



Full Length Research Article

VENOUS THROMBOPROPHYLAXIS RATES IN MEDICALLY ILL PATIENTS IN A TEACHING HOSPITAL IN KINGDOM OF SAUDI ARABIA

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ABSTRACT

Objective: To assess the appropriateness of venous thromboembolism prophylaxis in hospitalized medical patients, and to measure incidence of venous thromboembolism in a follow up period of eighteen month post discharge.

Design: Retrospective study.

Setting: The medical department of a teaching hospital in Jeddah, Saudi Arabia.

Participants: 97 patients, admitted to the medical ward during the month of December 2015.

Method: We longitudinally followed up 97 patients discharged from KAUH over a period of eighteen month.

Results: Ninety-seven patients, mean age 50 (15-92) and 50 (51%) males were included. Forty-seven percent of patients were stratified as high-risk score based on Padua score assessed by smart phone application. Our study demonstrate that the rate of pharmacological thromboprophylaxis was 72% however the rate of appropriate prophylaxis was found in 31% only.

Conclusions: This study highlights the low rates of appropriate thromboprophylaxis in hospitalized medical patient at a teaching hospital in accordance with the ACCP guidelines. Underutilization of venous thromboembolism prophylaxis in medical patients suggests that preventable causes of thromboembolism are occurring. More effort is required to improve the use of appropriate thromboprophylaxis.

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INTRODUCTION

Venous thromboembolism (VTE) is a significant problem for hospitalized medical patients leading to the possibility of PE and risk of death, (Heit, 2005). The incidence of deep vein thrombosis (DVT) in hospitalised medical patients, without thromboprophylaxis is 40%. (Anderson, 1991) Data have shown that the risk of VTE in this population varies from 60% in ischemic stroke patients to 24% in myocardial infarction patients, and to 19% in other medical patients (Kelly, 2001 and Anderson, 2003). Moreover, The prevalence of autopsy-proven pulmonary embolism in hospitalised medical patients is 2.5%. (Heit, 2005). The Sixth Consensus Conference on Antithrombotic Therapy of the American College of Chest Physicians (ACCP) recommended either low molecular weight heparin or low dose unfractionated heparin for patients with acute myocardial infarction, acute ischemic stroke and in general medical patients (ACCP/NHLBI, 1986).

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MATERIALS AND METHODS

This study was conducted at King Abdulaziz University Hospital (KAUH) following approval of the hospital ethical committee.

Inclusion: All patients admitted to the medical ward during the month of December 2015.

Exclusion criteria: Patients admitted with a diagnosis of acute DVT and/or pulmonary embolism (PE), patients with active cancer and patients already on anticoagulation for a previous indication were excluded from the study. Ninety-seven consecutive patients admitted to the medical ward during December 2015 were included. At KAUH, we have developed a smartphone application-based clinical decision support system (CDSS) (Thrombosis consult, Apple store), (Zaher and Adam, 2016). The application utilizes the Padua score for assessment of risk of VTE, (Barbar, 2010). We screened all patients for risk factors of VTE and to evaluate clinician adherence to current guidelines (Kearon, 2012). The presence of contraindications to anticoagulant prophylaxis was

documented including, active or recent bleeding, hemorrhagic tendency, active peptic ulcer disease or known esophageal varices, hypersensitivity to heparin or personal history of heparin-induced thrombocytopenia, and a platelet count of less than $< 70 \times 10^9/L$. (Baglin, 2006). However, patients presenting with clinical contraindications to anticoagulation were not excluded from the primary analysis.

Aim

To assess the appropriateness of VTE prophylactic therapy in medical patients, and to measure prevalence of VTE in a follow up period of eighteen month post discharge.

Protocol

Data collected from medical records include; age, recent surgery, immobility, active cancer, thrombophilia, cardiac and respiratory failure, acute myocardial infarction, acute infection, rheumatological disorder, hormonal treatment, prescribed pharmacological thromboprophylaxis and heparin contraindications. All newly admitted patients to the medical ward were assessed for risk of VTE, based on the Padua score. All potential contraindication to anticoagulants were evaluated in each patient. Thrombo-prophylaxis type, dosage, and duration of therapy across hospital service days were assessed based on the 9th ACCP guidelines, (Kearon, 2012). The specific criteria used in this study defining appropriate prophylaxis include drug choice, duration and dosage. Appropriate drug choice was defined as UFH, LMWH, or mechanical thromboprophylaxis. The appropriate drug dosages (per hospital service day) were at least: 10,000 U for UFH; 40 mg for Enoxaparin and 3500 U for Tinzaparin. The duration of therapy was based on the patient's length of stay in the hospital. For appropriate mechanical prophylaxis, high-risk patients with heparin contraindications were required to have received Intermittent Pnematic Compressions or Elastic stockings for the duration of their hospital stay. We followed up patients longitudinally for 18 months after discharge from the medical ward at KAUH. The main outcome measure was the incidence of VTE.

RESULTS

Ninety-seven patients were included in the study. Mean age of patients was 50 years (19-92), and 50 (51.5%) were males (Table 1).

Table 1. Demographic data and risk factors

Age	15-92
Males	51.5%
High risk score	47%
Sepsis	49.5%
Immobility	35%
MI or stroke	32%
CHF or Respiratory Failure	31%
BMI>30	22.7%
History of VTE	19.6%
Surgery	18.6%
Thrombophilia	12.4%
History of Cancer	2%

Myocardial infarction (MI), congestive heart failure (CHF), Body mass index (BMI), venous thrombo-embolism (VTE) and High score > 4

Forty-seven percent of patients were stratified as high-risk based on Padua score. Prothrombotic risk factors are shown in

Table 1. Inappropriate prophylaxis included errors of commission and errors of omission. Errors of commission were defined as patients receiving pharmacological thromboprophylaxis despite having a Low Padua risk score of < 4 , Or patients having a Padua risk score of > 4 but with heparin contraindications. Errors of omission include patients with a Padua risk score of > 4 who were not offered any thromboprophylaxis. In this population, 72% of patients received pharmacological thromboprophylaxis, but only 31% was appropriate thromboprophylaxis (Table 2).

Table 2. Thrombotic risk, bleeding risk and prophylaxis

		Prophylaxis		
High Score	Bleeding risk	Yes	26.8%	*Inappropriate
		No	6.2%	\$Inappropriate
Low Score	No Bleeding risk	Yes	12.3%	Appropriate
		No	3%	\$Inappropriate
		Yes	35%	*Inappropriate
		No	16.5%	Appropriate

*Error of Commission, \$ Error of Omission and High score > 4 :

Table 3. Demographic characteristics of patients who developed DVT upon follow up

	Patient 1	Patient 2	Patient 3	Patient 4
Age	86	41	60	60
Males	F	M	F	M
High score	Y	N	Y	N
Sepsis	Y	N	Y	N
Immobility	Y	N	Y	N
MI or stroke	Y	N	N	N
CHF or Respiratory Failure	N	N	Y	N
BMI>30	N	N	N	N
History of VTE	N	N	N	N
Surgery	N	N	N	N
Thrombophilia	N	N	N	N
History of Cancer	N	N	N	N
Thrombo-prophylaxis	UFH	UFH	UFH	LMWH

Myocardial infarction (MI), congestive heart failure (CHF), Body mass index (BMI), venous thrombo-embolism (VTE), high score > 4 , unfractionated heparins (UFH) and Low molecular weight heparins(LMWH).

Four patients developed VTE during the 18 months follow up period and the patients characteristics are shown in table 3.

DISCUSSION

The risk of thrombosis in hospitalized patients depends on individual risk factors. Accurate estimation of the risk of VTE by health care providers without the aid of a risk assessment tool is not easy. The Padua scoring system helps to classify patients into low or high risk for developing VTE. (7) A number of clear evidence-based guidelines (EBG) for thromboprophylaxis are available. (Kearon, 2012; Nicolaidis, 1992 and Thromboprophylaxis Guidelines for Adult Patients, 2010). The use of appropriate thromboprophylaxis reduces the risk of DVT by 53%, the risk of PE by 57%, and fatal PE by 62%. (Samama et al., 1999; Hull et al., 2010; Fraisse, 2000). There is growing awareness of the risk of VTE among hospitalized medical patients and the use of thromboprophylaxis in this population is increasing (Yu, 2007). Despite the availability of EBG for thromboprophylaxis, these guidelines remain underutilized. The utilization of thromboprophylaxis in a two large cohort of hospitalized patients (ENDORSE study and IMPROVE study) was found to vary from 40-60% in different studies. (16,17) Despite compelling evidence, less than half (40%) of at-risk

medical patients receive inappropriate thromboprophylaxis. (Arnold, 2001; Kahn, 2007). Reports from the national Canadian audit in 2014 showed that appropriate thromboprophylaxis was administered to 84% of general medical patients based on Safer Healthcare Now recommendations (Canadian, 2014). However, the audit assessed thromboprophylaxis ordered rather than the administered one, furthermore, the duration of thromboprophylaxis was not assessed. Moreover, Ageno *et al* demonstrate that VTE prophylaxis in medical patients is still significantly underused where only 46% of medical patients received appropriate prophylaxis (Ageno, 2002). At least one third of patients presented with clinical conditions at moderate or high risk for development of VTE. Amin *et al* a study evaluating type, dosage and duration of thromboprophylaxis rates in US medical centers, reported an overall VTE thromboprophylaxis rate was 61.8%. However, the appropriate thromboprophylaxis rate was only 33.9% (Amin, 2007). In a tertiary center in a developing country, the percentage of hospitalized medical patients on thromboprophylaxis was much lower at 12.5% (Pandey, 2009). Little is known about the actual use of VTE prophylaxis in Saudi Arabian medical patients, however a recent study reported that 21% of medical patients in a tertiary hospital in Jeddah, Saudi Arabia received thromboprophylaxis (Abo-El-Nazar, 2011). Our study demonstrates that the rate of pharmacological thromboprophylaxis was 72% however appropriate thromboprophylaxis was given in 31% which is comparable to Amin *et al* results. Furthermore, mechanical thromboprophylaxis was not offered to any patients in this study as compared to 5% in previous studies (Canadian, 2014; and Amin, 2014). The study highlights the current under-utilization of appropriate VTE prophylaxis in medical inpatients at risk of VTE. The findings indicate that while VTE prophylaxis may be considered in medical patients with known risk factors for VTE, often thromboprophylaxis is not used at all or the use of therapies does not match with EBG in terms of choice of therapeutic modality, and dose and duration of treatment. Improvement in appropriate thromboprophylaxis is urgently required to reduce the burden of VTE on the Saudi healthcare system. Moreover, mechanical thromboprophylaxis is encouraged to be used particularly in patients with contraindications for pharmacological modes of thromboprophylaxis. In addition, means for improving uptake of guidelines are multifaceted including continuous medical education, preprinted formate, or use of computer decision support system. Different means should be explored individually or in combination.

Limitations of the VTE Audit

The study includes a relatively small number of patients. Furthermore, details on individual risk assessment of patients, which subsequently led to prescribing or withholding of thromboprophylaxis are not available.

Strengths of the VTE Audit

Risk factors for VTE were identified for each patient individually and the details of thromboprophylaxis were documented including type, dosage and duration. Appropriate thromboprophylaxis was defined based on ACCP guidelines. Longitudinal follow-up of patients for 18 months following discharge allowed us to assess the incidence of VTE based on

the decision to give or withhold thromboprophylaxis.

Conclusion

This study highlights the low rates of appropriate thromboprophylaxis in hospitalised medical patient at a teaching hospital in accordance with the ACCP guidelines. Prophylaxis of venous thromboembolism is underused in medical patients. The low rate of usage of prophylaxis suggests that preventable cases of thromboembolism are occurring. More effort is required to improve the uptake of evidence based guidelines for thromboprophylaxis.

Future plan

Post implantation study and follow up studies for bleeding complication in patients with errors of commission.

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