ASSESSMENT OF VENOUS THROMBOEMBOLISM RISK AND EVALUATION OF EFFECTIVE PRACTICE PATTERNS OF THROMBOPROPHYLAXIS IN HOSPITALISED MEDICAL PATIENTS

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ABSTRACT

BACKGROUND

Venous thromboembolism is a significant cause of increased mortality and disability and despite the availability of clinical guidelines and various risk assessment scores, thromboprophylaxis continues to be underutilised in the hospitalised patients. The objectives of the present study were to evaluate the medical patients for venous thromboembolism risk and to assess the appropriate practice patterns of thromboprophylaxis.

MATERIALS AND METHODS

100 medical inpatients admitted at P.E.S. Institute of Medical Sciences and Research, Kuppam from November 2017 to April 2018 were randomly selected in this retrospective observational study and were assessed for VTE risk factors and effective prophylaxis patterns according to the American College of Chest Physicians (ACCP) evidence-based consensus guidelines.

RESULTS

As per the Padua prediction score in our study, 69% of the medical patients were at a high risk of developing VTE out of whom only 30.4% received effective thromboprophylaxis and 65.21% did not receive any thromboprophylaxis. 31% were at a low risk to develop VTE out of which 3% received effective thromboprophylaxis.

CONCLUSION

Effective Thromboprophylaxis is underutilised in the at-risk population thereby increasing the morbidity and mortality. This necessitates increasing the awareness about VTE risk. There is a strong need for a standard hospital policy for VTE risk assessment and effective thromboprophylaxis in hospitalized patients.

KEYWORDS

Venous thromboembolism risk assessment, Thromboprophylaxis.

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BACKGROUND

Venous thromboembolism (VTE) represents a spectrum of diseases that include deep vein thrombosis and pulmonary embolism (PE). It is a major source of morbidity and mortality for hospitalised patients. It is the most common preventable cause of hospital-related death,[1] yet despite the availability of clinical guidelines, thromboprophylaxis continues to be underutilised[1,2] and has been identified as "the number one strategy to improve patient safety in hospitals."[3]

Both clinically symptomatic and asymptomatic episodes of VTE are common in hospitalized patients[4], and are associated with high mortality.[5,6,7,8] Autopsy studies have shown that approximately 10% of all inpatients deaths are due to PE, but only a small proportion of PE are suspected before death.[9,10] Until the mid 90s, most studies focused on surgical patients, given their high incidence of VTE. As a consequence, the notion about the need for VTE prophylaxis in surgical population gained acceptance. More recently, randomized controlled trials have highlighted the fact that the risk of VTE in patients with medical conditions is similar to that of some surgical patients.[11,12] Additionally, some epidemiological studies have demonstrated that more than half of patients who develop symptomatic VTE have medical, not surgical conditions.[13]

Therefore, the analysis of the importance of risk factors in hospitalized medical patients is crucial to define the risk-benefit of VTE prophylaxis utilization. A systematic review of

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risk factors for VTE was performed, evaluating the current evidence about the factors that could justify the use of VTE prophylaxis in this population.[14]

VTE risk stratification is performed by initially considering the patient's age, mobility level, and comorbidities. Individuals aged 40 years and over, with reduced mobility and at least one additional risk factor (among the following: stroke, cancer, central and Swan-Ganz catheters, bowel inflammatory disease, severe respiratory disease, acute rheumatic disease, pregnancy and postpartum, previous VTE history, acute myocardial infarction (AMI), class III or IV congestive heart failure (CHF), infections, arterial insufficiency, intensive care unit admission, obesity, lower limb weakness/paralysis, chemo/hormonal therapy, hormone replacement therapy, nephrotic syndrome, and thrombophilia) for VTE should be considered at risk. In the absence of contraindications, prophylaxis is indicated.[15]

Aims and Objectives

To identify hospitalized medical patients at risk of VTE and to determine the proportion of patients receiving effective VTE prophylaxis.

MATERIALS AND METHODS

100 medical inpatients admitted at P.E.S Institute of Medical Sciences and Research, Kuppam from November 2017 to April 2018 were randomly selected in this retrospective observational study using the case records as the primary source of data. These patients were assessed for VTE risk factors and effective prophylaxis patterns according to the American College of Chest Physicians (ACCP) evidence-based consensus guidelines.

Inclusion Criteria

All the Hospitalised medical patients who were admitted for more than 72 hours.

Exclusion Criteria

All Patients with suspected or diagnosed venous thromboembolic disease on admission and the patients whose hospital stay was less than 72 hours were excluded.

RESULTS

Male	Female
49%	51%

Table 1. Gender Distribution of Medical Patients (n=100)

Age Groups	Number of Patients
< 40 Years	8%
41-60 Years	31%
61-80 Years	44%
>80 Years	17%

Table 2. Age distribution of Medical Patients

Risk Factors	Medical Patients
Immobility	29%
Cancer	15%
Cancer Therapy	10%
Age >70 Years	37%
Acute Medical Illness	28%
Obesity	6%
Pulmonary Diseases	38%
Heart Failure	12%
Other Cardiac Disorders	23%
Pregnancy/Postpartum Period	0%
Oral Contraceptives	0%

Table 3. Risk Factors for Venous Thromboembolism

Contraindications	Medical Patients
Significant renal impairment	11.59% (8/69)
Intracranial Haemorrhage	1.44% (1/69)
Low platelet count <1 L	4.34% (3/69)
Known bleeding disorder	0%
Hepatic Impairment	5.79% (4/69)
Bleeding at Admission	7.24% (5/69)
Active Gastroduodenal ulcer	4.34% (3/69)
Aspirin on Admission	15.94% (11/69)
NSAIDS on Admission	0%

Table 4. Contraindications to Pharmacoprophylaxis

Pharmacoprophylaxis	Medical Patients
LMWH	26% (18/69)
LDUH	2.89% (2/69)
FONDAPARINUX	0
OTHERS	0
Mechanical Prophylaxis	
IPC	4.37% (3/69)
GCS	5.79% (4/69)
FOOT PUMPS	0

Table 5. Types of VTE Prophylaxis

LMWH - Low Molecular Weight Heparin.
LDUH - Low Dose Unfractionated Heparin.
GCS – Graduated compression stockings,
IPC – Intermittent Pneumatic Compression.

Recommendations for Venous Thromboembolism risk assessment[16]

1. The use of Modified Wells Score for pretest probability assessment in outpatients with clinical suspicion of DVT is suggested.
2. In hospitalized patients considered to be at high risk of VTE, the use of PADUA score, for risk assessment is suggested.
3. In patients who are undergoing general and abdominal-pelvic surgery, the use of Caprini score to assess the risk of VTE is suggested.

In our study we have used the Padua Prediction Score[17] for risk assessment in medical inpatients.

Parameters	Score
Active cancer (local or distant metastases and/or in whom chemotherapy/ radiotherapy in previous 6 months).	3
Previous VTE (with the exclusion of superficial vein thrombosis)	3
Reduced mobility (Bed rest with bathroom privileges due to patient's limitations or on physician's order) for > 3 days.	3
Already known thrombophilic condition (Carriage of defects of Anti-thrombin, Protein C or S, Factor V Leiden, G20210A Prothrombin mutation, Anti-phospholipid syndrome)	3
Recent (<1 month) trauma and/or surgery	2
Elderly patient with age >70 years	1
Heart and/or respiratory failure	1
Acute myocardial infarction or ischemic stroke	1
Acute infection and/or rheumatologic disorder	1
Obesity (BMI >30 kg/m2)	1
Ongoing hormonal treatment	1

Table 6. Padua Prediction Score

Interpretation

If the score is <4: Low risk of VTE

If the score if ≥4: High risk of VTE

As per the Padua Prediction Score in our study 69% of the medical patients were at a high risk of developing VTE and 31 % were at a low risk to develop VTE.

As per the American College of Chest Physicians Evidence-Based Clinical Practice Guidelines out of the 69% of the high risk medical patient population only 30.4% received effective thromboprophylaxis for VTE and 4.33% of the high-risk patients received ineffective thromboprophylaxis and 65.21% of the high risk medical patient population did not receive any thromboprophylaxis and among the low risk group only 3% received effective thromboprophylaxis.

	Number of Patients	Effective Thromboprophylaxis	Ineffective Thromboprophylaxis	No Prophylaxis
High Risk	69%	30.43%(21)	4.33%(3)	65.21(45)
Low Risk	31%	9.67%(3)	9.67%(3)	80%(25)

Table 7

DISCUSSION

Hospitalised medical patients are at a particularly high risk of developing a thrombotic event. This study demonstrated high occurrence of patients at-risk for VTE. We also assessed the current thromboprophylaxis practice in order to optimize practice patterns for appropriate use of thromboprophylaxis. The proportion of Indian patients considered at risk for VTE (53.6%) was similar to that of the global patients at risk for VTE (51.8%).[18] The global ENDORSE data showed that 50.2 per cent at-risk patients received ACCP-recommended prophylaxis, while in India, very low proportion of at-risk patients (17.4%) received ACCP-recommended prophylaxis.[18]

The Indian data from ENDORSE study revealed that despite a similar proportion of patients at risk in India and other participating countries, there is major underutilization of prophylaxis (17.4%) in India as compared to higher usage of prophylaxis globally (50.2%).[18] According to the ENDORSE global study, higher percentage of at-risk medical patients received ACCP-recommended prophylaxis countries such as Germany (70%), Colombia (64%), Spain (64%) and Switzerland (61%).[19,20,21,22]

A similar study done at a Lebanese hospital has shown appropriateness of VTE prophylaxis in 51.2 % to 67.2 % of the patients.[23]

In the present study out of the 69% of the high risk medical patient population only 30.4% received effective thromboprophylaxis for VTE and 4.33% of the high-risk patients received ineffective thromboprophylaxis and 65.21% of the high risk medical patient population did not receive any effective thromboprophylaxis. Among the low risk population only 3% received effective thromboprophylaxis. This could be either due to lack of identification of risk factors or risk assessment by the Padua Prediction Score due to lack of proper awareness and understanding of the guidelines.

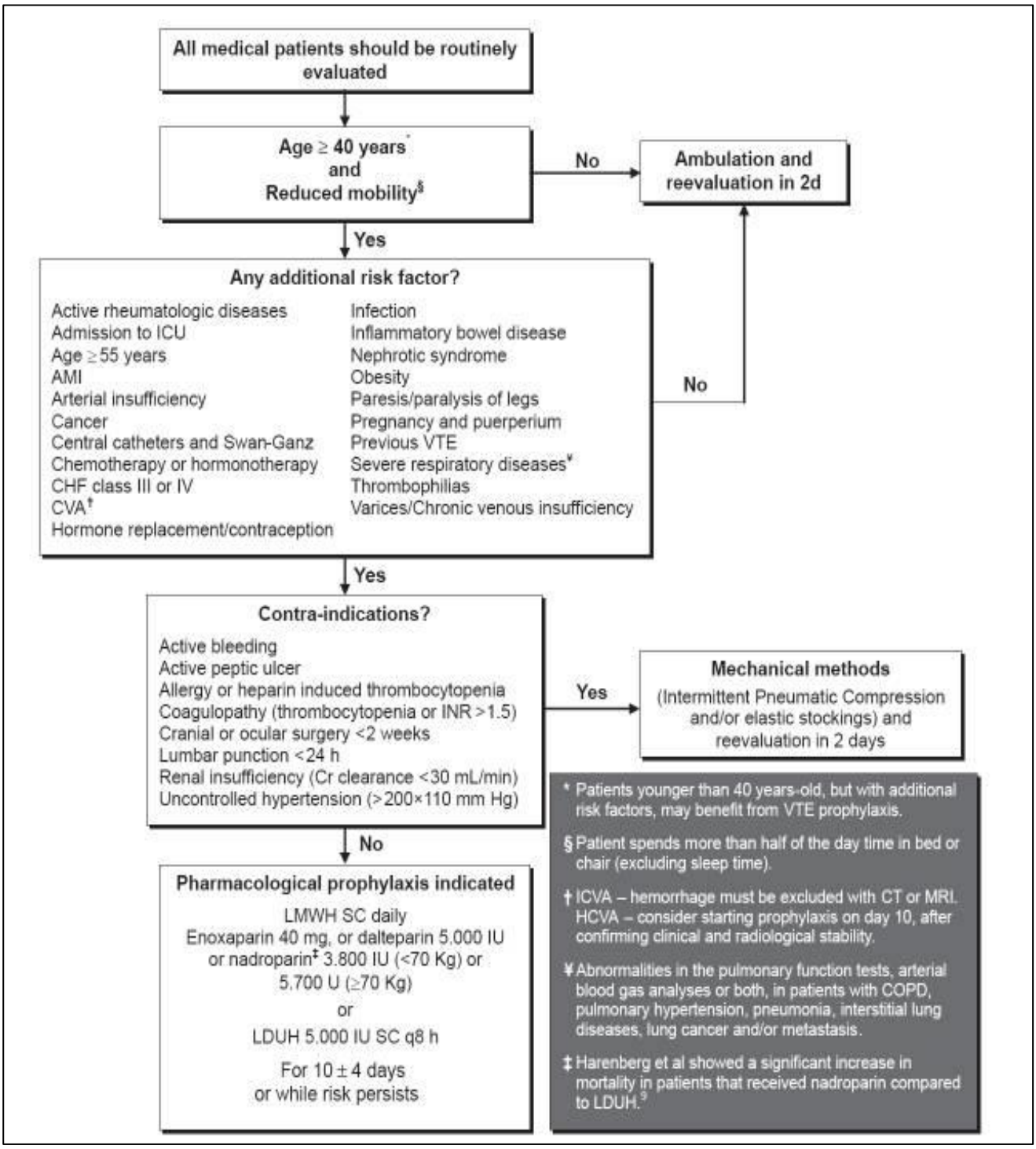
The Indian data are in agreement with the results of earlier studies from India and emphasize the underutilization of prophylaxis.[24] The Prospective Registry on venous thromboembolic Events (PROVE) study showed that only 7 per cent of patients with confirmed symptomatic DVT received appropriate thromboprophylaxis.[24] Although critically ill patients require more intensive and prolonged thromboprophylaxis, earlier studies have demonstrated that only half the patients in multidisciplinary critical care units (44-47%) had received thromboprophylaxis.[25,26]

The most common reasons for the underutilization might be bleeding complications as contraindications to anticoagulants.[27] However, the inadequacy of thromboprophylaxis cannot be explained only by contraindications to anticoagulant use, since mechanical thromboprophylaxis was also underutilized. Earlier evidence has shown that LMWH is as effective and safe as UFH for treatment of VTE.[28,29] However, since LMWH is associated with lower incidence of thrombocytopenia and osteoporosis during long-term use, it is generally preferred over UFH despite its high cost.[30]

In the Present Study

1. The maximum number of patients (44%) were in the age group of 60-80 years.
2. The most common risk factor for VTE was pulmonary diseases (38%).

3. The most common contraindication for parmacoprophylaxis was use of aspirin on admission (15.94%).
4. The most common type of thromboprophylaxis used was LMWH (26%).



***Algorithm for VTE Prevention in Hospitalized Medical Patients.*[14]**

Medical Conditions

1. For acutely ill medical patients admitted to the hospital with CHF or severe respiratory disease, or who are confined to bed and have one or more additional risk factors, including active cancer, previous VTE, sepsis, acute neurologic disease, or inflammatory bowel disease, we recommend thromboprophylaxis with LMWH (Grade 1A), low-dose UFH (Grade 1A), or fondaparinux (Grade 1A).
2. For medical patients with risk factors for VTE and for whom there is a contraindication to anticoagulant thromboprophylaxis, we recommend the optimal use of mechanical thromboprophylaxis with GCSs or IPC devices (Grade 1A).

3. For acutely ill hospitalized medical patients at low risk of thrombosis, we recommend against the use of pharmacologic prophylaxis or mechanical prophylaxis (Grade 1B).

Acute Ischemic Stroke

1. For acute stroke patients with restricted mobility, we recommend prophylactic low-dose subcutaneous heparin or LMWH (Grade 1A).
2. For patients who have contraindications to anticoagulants, we recommend IPC devices or elastic stockings (Grade 1B).

Critical Care

1. For patients admitted to a critical care unit, we recommend routine assessment for VTE risk and routine thromboprophylaxis in most (Grade 1A).
2. For critical care patients who are at moderate risk for VTE (eg, medically ill or postoperative general surgery patients), we recommend using LMWH or low-dose UFH thromboprophylaxis (Grade 1A).
3. For critical care patients who are at high risk for bleeding, we recommend the optimal use of mechanical thromboprophylaxis with GCSs and/or IPC devices at least until the bleeding risk decreases (Grade 1A). When the high bleeding risk decreases, we recommend that pharmacologic thromboprophylaxis be substituted for or added to the mechanical thromboprophylaxis (Grade 1C).

Selected Recommendations on VTE Prevention from the ACCP Guidelines (9th Edition).[31]

CONCLUSION

Our results showed a high occurrence of VTE risk in hospitalised medical patients and underutilization of effective thromboprophylaxis to a large extent. This confirms the need for increasing awareness about VTE risk, use of risk assessment scores, and improved effective implementation of appropriate thromboprophylaxis in at-risk hospitalized patients. This will help in successful management of VTE and prevent the morbidity and mortality due to VTE.

VTE prophylaxis is recommended for acutely ill, hospitalized medical patients, age 40 years or older, with reduced mobility and at least one additional risk factor for VTE. Patients younger than 40 years of age, but presenting with important risk factors, may benefit from prophylaxis. When the algorithm for risk assessment indicates that VTE prophylaxis is recommended, LMWH once a day (enoxaparin 40 mg, dalteparin 5000 IU, nadroparin 3800 IU if <=70 Kg or 5700 IU if >=70 Kg) or LDUH 5000 IU SC every 8 h should be used. For patients older than 60 years, fondaparinux 2.5 mg once a day is also an option.

If there is contraindication for pharmacological prophylaxis, mechanical prophylaxis may be considered. However, all patients must be frequently re-evaluated for the appearance of new indications or contraindications for prophylaxis during the hospitalization.

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