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Prophylaxis and Outcome Measures of Venous Thromboembolism in Admitted Patients at a Tertiary Care Hospital

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ABSTRACT

Deep vein thrombosis and pulmonary embolism are significant reasons of chronic illness & death in people suffering from venous thromboembolism (VTE). The goal of this study was to evaluate venous VTE risks, prevention, and outcomes in medical wards of a tertiary care hospital in Vadodara, Gujarat. The tool from the ACCP guideline on VTE prevention and therapy was used in a retrospective cross-sectional analysis including 200 patients' charts reviewed in those hospitalized to medical wards. MS Excel was used to input the data, which was subsequently uploaded to the SPSS 21 dataset for analysis. 186 (93 percent) of 200 medically hospitalized patients had at least two risk indicators for VTE development. Only 75 (40%) of the patients got thromboprophylaxis, and only 61 (32.8%) of those who obtained prophylaxis had VTE. However, 22 (11%) of the study participants in the high and highest risk categories experienced VTE within their hospital admission. Because such information was not included on patients' records, the status of VTE result was unknown to 128/200 (64 percent) research participants. All of the patients in this research have at least one VTE risk factor. Thromboprophylaxis was given to just 37.5 percent of patients. Current evidence-based guidelines provided by ACCP must be implemented.

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INTRODUCTION

Deep vein thrombosis (DVT), a kind of venous thromboembolism (VTE), is a leading cause of illness and death around the world. Every year, one out of every 1,000 people is expected to develop VTE [1, 2], with DVT accounts for approximately two-thirds among these cases [3]. Pulmonary embolism (PE), the most feared complication of DVT, accounts for up to one-third of patients and is the major cause of death [4]. Much of the severity of DVT is attributed to the development of post-thrombotic syndrome, which occurs in up to 50% of patients within two years of DVT and includes a variety of clinical manifestations such as leg discomfort, inflammatory responses, and, in severe cases, venous ulcers [5, 6]. Anticoagulation is at the heart of DVT treatment, with the goal of preventing PE and thrombus recurrence. Patients with DVT who have not been anticoagulated have a 30-day mortality rate of more than 3%, and this danger is ten-

fold increased in patients who develop PE [7]. The introduction of direct oral anticoagulants (DOACs) in the treatment of DVT has prompted a comparative assessment of these newer drugs to more conventional vitamin K-antagonists (VKAs). Several recent clinical studies have examined this issue and discovered that the two drug classes have comparable safety and efficacy profiles. Clinicians are best prepared now that there are more therapeutic options to implement disease- and patient-specific concerns into DVT medical therapy.

Pathogenesis

According to Virchow's Triad, which was first published in 1856, thrombosis is influenced by three factors: venous stasis, vascular injury, and hypercoagulability. Despite being the most important of the three variables, venous stasis does not appear to be sufficient to cause thrombus formation [8]. The presence of venous stasis and vascular injury or hypercoagulability, on the other hand, increases the likelihood of clot formation significantly [9]. The clinical factors most strongly linked with DVT are surgery or trauma, malignancy, prolonged reduced mobility, pregnancy, congestive heart failure, varicose veins, obesity, increasing age, and a history of DVT [10].

Venous thrombosis is more likely in regions where blood circulation is impaired or changed, such as divisions surrounding valves in deep veins of the leg [11]. Although valves help blood flow through the veins, they can indeed produce venous stasis and hypoxia. Venous blood clots have been seen in the sinuses around venous valves in a number of autopsy investigations [12–14]. As blood circulation reduces, oxygenation tension decreases and hematocrit increases [15]. The ensuing hyperdynamic milieu may limit the production of thrombolytic proteins such as thrombomodulin and endothelial protein C receptor (EPCR), both of which are generated preferentially on venous valves [16]. Hypoxia stimulates the synthesis of certain inflammatory mediators while suppressing the generation of important anticoagulation proteins. P-selectin is an adhesive protein that binds to the endothelium and binds immune cells harbouring tissue factors [17, 18]. Whereas researchers debate about whether tissue factor is generated on the endothelium or by cells in extravasation tissue throughout this procedure, it is commonly acknowledged that tissue factor is the major nidus for plaque formation [19].

Cancer, oral contraceptive methods, obesity, and advanced age are all risk factors for the formation of clots. Malignancy can cause veins to constrict, resulting in stasis. It also causes the release of procoagulants, such as tissue factor, on membrane particles, which increases thrombosis [20]. Obesity and the use of oral contraceptives are both thrombosis risk factors. They work together to increase the risk of thrombosis [21]. Finally, being older is associated with an increased risk of thrombosis. While the evidence is inconclusive, so many aspects associated with aging have been noticed: increased obesity, greater incidence of illness and intervals of sustained immobility, co-morbid health problems, and enhance in pro-coagulants without a significant increase in anticoagulants such as protein C. (19). Thrombosis production is a multi-cause, dynamic process that requires a fine balance of physical and biological components.

Diagnosis

The size and location of a thrombus have an impact on the clinical appearance of DVT. Asymmetrical edema, warmth, or discomfort in an extremity is all common manifestations of DVT, and patients with these risk factors should be cautious. A variety of scoring methods have been designed to evaluate the pre-test likelihood of DVT. In the United States, the Wells criteria [22] are the most widely used scoring system. Patients were originally divided into three risk categories: high, intermediate, and low risk, depending on the presence or absence of nine clinical criteria. DVT prevalence was predicted to be 5% in the low-risk category and 53% in the high-risk category [23]. Many years later, the Wells scoring system was modified to include a "previously recorded DVT" criterion and to extend the post-operative period from 4 to 12 weeks. The risk categories were also narrowed down to "unlikely" or "likely," with DVT prevalence estimated to be 6% and 28%, respectively [24]. The National Institute for Health and Care Excellence (NICE) recommendations in 2012 [25] determined the sensitivity and specificity of the Wells criteria for DVT to be 77–98% and 38–58%, respectively. While the Wells criteria are highly sensitive, the data shows that the scoring system cannot be used as the sole diagnostic tool for DVT. Nonetheless, it is useful in clinical settings for patient stratification and determining the best sequencing for additional tests. The D-dimer test, like the Wells scoring criteria, has a high sensitivity but a low specificity for diagnosing DVT, with NICE estimates of 75–100% sensitivity and 26–83% specificity [25].

Conventional contrast venography, computed tomography (CT) venography, and magnetic resonance (MR) venography were some of the diagnostic imaging techniques utilized for DVT. Contrast venography is the standard method for lower-limb

DVT, but it is restricted by a number of reasons, including surgical discomfort, user reliance, inadequate eyesight, and patient-specific features such as contrast sensitivity and renal failure [26, 27].

Medical Management

Anticoagulation is a critical component of DVT therapy. Individuals with DVT could only be treated with oral anticoagulants, with a limited tends to be particularly.

In the acute phase, physical and catheter-directed therapeutic option (CDT) may be appropriate in situations with significant thrombus load including proximal deep veins to cause clot breakdown quickly and reduce the risk of post-thrombotic syndrome [28, 29]. Although there is an elevated risk of ischemia reperfusion damage, these approaches are also being used to treat acute limb ischemia caused by arterial thrombosis [30, 31].

Thrombolytic treatment, on the other hand, has been linked to an increased risk of significant bleeding and has demonstrated no effect in terms of mortality in patients with DVT [32–34]. More research is being conducted to determine the best patient selection as well as the potential short- and long-term benefits of CDT over systemic thrombolysis and/or anticoagulant treatment [34]. In patients who are at risk of hemorrhage or have an extreme potential complications to anticoagulant treatment, an inferior vena cava filter can be utilized to avoid Pulmonary Embolism.

Commonly Prescribed Agents

1. Low molecular weight heparin
2. Dabigatran
3. Rivaroxaban
4. Apixaban
5. Edoxaban

METHODOLOGY

Study Site

At a tertiary care hospital, Vadodara, Gujarat.

Study Design

From November 2021 to April 2022, a retrospective cross-sectional research comprising patient chart review was done in patients admitted to the hospital's medical wards (6 months).

Study Period

6 months.

Study Population

The research population consisted of medical patients admitted to the hospital between November 2021 and April 2022.

Sample Size

200 patients.

Study Criteria

Inclusive Criteria

All patients admitted to the study hospital's medical wards between November 2021 and April 2022 who met the study's requirements had their files examined until the sample size was reached.

Exclusive Criteria

Patients under the age of 18, those with a known DVT, and those receiving DVT treatment were all excluded from our study.

Plan of Study

A structured data abstraction format was used to collect data on patient socio-demographic parameters, VTE risk analysis, contraindications, thromboprophylaxis, and VTE-related patient outcome (DAF). Each patient's overall risk score was computed, and risk stratification was derived by aggregating all VTE hazards identified in each patient. Low, moderate, high, and greatest VTE risk groups were assigned to patients with overall risk scores of 0-1, 2, 3-4, and 5, respectively. The tool was created using the TASH guidelines for VTE prevention and therapy [16].

The relevant data was gathered from the patient's medical records. Prior to data collection, the DAF structure was pre-tested on 5% of the research population to ensure clarity, simplicity, and understand ability, and modifications were made based on input from the preliminary abstraction format.

Statistical Analysis

Prior to data input, the acquired data was collected and any incomplete documents were cleansed. The information was entered into Microsoft Excel and then transferred to SPSS 21 for assessment.

RESULTS AND DISCUSSION

119 of the 200 research participants were male, with a mean age of 41.2 16.1 years and a range of 18-80 years in Figure 1 and Figure 2, respectively. Nearly 50 % of the patients were people aged 18 to 39 years old. Table 1 shows the length of time spent in the hospital. The most common reasons for hospitalization were various haematological malignant tumors (31.5 percent) and congestive heart failure

(20.5%), with additional reasons shown in Figure 3. Table 2 shows the risk stratification score, while Figure 4 shows the incidence of VTE. Table 3 shows the prophylaxis protocol. A little more than 50 % of patients (51%) were classified as having the highest risk of VTE. The average VTE risk score was 4.6 (SD=2.7), with the highest and lowest values being 19 and 1, accordingly. Only 75 (37.5%) patients received VTE prophylaxis, and four of them were from the low risk strata, despite being ineligible for anticoagulant therapy. Thrombo-prophylaxis was not administered to the remaining 125 (62.5%) trial participants. The most often utilized prophylaxis regimen in the study population was heparin 7500 IU SC BD.

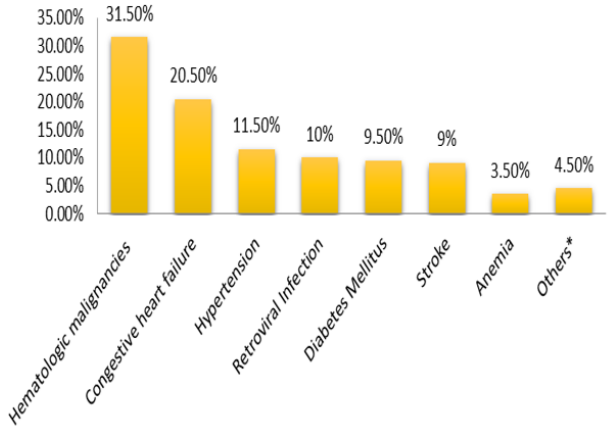

Figure 3: The Reason for Hospitalization

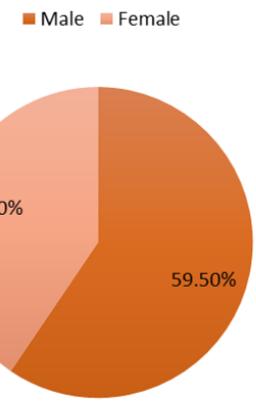

Figure 1: Gender Wise Classification

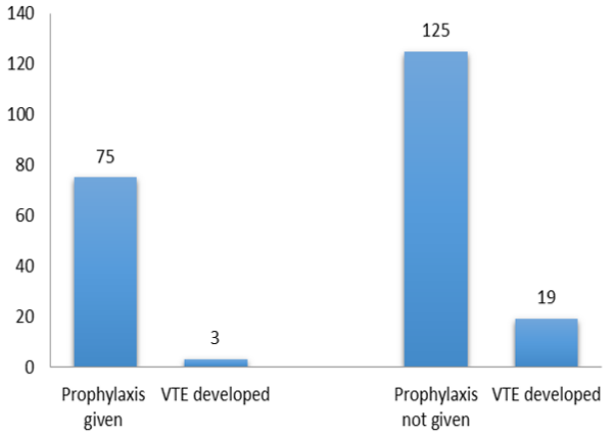

Figure 4: Incidence of VTE

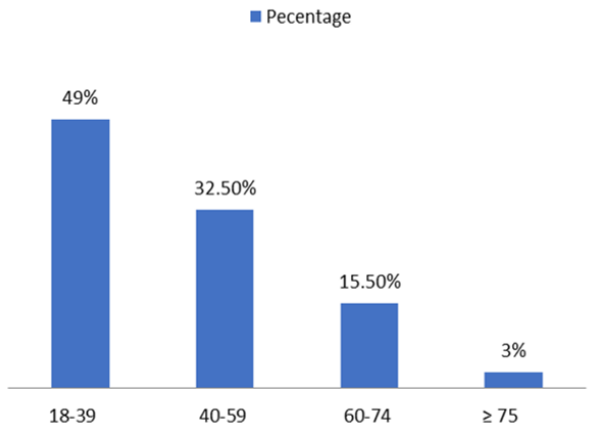

Figure 2: Age Wise Classification

Only 37.5 percent of patients in our research were offered thromboprophylaxis, and four of them were given it without risk. In Tunisian research, practically all of the patients at risk (41 percent out of 46 percent) got an ACCP [29] indicated prophylactic. Saudi Arabia (55.7 percent) [19], IMPROVE (60 percent), and CURVE (16 percent) [20] studies all indicated under utilization prophylactic. Despite the fact that the risk of VTE differed depending on the patient's illness, ACCP-recommended prophylaxis was continuously underutilized throughout the worldwide ENDORSE medical patient group [12, 18]. In our analysis, 22 (11%) of patients had VTE events during their hospital stay, with almost two-thirds of them coming from patients with the greatest VTE risk and occurring in patients who were in the hospital for more than 15 days.

Because this is a retrospective chart analysis, there may be other VTE risk variables that were not included in the patients' reports. We had a constant struggle extracting vital information from patients' files owing to inadequate organization in clerking their histories.

Illegible doctor writing style and the absence of a significant number of charts that could have provided pertinent data, as well as other conventional methods, such as educating patients on the importance of leg elevation and early mobility, were not analyzed in this study because they were not included in patients' documents, were not included in this study. This might have an impact on our findings, such as risk assessment and risk stratification, as well as the prophylactic treatment offered to

Table 1: Hospital Stay Duration

Hospital Stay Duration (in days)	Frequency (N)	Percentage (%)
<5 days	32	16%
6-10 days	46	23%
11-15 days	57	28.5%
15-30 days	52	26.0%
>30 days	13	6.5%

Table 2: Risk Stratification Score

Total Risk Score	Risk Level	Frequency	Percentage
0-1	Low	14	7%
2	Moderate	39	19.5%
3-4	High	45	22.5%
≥5	Highest	102	51%
Total		200	100%

Table 3: Prophylaxis Regimen

Prophylaxis Therapy	Frequency (75)	Percentage (37.5%)
Heparin 5000 IU BD	9	4.5%
Heparin 7500 IU BD	52	26%
Enoxaparin 40/ 60 mg OD	3	1.5%
Heparin 40mg SC BD with Warfarin 2.5mg PO OD	4	2.0%
Warfarin 5mg OD	7	3.5%

patients.

CONCLUSION

After major general surgery, venous thromboembolism (VTE) is prevalent. VTE is expected to be present in 20% of general surgical patients and 30% of those receiving colorectal operations. PE is the greatest cause of avoidable hospital death in the United States, estimates suggest that up to 200,000 fatalities per year. In most mandatory quality-improvement projects, preventing postoperative VTE is considered a quality and patient-safety strategy. At least one VTE risk factor is present in every patient in our study. Only 37.5 percent of patients received thromboprophylaxis. Being over 60 years old, having an AMI, having a chronic lung infection, such as pneumonia, and having had a stroke in the preceding month were all found to be independent predictors of VTE. Acceptable risk classification and prophylaxis for medically hospitalized patients result in better VTE prevention and the best treatment of hospital admitted patients for a variety of reasons. Current evidence-based content of the curriculum by ACCP must be implemented.

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Conflict of Interest

The authors declare that there is no conflict of interest.

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