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Risk score and prevention of thromboembolism in patients admitted to a surgical clinic

Escore de risco para tromboembolismo e prevenção em pacientes hospitalizados em uma clínica cirúrgica

Puntuación de riesgo de tromboembolismo y prevención en pacientes hospitalizados en una clínica quirúrgica

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ABSTRACT

Objective: To identify thromboembolic risk in surgical patients and the use of preventive measures. **Method:** Cross-sectional, retrospective and epidemiological study through interviews and survey in the medical records of surgical patients. The risk for thromboembolism was assessed, according to a validated and adapted scale. The analyses were processed using the Stata statistical software, version 12.1. **Results:** The medical records of 100 patients were analyzed, and they were interviewed. All participants had at least one risk factor for thromboembolism. Of the interviewees, 41% were classified as high risk, 7% received drug thromboprophylaxis and 11% received non-drug prophylaxis. **Conclusion:** Although all participants had at least one risk factor for venous thromboembolism, the implementation of preventive measures was low, thus indicating the need for multiple interventions, such as the implementation of protocols, continuing education, mainly of the nursing staff, use of follow-up tools and results auditing.

Key words: Venous thrombosis; Risk assessment; Disease prevention; Nursing care.

RESUMO

Objetivo: Identificar o risco tromboembolítico em pacientes cirúrgicos e o uso das medidas preventivas. **Método:** Estudo epidemiológico transversal, retrospectivo por meio de entrevistas e abordagem aos prontuários de pacientes cirúrgicos. O risco para tromboembolismo foi avaliado, conforme escala validada e adaptada. As análises foram processadas pelo software estatístico Stata, versão 12.1. **Resultados:** Foram entrevistados e analisados os prontuários de 100 pacientes. Todos os participantes apresentaram pelo menos um fator de risco para tromboembolismo. Dos entrevistados, 41% foram classificados como de alto risco, 7% receberam tromboprofilaxia medicamentosa e 11% recebendo profilaxia não medicamentosa. **Conclusão:** Apesar de todos os participantes apresentarem pelo menos um fator de risco para tromboembolismo venoso, a implementação de medidas preventivas foi baixa indicando a necessidade de múltiplas intervenções, tais como implementação de protocolos, educação permanente, principalmente da equipe de enfermagem, uso de ferramentas de monitoramento e auditoria de resultados.

Descritores: Trombose venosa; Medição de risco; Prevenção de doenças; Cuidados de enfermagem.

RESUMÉN

Objetivo: Identificar el riesgo tromboembólico en pacientes quirúrgicos y el uso de medidas preventivas. **Método:** Estudio epidemiológico, transversal y retrospectivo a través de entrevistas y abordaje de la historia clínica de los pacientes quirúrgicos. Se evaluó el riesgo de tromboembolismo, según una escala validada y adaptada. Los análisis se procesaron utilizando el programa estadístico Stata, versión 12.1. **Resultados:** Se analizó la historia clínica de 100 pacientes, que fueron entrevistados. Todos los participantes tenían al menos un factor de riesgo de tromboembolismo. De los entrevistados, el 41% fueron clasificados como de alto riesgo, el 7% recibieron tromboprofilaxis farmacológica y el 11% recibieron profilaxis no farmacológica. **Conclusión:** Aunque todos los participantes presentaban al menos un factor de riesgo de tromboembolismo venoso, la implementación de medidas preventivas fue escasa, lo que indica la necesidad de múltiples intervenciones, como la implementación de protocolos, la formación continua, especialmente para el equipo de enfermería, el uso de herramientas de monitorización y la auditoría de resultados.

Palabra clave: Trombosis de la vena; Medición de riesgo; Prevención de enfermedades; Atención de enfermería.

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INTRODUCTION

Venous Thromboembolism (VTE) is among the main causes of preventable death in hospitalized patients and is the third leading cause of death of cardiovascular origin, after coronary heart disease and cerebrovascular accident [1]. Even with the technological advances employed in hospital care, the incidence of VTE developed during the hospital stay is high [2]. In Brazil and around the world, this is an important public health problem due to the high costs associated with acute episodes and their long-term complications [3].

A recent literature review revealed that the annual global burden of VTE is increasing. In the United States, approximately 100,000 to 300,000 VTE-related deaths are reported each year. In Europe, that number is about 500,000 deaths yearly by most published reports [4]. In Brazil, there are few studies that highlight the number of VTE cases, and it is estimated that there are about 0.6 cases per thousand inhabitants per year [5]. About 60% of VTE cases are acquired during the hospital stay, which increases the number of incidents related to hospital care [4,6].

Among the most common risks for the development of venous thromboembolism in hospitalized patients, we can cite: advanced age; hormone use; pregnancy; previous thromboembolism; immobilization; cancer; lower limb paralysis; obesity; varicose veins; Chronic Obstructive Pulmonary Disease (COPD);[7] and patients undergoing surgical procedures [7-8]. With regard to surgeries, major procedures (amputation, general, urologic or gynecologic surgery) and orthopedic surgeries stand out, especially in cases of multiple traumas [3]. Nevertheless, even apparently healthy patients without previous clinical or surgical conditions can spontaneously develop VTE when hospitalized [9]. Thromboprophylaxis is the initial strategy to optimize the safety of assisted patients, especially in the surgical context [9].

Accordingly, preventing VTE among hospitalized patients must be one of the priorities of the health team. The use of evidence-based preventive interventions has shown good results in decreasing the incidence of thrombosis caused by hospital confinement when effectively applied. Thus, thromboembolism prevention must be based on the risk for VTE and include drug and non-drug therapeutic measures [10]. Among drug prophylaxis, the most used are anticoagulants and antiplatelet agents, which prevent thrombus formation in the venous network and inhibit the synthesis of blood coagulation factors [5]. Regarding non-pharmacological measures, mechanical methods are the most adopted, such as graduated compression elastic stockings and intermittent pneumatic compression [1]. In addition to these, we can highlight foot pumps, passive and active movement of the lower limbs and early ambulation [11]. Such methods increase the venous flow velocity of the lower limbs, reducing venous stasis. The effectiveness of non-pharmacological measures is greater among patients at low and medium risk for developing VTE, among those unable to use anticoagulants, as well as among patients at very high risk, as reinforcement for pharmacological means [2]. The indication of the prophylactic strategy is not a specific definition for the operative period (pre, intra or postoperative), but is conditioned to the patient's conditions regarding the assessed risk and each type of surgery or disease in progress, and may extend its use to a few weeks postoperatively. Pharmacoprophylaxis still does not have an ideal anticoagulant, but it has different and several clinical trials measuring evidence of efficacy [1], which gives rise to an assertive indication.

In the Brazilian context, studies indicate differences among hospital institutions regarding the existence and/or adherence to VTE prevention protocols. Among the strategies for the effectiveness of prevention, positive, we should emphasize the implementation of permanent education measures for the health team and the prioritization of the issue institutionally [12]. Nevertheless, a significant portion of hospitalized patients at risk for thrombolytic development do not receive prophylaxis during their hospital stay [9,13-14]. A recent study carried out in the medical clinic of a public university hospital in São Paulo showed that all patients had at least one risk factor for VTE, but pharmacological prophylaxis was implemented in only 70.3% of patients classified as high risk without contraindication, while mechanical prophylaxis was performed in only one of the cases with indication [14].

In this context, studies highlight the nursing team in this process, since, despite not prescribing drug prophylaxis, these professionals are responsible for advising patients and families about the risk of VTE, in addition to the management of anticoagulation therapy and, above all, for the assessment of the risk among patients [12]. Thus, knowing the institutional work dynamics in relation to VTE prevention can contribute to improving the performance of all health professionals, especially nursing. In light of the above, this research is intended to identify the thromboembolic risk of hospitalized surgical patients and the use of preventive measures by health professionals. It should be noted that the researched scenario does not have measured VTE indicators, reinforcing the need for studies with this audience.

METHOD

This is a cross-sectional, retrospective and epidemiological study with a descriptive quantitative approach. Interviews were carried out and the medical records of patients were surveyed on the third day of hospitalization, with at least 48 full hours of hospitalization in the surgical clinic of a philanthropic hospital, located in a city in the countryside of Minas Gerais. The studied institution has its resources coming from the Brazilian Unified Health System, being a macro-regional reference of medium and high complexity in Vale do Jequitinhonha-MG.

As a guarantee of a hospital stay longer than 48 hours, conscious patients aged 18 years or over were included in this study, regardless of the surgical time, on the third day of hospitalization. A total of 100% of the patients who met the

aforementioned criteria were invited to participate during the data collection period. Of these, 18% refused to participate, representing an 82% response rate.

The research project was submitted to the Research Ethics Committee and approved under CAAE nº 01022918.3.0000.5108 and opinion nº 3.027.719. According to the ethical principles provided for in Resolution Nº 466/12 of the National Health Council, the patient was guaranteed free choice to participate or not by signing the FICF (Free and Informed Consent Form). After authorization from the hospital's clinical board and approval by the Ethics Committee, data collection started by means of daily visits to the institution for a period of three months, from April to July 2019.

The collection was carried out by students from the Nursing course who were duly trained in a rotation scheme. The collection took place through daily visits to the institution to approach patients and medical records. This entire phase took place under the direct coordination and supervision of the researchers responsible for the project through weekly meetings. During the training of the collection team, the objectives of the research, its collection instruments were presented and the means of filling out these instruments were standardized. During collection, each team member completed his/her logbook, where doubts and/or complications during collection were recorded, discussed in weekly meetings, in order to promote instrument calibraton and collection standardization.

The recruitment of patients participating/subjects of the research took place in the wards, at the bedside, using a screen as a means of providing greater privacy. Data were collected only through interviews and information from medical and nursing prescriptions in the medical record. The interviews were guided by a questionnaire-type instrument, developed by the researchers according to the research objectives and according to the risk scale [15-16]. Patients who met the inclusion criteria mentioned above were interviewed on the third day of hospitalization.

The variable of interest was the risk category for thromboembolism according to the scale adapted from Joseph and Caprini, 2010. This scale is widely used in Brazil and worldwide for screening the risk for VTE. According to the scale score used and from the interview carried out, the patients were classified as: Score 0=Very low risk; Score 1-2=Low risk, Score 3-4= Moderate risk; Score ≥5=High risk for developing VTE. Among the factors that determine the risk for VTE, we can cite: age, clinical conditions, level of mobility and previous pathologies [16]. For patients undergoing surgical procedures, some particularities, such as type of surgery and procedure time, should be taken beyond the aforementioned characteristics. The higher the patient's score, the more indicated the use of thromboprophylaxis.

In addition to this, the other variables were grouped into sociodemographic (gender, age and education) and clinical (date of admission, main and secondary diagnosis, indication and use of pharmacological and non-pharmacological thromboprophylaxis at the time of the interview). Analyses were processed using Stata version 12.1 statistical software. The distribution of the outcome and other variables are displayed using descriptive statistical methods.

RESULTS

Of the 122 patients eligible to participate in the research, the medical records of 100 patients were interviewed and analyzed. Response rate equal to 82%.

The sample consisted mostly of male patients (56%), with an average age of 54 years old, with an age ranging from 18 to 98 years old. The distribution of the interviewed population according to sociodemographic and health data is shown in Table 1.

Table 1 - Distribution of the studied sample according to sociodemographic data, health and lifestyle habits. Diamantina, 2019.

Sociodemographic Variables	N (%)
Gender	
Male	56 (56%)
Female	42 (42%)
Age (years)	
18-30	12 (12%)
31-40	13 (13%)
41-50	16 (16%)
51 and older	21 (21%)
60 and older	38 (38%)
Skin color	
White	19 (19%)
Black/Brown	79 (79%)
Indigenous/Yellow	02 (2%)
Health and life habits	
BMI*	
Low<18.5	6 (6%)
Normal ≥18.5 and ≤25	46(46%)
Overweight ≥25 and <30	37(37%)
Obese ≥30	11(11%)
Health self-assessment	
Good/very good	54 (54%)
Regular	29 (29%)
Bad/very bad	17 (17%)

(continue)

Sociodemographic Variables	N (%)
Smoking	
Non-smoker	40 (40%)
Former smoker	40 (40%)
Smoker	20 (20%)
Habit of drinking alcoholic beverages	
Non-alcoholic	81 (81%)
Alcoholic	19 (19%)

* BMI (body mass index for adults) – (BRASIL, 2014).

Table 2 shows the distribution of interviewees according to the risk for developing VTE and evidence of the use of prophylaxis at the time of the survey. In total, 41% of interviewees were classified as high risk for VTE.

Table 2 - Distribution of the studied sample according to risk classification for VTE and use of prophylaxis. Diamantina, 2019.

	Risk for VTE *				
	High N (%)	Moderate N (%)	Low N (%)	Very low N (%)	Total N
Drug prophylaxis	2 (4.9)	1(3.7)	2 (8.3)	0 (0)	5
Non-drug prophylaxis	7 (17.1)	2 (7.4)	0(0)	0 (0)	9
Conjugated prophylaxis (drugs + non-drug)	1 (2.4)	0 (0)	1(4.2)	0 (0)	2
No prophylaxis	31 (75.6)	24 (88.9)	21 (87.5)	8 (100)	84
Total	41 (100)	27 (100)	24 (100)	8 (100)	100

* Risk for thromboembolism according to an adapted version of the stratification scale designed by Joseph, Caprini (2010).

Of the total number of approached patients, regardless of risk classification, only 16% had evidence in their prescriptions of some pharmacological and/or non-pharmacological measure to prevent thromboembolism. As for the first, pharmacological therapies, they were evidenced in seven patients. Of these, three were using Enoxoparin Sodium 40mg, 0.4ml/dose and four were receiving Heparin 5000 IU/0.25ml/dose. Non-pharmacological measures were identified in 11 of the patients. Of these, eight were instructed to walk, two were encouraged to move the lower limbs and upper limbs and only one underwent motor physical therapy.

All patients interviewed had at least one risk factor for developing VTE, the most prevalent being: reduced mobility (40%), age ≥60 years (38.0%), gastrointestinal surgeries (35%), infected wound/necrosis (20.0%), acute abdomen (12%), obesity (11%), fracture/trauma (8%), herniorrhaphy (8%), active cancer (5%) and others (12%).

DISCUSSION

The study in question identified a relevant proportion (41%) of surgical patients at high risk for VTE, contrasting with a low implementation of prophylactic measures evidenced in the prescriptions (16%). In addition, the data suggest a lack of consistency in the relationship between the identified risk and the prescription of an adequate prophylactic measure. In part, findings of this nature can be related to both implementation failures and lack of knowledge on the part of the team and even the absence of an institutional protocol in relation to the prevention of VTE [9].

The profile of surgical patients surveyed is similar to what was identified in different studies carried out in other hospital institutions [3,9,17]. As for the identified risk factors and their prevalence, they are also common. As in the findings of this research, the prevalence of at least one risk factor for VTE among hospitalized patients is frequent and reported by other studies [9]. Research confirms that the risk stratification for VTE should consider the diversity of associated factors, and it is of fundamental importance to assess the characteristics and morbidities of each patient even in the first moments of hospitalization [11].

As a criterion for risk stratification, the current study used the stratification scale adapted from Joseph, Caprini (2010). From this scale, it was possible to check that more than half of the sample was classified at high or moderate risk for VTE. Despite this, there was evidence of some type of prophylactic treatment for VTE in only 16% of the total sample. This finding is worrisome, since the protocols guide that, when there is a high risk for the development of VTE, prophylactic treatment should be implemented, and this treatment can be drug associated or not with non-pharmacological measures[2].

The underutilization of prophylactic measures for VTE is corroborated by results of other studies, such as one carried out in a teaching hospital in Maceió (AL) in 2007 and in a general hospital in São Paulo (SP) in 2018. Both studies indicate that, despite the wide dissemination of the need to adopt VTE prevention measures, there is still an underutilization of thromboprophylaxis, both drug and non-drug type[9,18]. It is possible that the underutilization of thromboprophylaxis occurs due to doubts by health professionals regarding the risk classification and/or the prophylactic indications for each specific group [3]. Prophylaxis is not properly used and practices vary considerably among different specialties. This finding makes it clear that current practice can be improved by implementing current evidence-based guidelines in hospitals. In addition, continuing education is a strategy for better adherence to prophylaxis [19].

Another explanation for decreased adherence to prophylactic measures may be linked to the low rate of VTE risk assessment in institutions and other barriers, including incorrect identification

of contraindications for pharmacological prophylaxis and poor documentation of mechanical prophylaxis, as pointed out in the study by Suh et al. 2017 [20]. Once again, the implementation of protocols is a strategy with good results to mitigate the problem at stake.

In this context, the entire health team must be included, with emphasis on the nursing team, both in the idealization of protocols and in their implementation, assessment and maintenance. Nursing can contribute whether in risk assessment, guidance and medication administration, development and implementation of prophylaxis protocols as a member of the multidisciplinary team [21]. A study assessed the knowledge of the nursing staff about VTE prophylaxis, the best knowledge domain about thromboprophylaxis was related to higher educational level, more experience and continuing education, intensive care professionals and leading nurses [22]. There is a need to strengthen specific nursing education in this area, which, consequently, will contribute to a targeted and assertive approach to VTE prevention [21].

As in other studies, of the total number of surgical patients interviewed, all had at least one risk factor for thromboembolism. Among the risk factors, reduced mobility was the most prevalent factor. Immobility can increase the risk for the development of VTE during the hospitalization period, it is important to emphasize that this risk is proportional to the patient's bedtime restriction [17].

There is still no consensus among researchers about the levels of mobilization/walking that can contribute to reducing the incidence of VTE events. Nevertheless, studies show that early mobilization contributes to the prevention of functional decline and complications associated with a longer period of hospitalization [17]. VTE prevention guidelines emphasize early mobilization as a major component of prophylaxis and as the only necessary prophylactic measure in patients at low risk for VTE [7]. A systematic review highlighted that immobility is a risk factor for the development of venous thromboembolism; however, it did not find support to point out a reduction in events with the isolated implementation of walking, since pharmacological prophylaxis has greater evidence of prevention [23].

Despite the evidence and clinical significance recognized in practice, mechanical prophylaxis is still a controversial topic, especially considering its isolated use [11]. Recent results from a systematic review and network meta-analysis suggest that combined prophylaxis strategies may not be as effective in reducing deep vein thrombosis in patients undergoing total knee arthroplasty, for example [24]. Despite this, the international guidelines maintain a recommendation for the association of pharmacological and mechanical measures in protocols for VTE prophylaxis, highlighting the use of mechanical prevention, especially for patients who are contraindicated for the use of anticoagulants [11].

Another relevant risk factor for the development of VTE, advanced age, was prevalent among the surveyed individuals. Almost half of the sample consisted of individuals aged 51 years or older. Studies suggest that, with advancing age, human beings undergo physiological and metabolic changes that, associated with a higher prevalence of diseases, can increase the incidence of VTE. The risk of venous thromboembolism tends to increase exponentially with age, from the annual occurrence of approximately 30/100,000 at 40 years to 90/100,000 at 60 years and 260/100,000 at 80 years [25].

In addition to reduced mobility and advanced age, other relevant risk factors, such as gastrointestinal surgeries, infected wound/necrosis, acute abdomen, obesity, fracture/trauma and active cancer have been identified. Recent research indicates that these factors should also be considered for the implementation of thromboprophylaxis, since the patient affected by one or more of these phenomena associated with hospital confinement makes the individual more vulnerable, both for the occurrence of VTE and for the occurrence of other adverse events [5]. With regard to the presence of neoplasm, research indicates that patients with active cancer are more likely to develop symptomatic VTE when compared to other individuals without this condition. They also suggest that, if the patient with cancer undergoes a surgical procedure, this risk of a thrombolytic event may increase even more if compared to a patient without neoplasm [2].

During this research, it was possible to identify inconsistencies between the assessment of risk for VTE among patients and the actions implemented in the investigated hospital. Accordingly, we infer that adherence to VTE prophylaxis guidelines is still not ideal among health professionals responsible for this care. Such evidence is similar to other realities with different temporal perspectives [3,18]. The absence of systematic risk stratification contributes to negligence and misunderstandings of preventive care for VTE, whether these are drug-related or not [9]. When the patient does not undergo a stratification, the implemented treatment is more likely to be inadequate and may cause immediate or future harm to him/her[2]. Barp et al. (2018) observes a lack of institutional protocols and tools to help assess the risk of VTE in Brazil.

The development and effective implementation of VTE prevention protocols are essential for the confluence of the actions of health professionals in daily practice. In relation to nursing care, the importance of well-designed institutional protocols that include in the nurse's routine a careful assessment and a systematic follow-up in the pre, trans and post-surgical period should be highlighted. In addition to providing for the administration of pharmacological measures and supporting the implementation of non-pharmacological prevention measures by nursing, the protocols provide tools for the category to carry out care procedures aimed at the safety of patients under prophylactic therapies. Among these, we highlight daily care such as patient encouragement and guidance, care to avoid bleeding, permanent assessment of the skin, peripheral pulses and coloring of patients' extremities, massage, proper

positioning, among others, are attributions of the health team.

CONCLUSIONS

The current study indicated that, despite all patients hospitalized in the surgical clinic presenting at least one risk factor for venous thromboembolism, the implementation of preventive measures by health professionals was low. Such evidence indicates the need for multiple interventions, from admission and follow-up of patients to continuing education of the health team in relation to risks and prevention of VTE, warning systems and results auditing. Among the latter, the standardization for risk classification and adequate implementation of VTE prevention protocols stands out as a means of guaranteeing safety and equity in care.

In this context, nursing has an important action potential in the process of improvement and systematization of care. Therefore, it is important that nurses anchor their care on scientific evidence, have institutional support and sufficient autonomy to take part in the processes of elaboration and implementation of safe protocols that are adequate to the reality of each health service.

One of the limitations of the study refers to the sample. The current research addressed a non-probabilistic sample, convenience type. Even so, it obtained a satisfactory response rate, corresponding to a relevant percentage of participants among the universe. Thus, even not being large enough from a statistical point of view, the studied sample is representative. In addition, the limit of comparisons among studies should also be considered, considering the use of different risk measurement instruments. It is noteworthy that, despite the use of different methodologies regarding the instruments, the factors considered as risk for VTE in different scales are, in general, the same. Correlation tests were not performed, since they were not part of the study objective and due to the small number of patients who had prophylactic interventions. Lastly, it is noteworthy that, despite the limits, an important advantage of this study refers to the consistency of the results with the scientific literature, suggesting adequate external validity of the information.

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