dx.doi.org/10.5380/ce.v24i0.56741 Cogitare enferm. 24: e56741, 2019

Cogitare Enfermagem

ORIGINAL ARTICLE

STRATIFICATION OF RISK FOR VENOUS THROMBOEMBOLISM IN PATIENTS OF A PUBLIC HOSPITAL OF THE FEDERAL DISTRICT

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ABSTRACT
Objective: to stratify the risk of venous thromboembolism and associated characteristics in clinical patients of a public hospital of the Federal District.
Method: prospective study (60-day follow-up), between August 15 and October 15, 2016, with clinical patients aged over 18 years hospitalized for more than 48 hours. The demographic, clinical and prophylactic characteristics were analyzed. The subjects were divided into two groups: high risk (cases) and low risk (control) for venous thromboembolism, according to the Padua Score.
Results: there was a high prevalence of high-risk patients and the most frequent risk factors were: reduced mobility 59 (58.42%), advanced age 54 (53.47%), and rheumatic infections or diseases 47 (46.53%).
Conclusion: we emphasize the importance of the identification of risk characteristics, as well as the practice of the multidisciplinary team to optimize the risk stratification and to implement early prophylaxis and therapeutic measures.

DESCRIPTORS: Thromboembolism; Venous thromboembolism; Pulmonary Embolism; Risk factors; Nursing; Nursing team.

HOW TO REFERENCE THIS ARTICLE:
Lima I, Ferreira EB, Rocha PRS. Stratification of risk for venous thromboembolism in patients of a public hospital of the Federal District. Cogitare enferm. [Internet]. 2019 [access "insert day, monh and year"]; 24. Available at: http://dx.doi.org/10.5380/ce.v24i0.56741.

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ARTIGO ORIGINAL / ARTÍCULO ORIGINAL

ESTRATIFICAÇÃO DE RISCO PARA TROMBOEMBOLISMO VENOSO EM PACIENTES DE UM HOSPITAL PÚBLICO DO DISTRITO FEDERAL

RESUMO
Objetivo: estratificar o risco de pacientes clínicos para tromboembolismo venoso e características associadas em hospital público do Distrito Federal.
Método: estudo prospectivo (follow-up de 60 dias), entre 15 de agosto e 15 de outubro de 2016 com pacientes clínicos maiores de 18 anos e tempo de internação superior a 48 horas. Foram analisadas características demográficas, clínicas e profiláticas. Os sujeitos foram separados em dois grupos: alto risco (casos) e o baixo risco (controle) para tromboembolismo venoso, conforme o Escore de Pádua.
Resultados: foi elevada a prevalência de pacientes com alto risco e os fatores de risco mais frequentes foram: redução de mobilidade 59 (58,42%), idade avançada 54 (53,47%) e infecções ou doenças reumáticas 47 (46,53%).
Conclusão: ressaltamos a importância da identificação das características de risco, além da atuação da equipe multiprofissional para otimizar a estratificação do risco, implementação de medidas profiláticas e terapêuticas precoces.

DESCRITORES: Tromboembolia; Tromboembolia venosa; Embolia Pulmonar; Fatores de Risco; Enfermagem; Equipe de Enfermagem.

ESTRATIFICACIÓN DE RIESGO PARA TROMBOEMBOLISMO VENOSO EN PACIENTES DE UN HOSPITAL PÚBLICO DE DISTRITO FEDERAL

RESUMEN:
Objetivo: estratificar el riesgo de pacientes clínicos para tromboembolismo venoso y identificar características asociadas en hospital público de Distrito Federal.
Método: estudio prospectivo (follow-up de 60 días), hecho entre 15 de agosto y 15 de octubre de 2016 con pacientes clínicos mayores de 18 años y tiempo de ingreso superior a 48 horas. Se analizaron las características demográficas, clínicas y profilácticas. Se organizaron los individuos en dos grupos: alto riesgo (casos) y bajo riesgo (control) para tromboembolismo venoso, de acuerdo a la Puntuación de Pádua.
Resultados: se elevó la prevalencia de pacientes con alto riesgo y los factores de riesgo más frecuentes fueron: reducción de movilidad 59 (58,42%), edad avanzada 54 (53,47%) e infecciones o enfermedades reumáticas 47 (46,53%).
Conclusión: se resalta la importancia de la identificación de las características de riesgo, además de la actuación del equipo multiprofesional para optimizar la estratificación de riesgo, implementación de medidas profilácticas y terapéuticas precoces.

DESCRIPTORES: Tromboembolía; Tromboembolía venosa; Embolia Pulmonar; Factores de Riesgo; Enfermería; Equipo de Enfermería.

INTRODUCTION

Venous thromboembolism (VTE) is one of the main causes of avoidable death in the in-hospital environment and is frequently associated with complications[1]. Venous thromboembolism is a thrombotic vascular disease with multifactorial etiology, resulting from the formation of thrombi in the venous system due to idiopathic or unknown factors. There are two types of VTE: deep vein thrombosis (DVT) and pulmonary thromboembolism (PTE)[2].

The mechanisms involved in this process were described by Rudolf Virchow as the triad of thrombogenic factors, namely: venous stasis, endothelial damage and hypercoagulation. The American College of Chest Physicians (ACCP)[3] highlighted active cancer, previous history of VTE, reduced mobility, known thrombophilia, trauma or surgery in the previous month, advanced age, heart or respiratory failure, rheumatic infections and/or diseases, acute myocardial infarction or stroke, obesity and current hormonal therapy as risk factors for VTE.

The occurrence of thrombophilia in non-surgical patients is associated with increased hospital costs and longer periods of hospitalization, as well as an increased risk of recurrence of VTE when not adequately anticoagulated[4].

The risk of early death among patients with PTE is 18 times higher in comparison to isolated DVT. For almost a quarter of patients with PTE, the initial clinical presentation is sudden death[5]. In Brazil, a registry including more than 27,000 surgical and clinical patients revealed the underutilization of VTE prophylaxis in 25% of high-risk patients and 45% of those with moderate risk, predominantly in non-surgical patients[6].

The stratification of VTE risk is a dynamic process, which aims to adapt the prophylactic method and monitor the therapies[7-8]. Among the risk stratification scales for clinical patients, the ACCP suggests the Padua Score as a form of evaluation[3]. This score evaluates the 14 risk factors described in Table 1, with each positive factor added to generate a cumulative risk. The final score defines the level of risk for VTE of the patient[9], with scores ≥ 4 being high risk and scores < 4 low risk.

Table 1 - Padua Score risk assessment[3]

Characteristics	Score
Active Cancer	3
Previous VTE	3
Reduced mobility	3
Known thrombophilia	3
Recent trauma or surgery	2
Advanced age	1
HF or KF	1
Rheumatic infections or diseases	1
AMI or stroke	1
Obesity	1
Hormone therapy	1

HF: Heart failure; KF: Kidney failure; AMI: acute myocardial infarction
Score ≥ 4 – high risk and score < 4 – low risk.
Source: American College of Chest Physicians (ACCP)[3]

Clinical trials[10-11] have evidenced the safety, efficacy and low cost of thromboprophylaxis in hospitalized patients at risk of VTE. Prophylactic methods may be mechanical or pharmacological, and may be used independently or in combination[3].

However, there are several barriers to the applicability of thromboprophylaxis, among them the lack of knowledge regarding current guidelines, socioeconomic difficulties, resistance to changes in practices and the absence of protocols, as well as the fear of bleeding[10].

It is necessary for professionals to be able to recognize and stratify the risks for VTE as early as possible, as the time prior to starting the prophylaxis leads to greater exposure to complications and mortality due to PTE and DVT[9].

This study aimed to stratify the risk of clinical VTE patients (Padua Score) from a public hospital of the Federal District and to verify the characteristics associated with the risk score.

METHOD

This was a prospective observational study (60-day follow-up), conducted from August 15 to October 15, 2016 with patients hospitalized in a Medical Clinical Unit (MCU) of a public tertiary hospital of the Federal District State Health Department.

Subjects 18 years of age or over and hospitalized for 48 hours or more were included, while patients with incomplete data were excluded. During the study period, there were a total of 103 admissions, with two patients excluded due to the hospitalization period being less than 48 hours. Therefore, 101 patients composed the sample of this study, as presented in Figure 1.

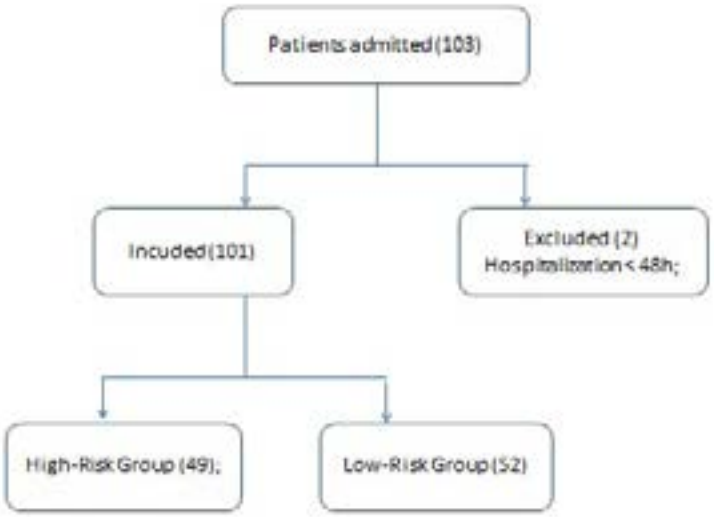

Figure 1 - Sample selection flow chart. Brasilia, FD, Brazil, 2016

The study consisted of two stages: in the first stage, the sociodemographic and clinical characteristics of the patients were documented and the stratification of the risk for VTE according to the Padua Score was carried out[3]. In the second stage, patients with Padua Score ≥ 4 (high risk for VTE) were monitored daily during the hospitalization period, using the electronic medical record, and the clinical outcome was recorded.

An instrument constructed by the authors was used for data collection, which included patient identification data (electronic medical record number); sociodemographic variables (age and sex); clinical variables (diagnosis according to ICD, length of hospitalization, risk factors for VTE, anthropometric data); Padua Score (Table 1) and prophylactic variables used for VTE (length of use and type of prophylaxis used). The anthropometric data for the calculation of BMI were obtained through records of the nutrition service (data measured or estimated at admission, according to the patient's physical condition), the other variables analyzed were obtained from the electronic medical records.

The data obtained were stored in a database managed by a relational database manager system, MySQL[12]. Subsequently they were exported to Microsoft Excel for sorting and grouping. Statistical analysis was performed using the SAS (Analytics software & solutions) University Edition for Windows program.

Continuous variables were reported as measures of central tendency, such as mean and standard deviation, and categorical variables were described through absolute frequencies and percentages. To verify the factors associated with a high risk of VTE, the subjects were divided in two groups: low risk of VTE (control) and high risk of VTE (cases), according to the stratification of the Padua Score. The Shapiro-Wilk test was used to evaluate the normality of the data. For data that assumed a non-normal distribution, the non-parametric Mann-Whitney test was used. The chi-square and Fisher's exact tests were used to compare the groups. Values of $p < .05$ were considered significant.

The study was approved by the Research Ethics Committee of the Foundation for Teaching and Research in Health Sciences (*Fundação de Ensino e Pesquisa em Ciências da Saúde* - FEPECS) under authorization number 1.655.708.

RESULTS

Of the 101 patients included in the study, 56 (55.45%) were older adults, with a predominance of 58 (57.43%) males and 50 (49.5%) being eutrophic. The mean duration of hospitalization was 12.12 (+15.04) days, with the most frequently observed risk factors for VTE being: reduced mobility, with 59 (58.42%) individuals, advanced age, with 54 (53.47%) and rheumatic infections or diseases, with 47 (46.53%) (Table 2). According to the Padua Score, 52 (51.48%) patients were classified as low risk (score <4) and 49 (48.52%), with a score ≥ 4, classified as high risk for the development of venous thromboembolism (Table 2).

Table 2 - Demographic and clinical characteristics and high risk for VTE development among patients hospitalized in the MCU of a public hospital of the Federal District. Brasilia, FD, 2016 (continues)

Demographic and clinical characteristics	Total patients	
	N (101)	%
Age (years) (mean ± SD)	61.95 ± 18.31	-
Age groups		
≤ 59 years	45	44.55
≥ 60 years	56	55.45
Male	58	57.43
BMI (mean ± SD)	23.05 ± 4.79	-
Length of hospitalization (days) (mean ± SD)	12.12 ± 15.04	-

Padua Score		
Low risk (< 4)	52	51.58
High risk (≥ 4)	49	48.42
Risk factors*		
Active Cancer	12	11.88
Previous VTE	4	3.96
Reduced mobility	59	58.42
Known thrombophilia	8	7.92
Recent trauma or surgery	7	6.93
Advanced age	54	53.47
HF or KF	36	35.64
Infections or rheumatic diseases	47	46.53

HF: Heart failure; KF: Kidney failure; SD: standard deviation; BMI: body mass index

Among the comorbidities presented by the patients, hypertension was the most frequent condition, with 48 (47.5%) patients, followed by infections, with 39 (38.6%) and diabetes, with 36 (35.6%).

In the second part of the study (Table 3), the comparison of the groups (cases and controls) showed that high-risk patients (Padua Score ≥ 4) were significantly older (≥ 60 years) (p = .0183). Male sex and BMI did not present statistical differences when associated with high risk of VTE. The high-risk group had more risk factors for VTE (p <.0001). The mean length of hospitalization of the high-risk group was greater than the low-risk group (13.40 ± 15.00 vs. 10.92 ± 14.98), however, this was not statistically significant (p = .3710).

Table 3 - Association between the demographic and clinical characteristics and the high risk for VTE development among the 101 patients hospitalized in the MCU of a public hospital in the Federal District. Brasilia, FD, 2016 (continues)

Variable	**Total patients N = 101**		
	Cases (49) High-risk	**Control (52) Low-risk**	**P-value**
Age			
≤ 59 years	16	29	.0183[a]
≥ 60 years (older adult)	33	23	
Male	28	30	.9555[a]
BMI kg/m^2			
Underweight (< 18.5)	12	7	.4892[b]
Eutrophic (≥ 18.5 - < 24.9)	23	27	
Overweight (≥ 25 - < 29.9)	11	11	
Obese (≥ 30 - < 39.9)	1	4	
Not reported	2	3	

Length of hospitalization (days) (mean ± SD)	13.40 ± 15.00	10.92 ± 14.98	.3710[c]
Risk factors for VTE (mean ± SD)	3.59 ± 0.88	1.51 ± 0.61	<.0001[c]
Medication or mechanical prophylaxis	26	3	<.0001[c]
Clinical outcome			
Discharge	27	42	.0026[b]
Hospitalized	6	2	
ICU	1	1	
Death	15	7	.0350[b]

a = chi-square test, b = Fischer's test, c = Mann Whitney test

It was observed that of the 49 patients in the high-risk group, 26 (53.06%) used prophylaxis, with a statistical difference between the groups (p <.0001). Among the patients studied, the majority that evolved to hospital discharge were from the low-risk group (p = .0026). Death was significant in the high-risk group (p = .0350).

DISCUSSION

Venous thromboembolism is an often silent event, which not only imposes a substantial socioeconomic burden on health systems, but is also responsible for generating debilitating health conditions, such as increased disability, morbidity and mortality and decreased quality of life[13]. According to scientific evidence, one in six cases of VTE could be avoided[14].

The assessment of VTE risk represents an important indicator of the quality of health services[15-16]. The standardization of risk stratification models is one of the main points that stimulate the research scenario, aiming for the adequacy of individual-centered prophylaxis and the optimization between the stratification process and the implementation of preventive measures[14].

In a multicenter study[17], conducted in African countries, 353 (62.3%) patients presented a high risk for developing VTE. An increased frequency of high risk for VTE was also found in a study carried out with 104 patients in a hospital in the southern region of Brazil[16], in which 46 (44.23%) of the patients were at high risk and 4 (3.85%) very high risk for VTE. These studies demonstrate that the high risk for VTE is a fact of the hospital reality 'and, as shown in the present study, it presents a high incidence in clinical patients. A possible explanation for the similarity between the studies is the population profile and comorbidities present, since the authors[16] found age > 40 years, with 75 (72.1%) individuals, and comorbidities, such as congestive heart failure and neoplasms, to be risk factors.

In the present study, greater age was also identified as a statistically significant factor associated with high risk of VTE (p = .0183). This feature is consistent with the current scenario of clinical patients, due to the increase in admissions for chronic degenerative diseases due to population aging(18-19). In a systematic review, rates of VTE were found to increase markedly with age, regardless of gender, with the highest overall age-adjusted incidence rate for men (1.2:1)[5]. The association between obesity and VTE has not yet been fully elucidated.

In an American study[20], the frequency of death in the high-risk group was higher than in the low-risk group, data consistent with the present study in which the death rate in the high-risk group was twice as high. The ACCP indicates pharmacological anticoagulant

thromboprophylaxis and non-pharmacological measures, such as graduated, intermittent compression stockings and pneumatic compression devices, for clinical patients stratified with high risk[3]. In the present study, 26 (53.06%) high-risk patients used drug prophylaxis, a similar percentage to that found in other studies[6,20].

Although multicenter trials of risk classification are being performed, such as the ENDORS Estudy (Epidemiologic International Day for the Evaluation of Patients at Risk for Venous Thromboembolism in the Acute Hospital Care Setting)[21], there is underreporting regarding the incidence of high risk for VTE. This is especially the case in institutions that lack specific care protocols, which increases the possibility of avoidable thromboembolic events, considering that the absence of the prescription of prophylaxis is not the sole responsibility of the physician, but of the entire multidisciplinary team involved[22-23]. It is necessary to seek measures directed toward improving the frequency and quality of use of thromboprophylaxis[24].

Regarding limiting factors, this study evidenced the lack of an institutional protocol for the risk stratification of patients for the development of VTE, which makes it difficult to identify and monitor the implementation of prophylactic measures.

CONCLUSION

The frequency of clinical patients at high risk for VTE according to the Padua Score was high. Risk factors, such as reduced mobility, advanced age and rheumatic infections or diseases, presented a high incidence in the study population. Age, number of risk factors, use of prophylaxis and clinical outcome were statistically associated with a higher risk of developing VTE.

Studies such as this help to identify the main characteristics relayed to the profile of hospitalized individuals at risk for VTE, especially the clinical patient, and corroborate the construction of the knowledge regarding the classification of risk of venous thromboembolism in clinical patients.

It is emphasized that a multidisciplinary approach is needed, seeking tools to optimize risk stratification and VTE prevention.

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Received: 05/12/2017
Finalized: 08/03/2019

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