International Journal of Medical and Health Research
ISSN: 2454-9142
Received: 08-08-2018; Accepted: 10-09-2018
www.medicalsciencejournal.com
Volume 4; Issue 10; October 2018; Page No. 39-42

The adequacy of anticoagulation practice in a teaching hospital

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Abstract

Background: Venous thromboembolism (VTE) is a major problem in all hospitalized patients, which can be prevented by following practice guidelines. Appropriate identification and management of patients at risk is critical in order to maintain patient safety.

Aim: To determine the risk of VTE and the use of anticoagulant prophylaxis according to Caprini score for hospitalized patients at King Abdulaziz University Hospital (KAUH).

Methodology: We conducted a cross-sectional study at KAUH from July to August 2017. All inpatients from medical ward (aged ≥ 40 years), surgical ward (aged ≥18 years), and obstetrics and gynecology (OB/GYN) ward were included. Patients receiving anticoagulant treatment were excluded. We used the Caprini scoring system to assess the risk of VTE and recommended regimen.

Results: A total of 496 inpatients were included in the study. Of those patients, 33.3% were surgical, 31% were medical, and 35.7% were OB/GYN patients. The mean participant age was 48.62 years. The percentages of patients within the risk categories (low, moderate, high, and highest) were 7.5%, 9.7%, 25.2%, and 57.7%, respectively. Among our sample, 248 (50%) patients received VTE prophylaxis. However, 213 (42.9%) received appropriate pharmacological doses. Of the 248 (50%) patients who did not receive any prophylaxis, 5.8% were in the low-risk group, 10.1% had contraindications, while the majority (34.1%) had no obvious reason.

Conclusion: The majority of the patients who were eligible for prophylaxis were managed properly. But still, there is underuse of prophylaxis in the sample as whole. Also, the implementation of mechanical prophylaxis is needed in our hospital.

Keywords: VTE prophylaxis, Caprini score, anticoagulants, risk assessment

Introduction

Venous thromboembolism (VTE) consists of deep vein thrombosis (DVT) and pulmonary embolism (PE), which can be a complication of DVT if not detected early [1]. It has been occurring in high rates in adult populations, with an incidence of 1 per 1000 annually, specifically slightly more in men than women [2]. In Saudi Arabia, roughly 25,000 people develop VTE annually [3]. Venous thromboembolism is a serious issue that has high mortality and morbidity rates in hospitalized patients [4]. Patients with VTE have an increased risk for complications such as post-thrombotic syndrome, pulmonary hypertension, and recurrence of thrombosis; and about 10% of hospitalized patients die from PE [5, 6]. Despite strong evidence supporting the benefit of VTE prophylaxis in reducing the risk, it is still inadequately used in at-risk patients according to several studies [5, 7]. The first step in providing appropriate VTE prophylaxis is to determine the patients who are at risk. As a consequence, several scores and models were designed to assess patient risk of venous thromboembolism. In this study we used the Caprini risk assessment model [4], which is an effective way to assess the risk of VTE by classifying patients into 4 categories: low, moderate, high, and highest risk [8]. Our aim in this study was to determine patients at risk for VTE and evaluate the use of anticoagulant prophylaxis according to Caprini score in King Abdulaziz University Hospital patients.

Materials and Methods

Procedures

After gaining approval by the Institutional Review Board (IRB) of King Abdulaziz University, we conducted this cross-sectional study at KAUH, Jeddah, Saudi Arabia. Data were obtained from enrolled surgical and OB/GYN inpatients aged 18-years old and above, as well as medical inpatients aged 40 years and above during the period between July and August of 2017.

Data Collection

Patient data were obtained from the Phoenix System of KAUH. A Google form and Excel file were designed to collect the needed information which included patient identification (ID) number, demographics, body mass index, admission diagnosis, active diseases, current anticoagulant use (name, dose, route, duration), any other VTE prophylaxis, and Caprini score assessment; which is a computer-generated, retrospective, risk-scoring method validated in 2005. Table one shows the scoring system [5].

Statistical Analysis

Statistical analysis was performed using SPSS software, version 25. A qualitative analysis was conducted on all parts of the data. A crosstabs table was made showing the patients'

risk levels and administration of VTE prophylaxis. The appropriate doses were also assessed, and a chi-square test was used with a p value < .05 being significant.

Results

During the period of the study (two months), 507 hospitalized patients who met the inclusion criteria were enrolled, 11 were excluded who were already taking warfarin prior to admission, resulting in a total of 496 inpatients. Among the total sample, 337 (67.9%) were women, and 159 (32.1%) were men. According to ward distribution, 33.3% were from the surgical ward, 31% were medical patients, and 35.7% were from the OB/GYN ward. The mean participant age was 48.62 years (min=18 years, max=102 years). The numbers of patients in each risk category (low, moderate, high, and highest) were 7.5%, 9.7%, 25.2%, and 57.7%, respectively. The mean Caprini-risk score was 5.60. Details of risk levels for each ward are shown in Table 2. Among the total sample, 248 (50%) patients received VTE prophylaxis; 213 of them (42.9%) were given the appropriate pharmacological doses [low-risk group 0%, moderate 0.8%, high 9.5%, highest 32.7%, (p = .000)]. Furthermore, 35 (7.1%) patients were either given wrong doses or were at low risk for VTE, more details are shown in Table 3. On the other hand, 248 (50%) patients did not receive any prophylaxis; the majority (34.1%) had no obvious reason, 10.1% had contraindications, while 5.8% were in the low-risk group. Inappropriate anticoagulant dose administration was found highest in the medical ward (11%), followed by the surgical ward (6.1), then the OB/GYN ward (4.5%).

Table 1: (Caprini Risk Score System) [5]

Risk Category	Caprini Score
Low	0-1
Moderate	2
High	3-4
Highest	5 and above

Table 2: Caprini score levels according to ward

Caprini Score Level		Wards	
	Medical n=154	Surgical n=165	OB/GYN n=177
Low	5 (1%)	14 (2.8%)	18 (3.6%)
Moderate	6 (1.2%)	9 (1.8%)	33 (6.7%)
High	25 (5%)	37 (7.5%)	63 (12.7%)
Highest	118 (23.8%)	105 (21.2%)	63 (12.7%)

Table 3: Distribution of patients receiving anticoagulant prophylaxis according to ward, risk level, and dosage

Ward	Risk	Appropriate	
		YES	NO
Medical:	Low	0	3 (2.5%)
	Moderate	3 (2.5%)	2 (1.7%)
	High	13 (10.8%)	3 (2.5%)
	Highest	87 (72.5%)	9 (7.5%)
Surgical:	Low	0	3 (3.9%)
	Moderate	0	1 (1.3%)
	High	16 (21.1%)	1 (1.3%)
	Highest	50 (65.8%)	5 (6.6%)
OB/GYN:	Low	0	2 (3.8%)
	Moderate	1 (1.9%)	2 (3.8%)
	High	18 (34.6%)	1 (1.9%)
	Highest	25 (48.1%)	3 (5.8%)
Total: 248 patients (100%)	Low	0	8 (3.2%)
	Moderate	4 (1.6%)	5 (2%)
	High	47 (19%)	5 (2%)
	Highest	162 (65.3%)	17 (6.9%)
		213 (85.9%)	35 (14.1%)

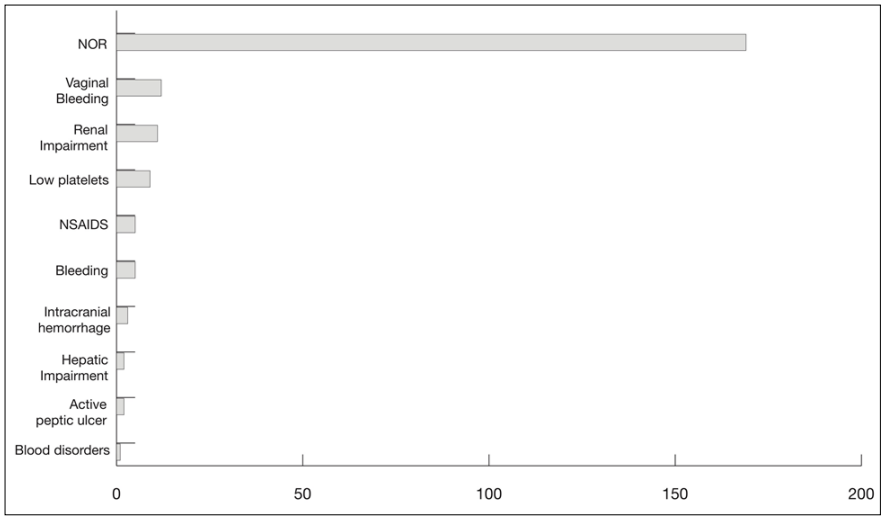

Fig 1: Contraindications to Anticoagulation, n = 219 NOR: no obvious reason, NSAIDs: Nonsteroidal anti-inflammatory drugs

Discussion

In this observational, cross-sectional study, our goal was to identify patients at risk for VTE and evaluate whether they received appropriate thromboprophylaxis at KAUH. After collecting the data, it was understandable why more than half of the patients were women (67.9%) as our study included patients from the OB/GYN ward. Analysis revealed that most of the patients were at risk for VTE, with the majority falling into the highest-risk category (57.7%); while the high, moderate, and low-risk categories had the percentages of 25.2%, 9.7%, and 7.5%, respectively.

The reason the majority of our study participants fell into the highest-risk category (57.7%) could be the multifarious frequencies of VTE risk factors, participant age (M = 48.62), as we had excluded medical patients below 40-years of age, as well as the fact that KAUH is a tertiary care center. In contrast, a study conducted in Jordan using the American College of Chest Physicians' (ACCP) guidelines showed that the majority of their sample fell in the low-risk category with no further explanation [9].

From 507 patients, we excluded 11 patients who were taking warfarin, which is a treatment in itself and conflicts with the prophylactic use of anticoagulants. Among 496 inpatients, we found that 248 (50%) received VTE prophylaxis, and that 213 (42.9%) received the appropriate prophylactic doses. As we had expected, the rate of our hospital's agreement with the guidelines was statistically significant (p = .000). This outcome is supported by another study conducted in Lebanon which concluded that teaching hospitals were compliant with VTE prophylaxis guidelines more than non-teaching hospitals [10]. The remaining 35 patients (7.1%) were either receiving wrong doses [moderate-risk group (1%), high-risk group (1%), and highest-risk group (3.4%)], or were administered VTE prophylaxis when they did not need it; low-risk patients (1.6%). Although, a study from India was recommending giving low-risk patients pharmacological and mechanical prophylaxis because they are still considered at risk for VTE [11].

In this study, we found that pharmacological anticoagulation was superior to the use of mechanical prophylaxis. In our sample, 43.8% had contraindications to pharmacological anticoagulation, and only 2 patients received mechanical prophylaxis. In opposition to the study by Cohen at al., where mechanical prophylaxis was used effectively in patients with contraindications [7]. A study by Asano *et al*. displayed the efficacy of mechanical prophylaxis by dividing the patients into two groups (control group, and treatment group using foot sole pump), the incidence of PE was lowered with (p < .008) [12].

On the other hand, 248 patients in our sample (50%) did not receive any thromboprophylaxis; 29 (5.8%) of them were not eligible as they were in the low-risk category; the other 219 patients (44.2%) were divided into two groups. The first group had no obvious reason for not receiving prophylaxis (34.1%) despite their need for it, which could be a result of poor documentation, history taking, or ignorance of the guidelines. While the second group had true contraindications (10.1%); vaginal bleeding was the main contraindication in the OB/GYN ward; and renal impairment in the medical and surgical wards. Other contraindications included: hepatic impairment, low platelet count, blood disorders, bleeding, active peptic ulcer, intracranial hemorrhage, and use of nonsteroidal anti-inflammatory drugs (NSAIDs). However, in a multinational study by Cohen at al., bleeding at the time of admission was the most common contraindication to thromboprophylaxis, followed by hepatic impairment in medical patients, while in surgical patients; intracranial hemorrhage was the most common [7].

Finally, we noticed that the OB/GYN ward had the least percentage (4.5%) in delivering inappropriate anticoagulant doses compared to the medical and surgical wards. This goes in agreement with the recommendations and guidelines, considering that pregnant women are at higher risk (5-10–fold) of having VTE than non-pregnant women of the same age [13]. The Medical ward showed 11% for administering inappropriate doses, while the surgical ward showed 6.1%. A study by Cohen at al. showed that out of 17,732 patients at risk for VTE who received the ACCP–recommended prophylaxis, 58.5% were surgical patients and 39.5% were medical [7]. This could be explained by the fact that surgical procedures are well known as one of the major risk factors for VTE, and that it has been established for decades that VTE prophylaxis improves outcome in surgical patients [7, 14, 15, 16, 17]. With regard to the limitations of this study, the major limitation was incomplete documentations involving bad organization, especially in clarifying past medical and surgical histories. For the future, a multicenter study is much needed to provide greater insight on the adequacy of prophylactic anticoagulant use.

Conclusion

This cross-sectional study showed proper application of VTE prophylaxis in half of the inpatients. Although there is a degree of compliance to practice guidelines, improvement plans should be considered. There is a slight defect in dealing with at-risk patients. Mechanical prophylaxis can be considered more in patients with contraindications for anticoagulation. Also, we recommend formation of an integrated team to check for VTE at-risk patients; consisting of physicians, pharmacists, and nurses; in order to improve prophylaxis strategies. Finally, continuous medical education in the hospital is critical as VTE prophylaxis adequacy is subject to change and provides continuous opportunity for enhancement by proper planning and application.

Acknowledgments

We would like to thank the following data collectors in contributing in this research; Badreyah Al-Dauig, Bashaer Basunaid, Bushra AlGhamdi, Eithar Meftah, Haifa Idrees, Hamza Owaidah, Manal Alrogi, Raghdah Khadwardi, Rasha Alharbi, and Renad Ateeq.

Declaration of conflicting interests

There are no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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