on physician orders; however, nurses were encouraged to check for presence of the VTE risk assessment sheet and correspondence of the recommendations with the medication orders. Nurses reported immediately any adverse effects of the pharmacologic prophylaxis (bleeding) to the physician.

Inclusion criteria were patients aged ≥ 18 years, admission for ≥ 24 hours, not receiving antithrombotic treatment, and admission to the respiratory, cardiology, gastrointestinal, nephrology, or surgical wards. Data collection sheets (3 forms) were used and gathered following information: demographics, body mass index (BMI), medical conditions, medications, duration of hospital stay, type of surgery or reasons for admission, previous surgeries, risk factors for VTE, and laboratory data (including kidney function tests, liver function tests, hemoglobin,

hematocrit, International Normalized Ratio, prothrombin time, activated partial thromboplastin time, and platelet count).

RESULTS

There were 361 patients eligible for the study from the different departments; 7 patients refused to grant the informed consent. Thus, 354 patients participated in this study and were distributed to the different wards as shown in Figure 1.

The overall rate of VTE prophylaxis among those 354 patients was 41.8% ($n = 148$). Enoxaparin (low-molecular-weight heparin) was the most frequently used pharmacologic prophylaxis (73.65%), followed by heparin twice daily (bid; 16.9%), tinzaparin (6.8%), and heparin 3 times daily (2.7%). The general characteristics of the patients in the study are shown in Table 1.

Of the 354 patients, 18.9% were in the low-risk group for DVT (Caprini score 0-1), 17.5% were in the moderate risk group (Caprini score 2), 34.2% were in the high-risk group (Caprini score 3-4), and 29.4% were in the highest risk group (Caprini score ≥ 5). We found that the institutional guideline was present in 167 of the 354 patient files (47.2%). Caprini score calculation was correct in 52.1% of the files. The prophylaxis recommended by the Caprini score present in the patient's file was implemented for 112 of the patients (67.07%). When patients were categorized into 2 groups according to provision of prophylaxis, the Caprini recommendations were implemented in 96.9% of patients receiving prophylaxis and 48.54% in those not receiving prophylaxis.

Surgery patients were admitted for vascular, urologic, endocrine, and gastrointestinal (GI) surgical procedures. Out of 119 patients included in the study, only 52 (43.7%) underwent a surgical procedure at the time of their selection. Among patients admitted to the surgical ward, 67 (56.3%) were admitted without undergoing an operative procedure at the time of selection and were considered as medical patients. This group was subsequently analyzed separately.

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