



Evaluation of the PADUA Prediction Score in Vein Thromboembolism Prophylaxis in Patients Admitted to Imam Reza Hospital in 2017

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Received 2018 August 07; Revised 2018 November 18; Accepted 2018 November 18.

Abstract

Background: Padua prediction score (PPS) predicts high risk patients of vein thromboembolism (VTE).

Objectives: This study was conducted to assess Padua prediction score in order to receive prophylaxis of VTE.

Methods: This prospective cohort study was conducted between 300 patients admitted to the internal ward of Imam Reza Hospital who stayed longer than three days in 2017. The initial questionnaire of PPS done for patients and telephone follow up after three months was used to gather data. For the statistical analysis, SPSS software version 22 using Chi-square test was used.

Results: Out of 300 patients, according to the Padua model, 266 patients were in a high risk of VTE, 35 received prophylaxis. Only 13.15% of high risk groups received prophylaxis. Around 87% of high risk groups did not receive prophylaxis. After six months follow up, 18 patients got VTE, three of them being in a high-risk group and received prophylaxis. There was a significant difference between PPS and cancer in receiving prophylaxis ($P < 0.05$).

Conclusions: Receiving prophylaxis in the high-risk group was low. Cancer patients needed more in receiving prophylaxis, according to categories of cancer/not cancer, however, they did not receive it and PPS could recognize them.

Keywords: Vein Thromboembolism, Prophylaxis, Padua Prediction Score

1. Background

Deep vein thrombosis (DVT) and pulmonary thromboembolism (PTE) are manifestations of a disease called venous thromboembolism (VTE). DVT is the presence of clotted blood (thrombosis) in one of the deep veins of the body that presents itself with pain and swelling (1).

More than 200000 new cases of thromboembolism occur every year. Of these, more than 30% of patients die within 30 days, and one in five cases of sudden death are due to pulmonary embolism (2).

VTE is one of the most preventable cases of death. Early diagnosis and proper treatment of DVT and its complications can save lives. Obviously, the lack of diagnosis increases the duration of hospitalization and treatment costs and complications (lung thromboembolism and death) (3).

About 25% of cases of thromboembolism occur due to hospitalization. Approximately 50% - 75% of cases of thromboembolic events occur in general internal

medicine patients. In prospective studies, in these patients who did not receive prophylaxis, symptomatic or asymptomatic DVT range is about 5% - 14%, and pulmonary embolism is about 10% of cases (4-6).

VTE prophylaxis is under-utilized in Asia due to the misconception that its incidence is lower in Asia as compared to the Caucasians. The available data on VTE in Asia is limited due to the lack of well-designed multicenter randomized controlled trials as well as non-standardized research designs, making data comparison difficult. There is also a trend towards increasing the incidence of VTE, as demonstrated by a number of hospital-based studies in Asia (7).

In addition, the utilization rate of VTE prophylaxis remains suboptimal in Iran, due to the fact that there is no national registry system for keeping VTE records. Although thrombophylaxis guidelines are being applied in Iran, appropriate prophylaxis (in terms of correct type of regimen, dosing and duration) is given only to 47.60% of patients prone to VTE. Under-prophylaxis is a major issue related to

VTE in developing countries including Iran (8).

In order to help stratify the risk of VTE in hospitalized medical patients, several risk assessment models (RAMs) and algorithms have been suggested (5, 7, 8).

In 2010, a fairly simple prediction score for evaluating the risk of thromboembolism in patients admitted to Padua Hospital with 11 parameters was introduced by Barbar et al. (9). In 2012, the American College of Chest Physicians (ACCP) was approved and recommended as preferred risk stratification tool in non-surgical patients. Padua prediction score suggest that patients with a cumulative PPS of four or above are at high risk of VTE through 90 days, and thus should receive thrombo-prophylaxis while in the hospital.

The benefits of this guideline include reducing hospital acquired VTE events by providing a method for screening medical and surgical patients for VTE risk using validated risk assessment tools and providing recommendations for appropriate VTE prophylaxis therapies (10-12). Additionally, this guideline provides recommendations for patient populations where data is limited or controversial (ex. Obese patients).

2. Methods

In this prospective cohort study, which was conducted in 2017, 300 patients who were admitted to the Internal Ward of Imam Reza Hospital and stayed there for more than three days were enrolled. Padua prediction score (PPS) and telephone follow up after three months were used to gather data. We evaluated the presence of thromboembolism by asking the following questions: "Do you have pain and swelling in your lower limbs"? and "Have you experienced acute dyspnea"?

Then, the effect of receiving prophylaxis was evaluated and analyzed in two high-risk and low-risk groups. Data analysis was performed in SPSS version 22 using Chi-square test.

3. Results

Based on the findings, the prevalence of thromboembolism in all the patients was 6%. The prevalence of DVT in cancer patients was 6.7%, and in non-cancer patients 4.7%. Therefore, DVT prevalence in cancer patients was higher ($P < 0.05$; Table 1).

The prevalence of DVT in men and women was 4.8% and 6.8%, respectively, showing that DVT prevalence was significantly higher in women ($P < 0.05$). We also noted that all the cancer patients (100%) were at high risk for VTE, while this rate was 67% in non-cancer patients ($P < 0.05$). All

the patients (100%) with DVT and about 86% of patients without DVT were at high risk based on PPS. In the low-risk group, the incidence of DVT was 0%.

In the high-risk group, DVT occurred in six men and 12 women. On the other hand, DVT in the low-risk group did not occur in 20 men and 14 women, while in the high-risk group it did not happen in 98 men and 150 women. Kruskal-Wallis test reflected a significant relationship between DVT and PPS based on gender ($P < 0.05$).

In the low-risk group, the rate of VTE in cancer patients and non-cancer patients was zero. DVT in high-risk cancer patients happened in 13 individuals, and in non-cancer patients it occurred in five cases.

On the other hand, all the low-risk patients were in the non-cancer group and did not develop VTE. However, in the high-risk group based on PPS, 181 cancer patients and 57 non-cancer patients did not experience VTE. Kruskal-Wallis test showed that the prevalence of DVT in cancer and non-cancer patients was significantly associated with PPS ($P < 0.05$).

Of 266 high-risk patients, 35 had positive prophylaxis and 231 had negative prophylaxis. Thus, receiving prophylaxis in the high-risk group was low ($P < 0.05$). In addition, 157 cancer patients were high risk with regard to PPS, however, they had negative prophylaxis, while 74 patients in the non-cancer group were high-risk ($P < 0.05$). Negative prophylaxis in cancer patients was higher than non-cancer patients. Therefore, cancer patients require receiving more prophylaxis, however, they did not receive it.

In general, 99 male and 132 female patients at high risk for VTE had negative prophylaxis, and there were significant differences in PPS and incidence of VTE between the two genders ($P < 0.05$).

Eleven patients with VTE and 220 patients without VTE were at high risk for PPS, however, they did not receive thromboprophylaxis. In other words, on the six-month follow-up, 18 patients developed VTE, three of whom were in the high-risk group and had received prophylaxis, while 11 of them were also from the high-risk group, however, they had not received prophylaxis. There were significant differences in PPS and incidence rate of VTE based on receiving prophylaxis ($P < 0.05$).

4. Discussion

In this study, we analyzed data from patients who were admitted to the Internal Ward of a hospital and stayed there for more than three days. We analyzed the rate of VTE, effectiveness of PPS in predicting VTE events, and the status of prophylaxis treatment in Iran.

The rate of VTE incidence during three months was 6% in contrast to 10% in general references. This discrepancy

Table 1. Padua Prediction Score System and VTE Events in Order to Receive Prophylaxis^a

Prophylaxis	With VTE		Without VTE	
	High Risk	Low Risk	High Risk	Low Risk
Positive	3	0	32	0
Negative	11	4	220	30

^a P value = 0.001.

could be due to symptomatic and asymptomatic VTE samples; our research was based on clinical and symptomatic data.

In the present study, the prevalence of VTE among women was higher than men, while in most studies, the prevalence of VTE was higher in male patients. The higher prevalence of VTE in men could be due to the fact that two common risk factors for DVT, that is, travelling long distances and low mobility, are more common in men (13-16). However, in the present study, higher prevalence of VTE in women may be due to some underlying factors, especially obesity.

All cancer patients (194 patients) were at high risk for thromboembolism, according to PPS, however, 157 of them did not receive thromboprophylaxis during their hospital stay. In the non-cancer group, 74 patients did not receive prophylaxis. In other words, most cancer patients needed prophylaxis, however, they did not receive it, and PPS was able to identify them. Among the high risk and low risk patients who received prophylaxis, there was a significant relationship between the findings of the present study.

Other findings showed that out of 300 patients, 11.6% received prophylaxis. Studies performed in USA, India, Portugal, and Netherlands showed that the rates of prophylaxis usage were 12.9%, 21.1%, 58.8%, and 51.8%, respectively (7, 8, 17-20).

Globally, different methods are used for the identification of DVT. In this research, the Padua method was used for the first time in Iran. Based on the Padua model, 266 people were at high risk for thromboembolism and only 35 received prophylaxis. Thus, only 13.15% of high-risk patients received prophylaxis. In other words, about 87% of high-risk patients, based on the Padua model, did not receive prophylaxis.

Based on the categorization of patients into cancer and non-cancer groups, mostly cancer patients needed prophylaxis, however, they did not receive it, and PPS was able to identify them. On the three-month follow-up, 18 patients developed thromboembolism, of whom three had received prophylaxis and were in the high-risk group based on PPS.

4.1. Conclusions

There was a significant difference in the incidence of VTE between the negative and positive groups of prophylaxis. VTE occurred in 11% of the patients who did not receive prophylaxis compared to 3% who did. Thus, PPS is a simple prognostic measure for VTE events, which can be used in hospital treatments.

We recommend future studies to review the Padua method in several treatment centers (since in most international studies this method has been used in only one facility), study cases requiring prophylaxis but have not received it (underuse), and those requiring prophylaxis but have not received it (overuse), use risk assessment methods for receiving and not receiving prophylaxis in patients, and compare the effectiveness of different risk assessment methods to select the best one. We also suggest placing the PPS table on the records of patients admitted to hospitals to help physicians in the use of prophylaxis for those with a score of more than four.

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