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Use of thromboprophylaxis for venous thromboembolism among patients admitted in medical ward

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Abstract

Introductions: Studies have shown inadequate use of prophylaxis for venous thromboembolism (VTE) in hospital admitted medical patients. This study aims to evaluate the use of VTE prophylaxis in admitted medical patients in a tertiary care teaching hospital.

Methods: This was a cross sectional observational study for three weeks from 19 March to 8 April 2017 in patients admitted in the medical ward of Patan Hospital, Patan Academy of Health Sciences, Lalitpur, Nepal. Patient charts were reviewed for appropriate VTE prophylaxis as per modified Padua risk Assessment model. Risks of VTE, presence of bleeding risks, demographics (age, BMI), hospital stay were descriptively analysed.

Results: Out of 122 patients, 81 (66.4%) were at risk of VTE. Among 81 at risk, 69 were eligible for VTE pharmacoprophylaxis with no risk of bleeding only 29 (42%) received pharmacoprophylaxis and 12 eligible for prophylaxis but with the risk of bleeding did not receive any prophylaxis. Reduced mobility was the most common indication of thromboprophylaxis in 79 (64%), followed by acute infection 50 (41%).

Conclusions: There was suboptimal use of thromboprophylaxis in hospital admitted medical patients at risk of venous thromboembolism, VTE.

Keywords: admitted medical patients, bleeding risk, thromboprophylaxis, venous thromboembolism VTE

Introductions

Venous thromboembolism (VTE) is a common but preventable serious complication in hospitalized patients.¹ Studies have reported hospital acquired VTE prevalence between 0.8%-11% depending on the patient population evaluated.²⁻³

Prophylaxis is carried out in patients at risk of VTE using either drugs (e.g. heparin) or mechanical methods (e.g. intermittent pneumatic compression boots).⁴ Studies have shown that 21-71% of hospital admitted patients are considered to be at risk of VTE depending upon the different types of scores used⁵⁻⁸ and only about half of them received adequate prophylaxis.^{9,10} There exists numerous barriers to prophylaxis use as well as lack of universally accepted tools.^{11, 12}

The primary objective of this study was to evaluate the adequacy of appropriate VTE prophylaxis for patients admitted in medical ward.

Methods

This was a cross sectional observational study among the patients admitted in medical ward of Patan Hospital, Patan Academy of Health Sciences (PAHS), Lalitpur, Nepal. Data was collected from patient charts for three weeks from 19th March to 8th April 2017. The medical ward included general medical ward, geriatric ward and step down. The study was conducted as a quality improvement project, an in-built teaching learning program of PAHS. The study was approved from internship elective committee. Patients who were hospitalized for more than 3 days in a medical ward and had negative history of receiving oral or intravenous anticoagulation therapy with indications other than thromboprophylaxis were included in the study. Patients younger than 16 years and/or patients who had received recent fibrinolytic therapy were excluded. Verbal consent was taken from each patient. During the study period, it was assured that the doctors of medical wards were not

aware about the study to prevent Hawthorne bias.

Data were collected from patient files, medication sheet and patient interview. The review of the chart and medication sheet was carried out on every 4th day in wards, total 6 times, based on average stay of patients in medical wards in last 3 months. The average stay was calculated from the data (duration of stay of discharged patients) provided by the of Patan hospital.

The patient interview questionnaire consisted of three sections: First section demographic characteristics of patient, diagnosis or indication of hospital admission, total hospital stay at time of encounter, inclusion and exclusion criteria. Second section consisted of Modified Padua risk Assessment model which assessed the risk of VTE in hospitalized medical patients.³ This model assesses presence of specific risk factors and assigns a score for each and total score is calculated at the end.

Factors such as critically ill and inflammatory bowel disease (IBD) was assigned 4-points each; active cancer, previous VTE, reduced mobility, thrombotic condition was assigned 3-points; recent trauma or surgery was assigned 2-points and remaining risk factors: age ≥ 70 year, heart or respiratory failure, acute myocardial infarction or ischemic stroke, acute infection or rheumatological disorder, Body Mass Index (BMI) more than or equal to 30 and ongoing hormonal treatment was assigned 1-point each.

Score of <4 was considered low VTE risk not requiring prophylaxis, score of ≥ 4 requires prophylaxis, pharmacoprophylaxis when no bleeding risk present, and mechanical prophylaxis when bleeding risks present. Third section assesses factors strongly associated with bleeding risk such as presence of active gastroduodenal ulcer, bleeding in the 3 months prior to admission, platelet count $<50 \times 10^9/L$, hepatic failure (INR >1.5 without anticoagulants) and uncontrolled systemic hypertension. Presence of any of the bleeding

risk factor was considered contraindication for pharmacological prophylaxis.

Descriptive analysis of data was done using Microsoft office excel.

Results

Among 148 patients, 22 were excluded as they had received recent fibrinolytic therapy. Data on 122 patients analysed revealed mean age 58.95±18.08) years, male 65 (53.3%%), and hospital stay 6.2±3.5 days, Table 1.

Reduced mobility was the most common risk factor for indication of thromboprophylaxis in 79 (64%) while risk factors such as IBD, recent trauma/surgery, hormonal therapy, known venous thromboembolism were not present, Table 2.

According to Padua risk assessment score, 81 (66.4%) patients had high risk of VTE and eligible for thromboprophylaxis. Of 81 eligible patients 29 (42%) received pharmacoprophylaxis and none received mechanical prophylaxis, Figure 1.

Twelve patients who were at the risk of thrombosis, had one or more risks of bleeding, hepatic failure 8 (8.6%), bleeding within 3 months of admission 4 (4.9%), uncontrolled systemic hypertension 3 (3.7%), platelet count less than 50000/microliter 1 (1.2%) and active gastroduodenal ulcer 1 (1.2%).

Two patients received pharmacoprophylaxis were not eligible for it. Injection Heparin was used as pharmacoprophylaxis in 29 (93.5%), and 2 (6.5%) received low molecular weight heparin (Enoxaparin).

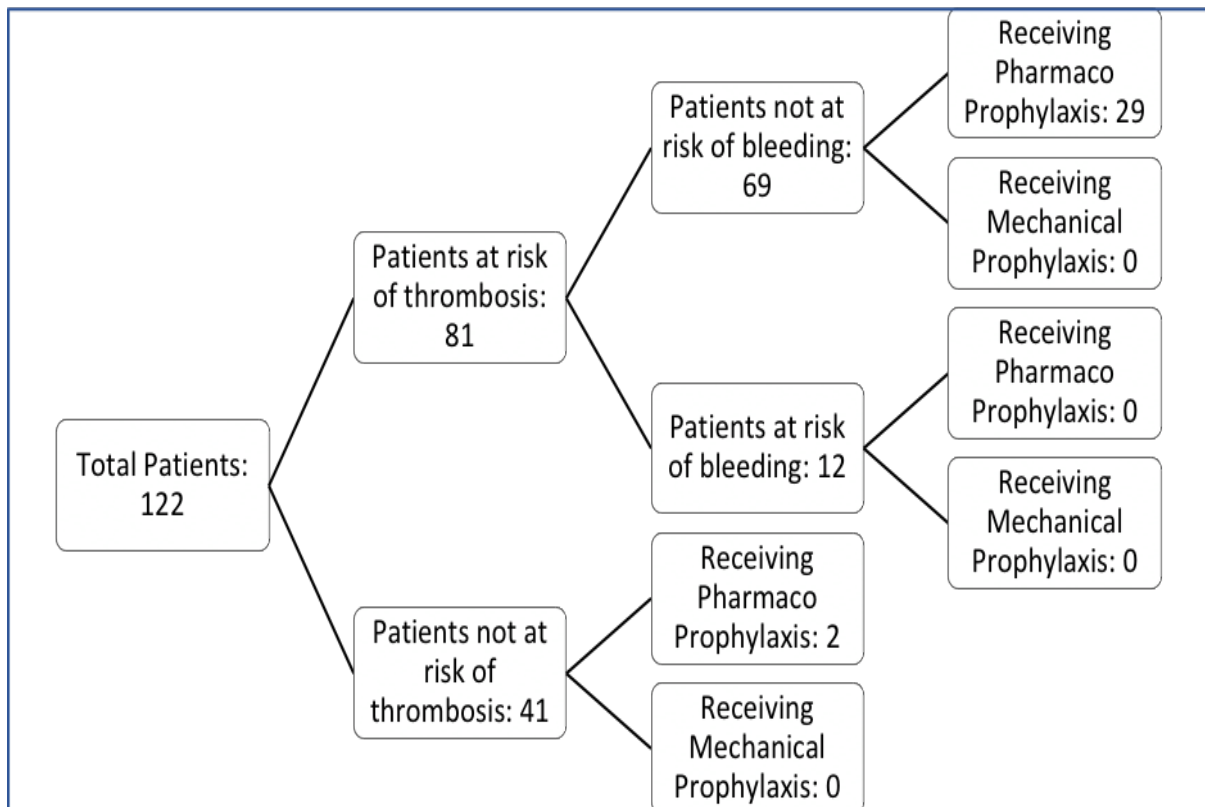


Figure 1. Flow chart showing patients at risk of venous thromboembolism (VTE) prophylaxis according to Padua risk model

Table 1. Characteristics of patients (122) in medical ward assessed for VTE prophylaxis

Characteristic	Number	Percent (%)
Male	65	53.2
Female	57	46.7
Ward		
General Medicine	33	27
Stepdown	58	48
Geriatric	31	25
Mean Age	58.95±18.08 years	
Mean duration of hospital stay	6.2±3.5	

Table 2. Risk factors of patients (122) in medical ward assessed for VTE prophylaxis according to Padua risk model

Risk Factors	Number (%)
Reduced mobility	79 (64)
Acute Infection	50 (41)
Age more than >70 years	45 (37)
Heart/Respiratory failure	28 (23)
Critically ill patients	18 (15)
Acute MI/Stroke	4 (3)
Cancer	7 (6)
BMI>30	1 (1)

Discussions

In this study, 81 (66.4%) patients had high risk of VTE as per Padua Prediction score. The proportion of patients at high risk varies in different study according to the risk assessment models. The Padua Prediction score in medical patients followed for up to 90 days reports the low risk patients with score of <4 had 0.3% probability of developing symptomatic VTE and high risk patients with score of ≥4 had 2.2% (receiving adequate in-hospital thromboprophylaxis) and 11% (not receiving adequate in-hospital thromboprophylaxis) probability.³ A Chinese study showed that 23.4% of the medical patients were classified as high risk by Padua risk assessment score, however the same study classified 70.9% of patients as high risk according to Caprine risk assessment model.⁷ An Indian subset of ENDORSE study showed 44.7% of medical patients were at risk of VTE according to American college of chest physician guidelines (ACCP) guidelines.⁸ A Canadian study which used Padua and the IMPROVE predictive risk assessment models, only 21.5% and 7.0% of the patients, respectively, were eligible for

thromboprophylaxis at the time of admission.¹³

The ACCP guidelines recommends anticoagulant thromboprophylaxis for acutely ill hospitalized medical patients at increased risk of thrombosis. For acutely ill hospitalized medical patients at increased risk of thrombosis who are bleeding or are at high risk for major bleeding, it suggests mechanical thromboprophylaxis with graduated compression stockings or intermittent pneumatic compression.¹

The most common risk factor in present study was reduced mobility 79 (64%), acute infection or rheumatological disorder 50 (41%), advanced age 45 (37%), and cardiac/respiratory failure 28 (23%). This is similar to the Italian study which showed most common risk factor was reduced mobility, advanced age, cardiac/respiratory failure and acute infection/rheumatological disorder.¹⁴ Reduced mobility was the most common risk factor which might be due to our deeply rooted cultural practices that anyone who is admitted in hospital should take rest and lie in the bed most of the time.

After the assessment of thrombotic risks, the patients should be assessed for bleeding risk before prescribing thromboprophylaxis. Among the high-risk patients, 14.8% of patients had one or more bleeding risk. Most common bleeding risk was hepatic failure (PT/INR >1.5) 8.6%, followed by bleeding in last 3 months 4.9%, others being uncontrolled systemic hypertension (3.2%) and low platelets counts and active gastroduodenal ulcer each 1.2%. These factors should be considered before prescribing thromboprophylaxis as IMPROVE trial showed Active gastroduodenal ulcer, prior bleeding and low platelet count were the strongest independent risk factors at admission for bleeding along with hepatic failure among others.¹⁵

Our findings show less than half 29 (42%) of 69 high risk of VTE patients, who had no risks of bleeding and were eligible for pharmacoprophylaxis, received injection heparin or enoxaparin. And, 12 (14.6%) patients at high risk of VTE but with risks of bleeding who were eligible for mechanical prophylaxis, none of them received prophylaxis. Inadequate availability and/or affordability of different methods of mechanical prophylaxis might be the reason for not using mechanical prophylaxis.

Studies have shown that the use of thromboprophylaxis is suboptimal in acutely ill hospitalized patients. The use of thromboprophylaxis in our study is similar to ENDORSE global study, which showed less than 40% of at-risk hospitalized medical patients receive ACCP-recommended prophylaxis.¹⁰ An American study showed that 51.81% received anticoagulant therapy, 2.48% received mechanical compression treatment only (stocking or pneumatic compression), and 4.41% received both during hospitalization.¹⁶ Another multinational study (IMPROVE study) showed 50% of patients received in-hospital pharmacologic and/or mechanical VTE prophylaxis.⁹

In hospital setting when physicians were not informed about the thrombotic risk of their patients less than 40% of the patients received

thromboprophylaxis.³ After the physician were made aware of the thrombotic risk as assessed with Padua prediction score, the use of appropriate thromboprophylaxis increased to 88.5%.¹⁶

This study had certain limitations. This was a chart review of admitted patients and assessment of bleeding risk requiring investigations reports of liver function test, prothrombin time, platelets etc. were not available in some patients' file. The exact BMI could not be calculated for patients who were unable to stand on weight machine because only latest known weight was taken as reference. Also, we could not analyse the availability and/or affordability of mechanical prophylaxis.

This study serves as a baseline and provides opportunities to improve the quality of care in developing appropriate interventions for prevention of venous thromboembolism and use of thromboprophylaxis. Measures should be taken to promote mobility among admitted patients as reduced mobility was the commonest risk factor of thrombosis.

Conclusions

The study demonstrates the suboptimal use of pharmacoprophylaxis in admitted medical patients at high risk of venous thromboembolism as per Padua Prediction score. Less than 50% of eligible patients received chemoprophylaxis and none received mechanical prophylaxis. Reduced mobility was the commonest risk factor of thrombosis.

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References

1. Kahn SR, Lim W, Dunn AS, Cushman M, Dentali F, Akl EA, et al. Prevention of VTE in

- nonsurgical patients: antithrombotic therapy and prevention of thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. *Chest*. 2012;141(2 Suppl):e195S-226S. DOI PubMed GoogleScholar
2. Gould MK, Garcia DA, Wren SM, Karanicolas PJ, Arcelus JI, Heit JA, Samama CM. Prevention of VTE in nonorthopedic surgical patients: antithrombotic therapy and prevention of thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. *Chest*. 2012;141(2 Suppl):e227S-77S. DOI PubMed GoogleScholar
 3. Barbar S, Noventa F, Rossetto V, Ferrari A, Brandolin B, Perlati M, De Bon E, Tormene D, Pagnan A, Prandoni P. A risk assessment model for the identification of hospitalized medical patients at risk for venous thromboembolism: the Padua Prediction Score. *J Thromb Haemost*. 2010;8(11):2450-7. DOI PubMed GoogleScholar
 4. Chopard P, Spirk D, Bounameaux H. Identifying acutely ill medical patients requiring thromboprophylaxis. *J Thromb Haemost*. 2006;4(4):915-6. DOI PubMed GoogleScholar
 5. Cohen AT, Tapson VF, Bergmann JF, Goldhaber SZ, Kakkar AK, Deslandes B, et al. Venous thromboembolism risk and prophylaxis in the acute hospital care setting (ENDORSE study): a multinational cross-sectional study. *Lancet*. 2008;371(9610):387-94. DOI PubMed GoogleScholar Weblink
 6. Rashid ST, Thursz MR, Razvi NA, Voller R, Orchard T, Rashid ST, Shlebak AA. Venous thromboprophylaxis in UK medical inpatients. *J R Soc Med*. 2005;98(11):507-12. DOI PubMed GoogleScholar
 7. Liu X, Liu C, Chen X, Wu W, Lu G. Comparison between Caprini and Padua risk assessment models for hospitalized medical patients at risk for venous thromboembolism: a retrospective study. *Interact Cardiovasc Thorac Surg*. 2016;23(4):538-43. DOI PubMed GoogleScholar
 8. Pinjala R, ENDORSE - India investigators. Venous thromboembolism risk & prophylaxis in the acute hospital care setting (ENDORSE), a multinational cross-sectional study: results from the Indian subset data. *Indian J Med Res*. 2012;136(1):60-7. PubMed GoogleScholar
 9. Tapson VF, Decousus H, Pini M, Chong BH, Froehlich JB, Monreal M, et al. Venous thromboembolism prophylaxis in acutely ill hospitalized medical patients: findings from the International Medical Prevention Registry on Venous Thromboembolism. *Chest*. 2007;132(3):936-45. DOI PubMed GoogleScholar
 10. Bergmann JF, Cohen AT, Tapson VF, Goldhaber SZ, Kakkar AK, Deslandes B, Huang W, Anderson FA, ENDORSE Investigators. Venous thromboembolism risk and prophylaxis in hospitalised medically ill patients. The ENDORSE Global Survey. *Thromb Haemost*. 2010 Apr;103(4):736-48. DOI PubMed GoogleScholar
 11. Rocha AT, Braga P, Ritt G, Lopes AA. Inadequacy of thromboprophylaxis in hospitalized medical patients. *Rev Assoc Med Bras (1992)*. 2006;52(6):441-6. DOI PubMed GoogleScholar
 12. National Clinical Guideline Centre – Acute and Chronic Conditions (UK). Venous thromboembolism: reducing the risk of venous thromboembolism (deep vein thrombosis and pulmonary embolism) in patients admitted to hospital. PubMed GoogleScholar Weblink, Accessed 27th Apr 2019.
 13. Rafizadeh R, Turgeon RD, Batterink J, Su V, Lau A. Characterization of venous thromboembolism risk in medical inpatients using different clinical risk assessment models. *Can J Hosp Pharm*. 2016;69(6):454-9. DOI PubMed GoogleScholar
 14. Rossetto V, Barbar S, Vedovetto V, Milan M, Prandoni P. Physicians' compliance with the Padua Prediction Score for preventing venous thromboembolism among hospitalized medical patients. *J Thromb Haemost*. 2013;11(7):1428-30. DOI, PubMed GoogleScholar
 15. Decousus H, Tapson VF, Bergmann JF, Chong BH, Froehlich JB, Kakkar AK, Merli GJ, Monreal M, Nakamura M, Pavanello R, Pini M. IMPROVE Investigators. Factors at admission associated with bleeding risk in medical patients: findings from the IMPROVE investigators. *Chest*. 2011;139(1):69-79. DOI PubMed GoogleScholar
 16. Baser O, Liu X, Phatak H, Wang L, Mardekian J, Kawabata H, Petersel D, Hamilton M, Ramacciotti E. Venous thromboembolism prophylaxis and clinical consequences in medically ill patients. *Am J Ther*. 2013;20(2):132-42. DOI PubMed GoogleScholar