Drug prophylaxis of deep vein thrombosis in patients submitted to trauma surgery in a university hospital

Profilaxia medicamentosa da trombose venosa profunda em pacientes submetidos à cirurgia do trauma em um hospital universitário

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Abstract

Background: Annually, millions of people are victims of trauma around the world. Besides the social and economic consequences caused by it, many of these patients need surgical treatment, thus generating greater risk to life. Venous thromboembolism, a consequence of deep vein thrombosis, represents a major cause of the morbidity and mortality in postoperative state, and it could be avoided with adequate prophylaxis.
Objective: To evaluate the use of chemoprophylaxis for deep vein thrombosis, in patients undergoing emergency trauma surgery in a teaching hospital.
Methods: A cross-sectional analytic study was conducted with 153 patients admitted to Cajuru University Hospital, in Curitiba, Paraná, in a two-month period. Records of patients who required surgery due to trauma were prospectively analyzed. The study included those classified as high and medium risk for deep vein thrombosis. Then, it was identified whether or not the drug prophylaxis was used. A statistical analysis was descriptively performed.
Results: Of the 153 patients included, 99 (64.7%) were classified as high risk for deep vein thrombosis and 54 (35.3%) as medium risk. Of the total, 144 (94%) did not receive prophylaxis and nine (6%) did. On those who received prophylaxis, only four patients received the adequate.
Conclusions: Prophylaxis of venous thrombosis disease is not performed routinely in patients of medium and high risk of developing deep vein thrombosis, who underwent trauma surgery. And, when performed, it is often inappropriate.

Keywords: prophylaxis; trauma; venous thrombosis.

Resumo

Contexto: Anualmente, milhões de pessoas são vítimas de trauma no mundo. Além de suas consequências sociais e econômicas, muitos dos pacientes necessitam de tratamento cirúrgico, gerando, portanto, maiores riscos à vida. O tromboembolismo venoso, consequência da trombose venosa profunda, é uma importante causa de morbimortalidade em pós-operatórios e pode ser evitado com profilaxia adequada.
Objetivo: Avaliar a utilização da profilaxia medicamentosa para trombose venosa profunda em pacientes submetidos à cirurgia do trauma de emergência, em um hospital-escola.
Métodos: Estudo transversal analítico, com 153 pacientes internados no Hospital Universitário Cajuru, em Curitiba, no Paraná, durante dois meses. Foram analisados prospectivamente prontuários de pacientes que necessitaram de cirurgia devido a trauma. O estudo incluiu pacientes classificados como alto e médio risco para trombose venosa profunda e avaliou-se a realização, ou não, da profilaxia medicamentosa. A análise estatística foi feita de forma descritiva.
Resultados: Dos 153 pacientes incluídos no estudo, 99 (64,7%) foram classificados como alto risco para trombose venosa e 54 (35,3%) como médio, sendo que 144 (94%) não receberam profilaxia medicamentosa. Dos nove (6%) pacientes que receberam profilaxia medicamentosa, um foi estratificado como médio risco e os outros oito de alto risco. Dos pacientes que receberam profilaxia, em apenas quatro a orientação foi adequada.
Conclusões: A profilaxia para trombose venosa não é realizada de maneira rotineira nos pacientes de médio e alto risco para trombose venosa profunda que são submetidos à cirurgia do trauma e, quando realizada, muitas vezes é inadequada.

Palavras-chave: profilaxia; trauma; trombose venosa.

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Introduction

Trauma is one of the leading problems of public health in the world. Nearly 5 million people die each year due to trauma, and other million are somehow affected by it. For each death, dozens of hospitalizations, hundreds of emergency admittances and thousands of medical appointments are estimated[1,2].

In 2004, around 150 thousand deaths due to trauma were identified in Brazil. The public budget involved in these occurrences surpass R$ 9 billion per year, while medical costs in the care of injuries due to violence represent almost 0.4% of the total health costs in Brazil. Loss of productivity as consequence of these injuries represents 12% of this expenditure[3,4].

And these numbers tend to grow in the next decades. According to the World Health Organization (WHO), car accidents, which represented 2.2% of the total death occurrences in 2004, will represent 3.6% in 2030. Other important causes of trauma, such as self-inflicted injuries and violence, also tend to increase in the next years[1].

Besides social and economic consequences of trauma, many patients require surgical treatment, which may aggravate their picture and bring risk to life such as venous thromboembolism, one of the main causes of morbidity in the postoperative period[5,6].

The incidence of deep vein thrombosis (DVT) among trauma patients submitted to surgery varies from 5 to 63% and depends on the type of trauma and on the use of adequate prophylaxis, which is essential in this group of patients. Without prophylaxis, the incidence of DVT after neurological surgery is 22%, in thoracic surgery 26%, and in orthopedic surgery 45-60%[6-8].

The aim of this paper was to assess the use of drug prophylaxis for DVT in patients undergoing emergency trauma surgery.

Methods

We carried out a cross-sectional study with medical records of patients admitted to Hospital Universitário Cajuru (HUC). Statistical analysis was descriptive.

This research project was appropriately approved by the Ethics Committee, protocol number 5256, version 1, and submission 0001201.

Patients included in the study were older than 18 years, admitted to the Public Health System and referred to HUC requiring urgency or emergency surgery that lasted more than 30 minutes due to abdominal, thoracic, vascular and orthopedic trauma, which are considered medium to high risk for DVT.

Patients presenting low risk for DVT were excluded, as well as those who underwent surgical procedures lasting less than 30 minutes, elective and neurological surgeries, and patients under the age of 18.

To assess DVT prophylaxis, we analyzed patient's medical records prospectively during two months.

Data collection was based on risk factors for DVT (age, preexistent diseases and polytrauma), type of surgery performed (orthopedic, abdominal, thoracic or vascular), and duration of the procedure. The use of adequate DVT prophylaxis was also assessed, including the type of drug used in hospitalizations (substance, dosage and duration of treatment).

The patients were stratified for DVT risk according to the guidelines by the Brazilian Society of Angiology and Vascular Surgery (SBACV)[9]. According to these guidelines, surgery patients may be stratified in low, medium and high risk for DVT. However, patients with low risk were excluded from our sample.

Criteria for medium DVT risk were: major surgery in patients between 40 and 60 years old without other risk factors, and surgery in patients less than 40 years old using estrogen. Criteria for high risk were: general surgery in patients older than 60 years old, surgery in patients between 40 and 60 years old with additional risks, major surgery in patients with history of DVT or pulmonary embolism and thrombophilia, as well as major general surgery.

Patients with polytrauma or hip fracture were classified as high risk for DVT. Polytrauma is characterized by concomitant injuries in more than one spot of the body[10]. Patients presenting only lower limb injuries or major trauma on the upper limbs (such as shoulder/arm fracture or exposed fracture of the forearm) were considered high-risk when older than 60 years old, and medium-risk when younger than 60 years old (Chart 1).

As to DVT prophylaxis, subcutaneous unfractionated heparin was considered adequate for medium-risk patients, in the dosage of 5,000 UI every 12 hours, initiated 2 to 4 hours before surgery with general anesthesia, 1 hour after blockage or low-molecular weight heparin (LMWH) in the lowest prophylactic dosage once per day, two hours before the surgical procedure with general anesthesia, or blockage 12 hours before surgery. High-risk patients should be given unfractionated heparin 5,000 UI every 8 hours, initiating two hours before surgery with general anesthesia, or blockage one hour before it, or LMWH in the highest dosage once per day, initiating 12 hours before surgery[9] (Table 1).

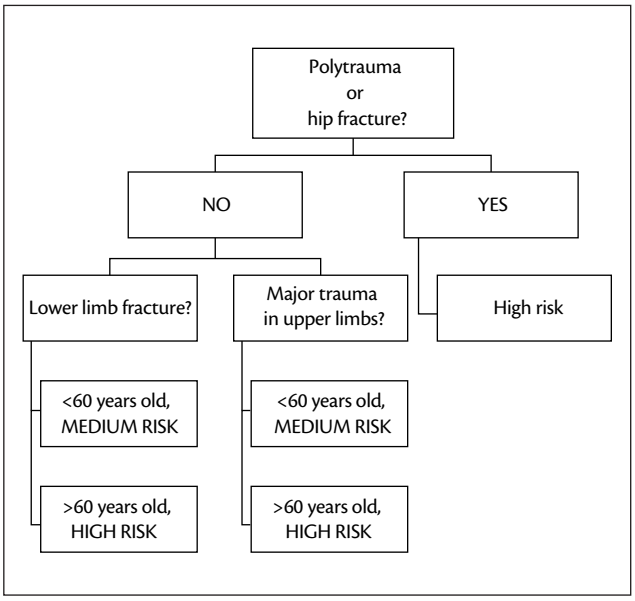


Chart 1. Deep vein thrombosis risk stratification.

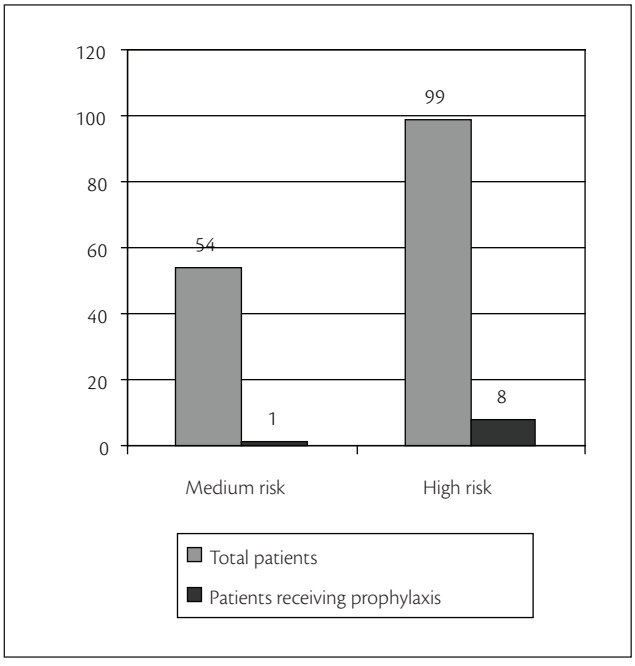
Table 1. Guidelines for deep vein thrombosis prophylaxis in surgical patients by the Brazilian Society of Angiology and Vascular Surgery.

Deep vein thrombosis prophylaxis	
Low risk	Unfractionated heparin 5,000 UI every 12 hours.
Medium risk	LMWH in the lowest dosage once per day.
High risk	Unfractionated heparin 5,000 UI every 8 hours.
	LMWH in the highest dosage once per day.

LMWH: low-molecular-weight heparin.

Table 2. Surgical procedures.

Type of surgery	Frequency	%
Orthopedic	116	69.46
Abdominal	32	19.16
Thoracic	15	8.98
Vascular	04	2.4
Total	167	100



Graph 1. Number of patients who received prophylaxis according to deep vein thrombosis risk.

Results

The records of 179 patients admitted to the HUC were analyzed in a two-month period. Twenty-six of these were excluded of the study because they had been submitted to neurosurgery or were classified as low-risk for DVT: seven patients had undergone surgery for spine fracture; three had surgery for closed forearm fractured; three had surgery for hand fracture; three had ocular penetrating trauma; two had been submitted to tenorrhaphy; two had liquor fistula repair; one had subdural hematoma drainage; two thoracic drainage; one wound debridement and bandaging; one urologic surgery, and one dog bite repair.

Among the 153 patients included in the study, 29 (19%) were females and 124 (81%) were males. Mean age was 39 years old (ranging from 18 to 96). Eighty-two patients (53.6%) were polytraumatized.

The length of time of surgeries varied from 30 to 540 minutes (mean: 146 minutes). Surgical procedures performed were divided into four groups, according to type of trauma and considering that some patients underwent surgery in more than one specialty (Table 2).

In total, 116 surgeries were orthopedic, 32 abdominal, 15 thoracic and 4 vascular. The most common orthopedic surgery was femoral fracture fixation (27.83%), followed by ankle fracture (15.65%), and leg fracture fixation (10.43%). Only five hip surgeries were performed (4.35%).

As for stratification of DVT risk, 54 (35.3%) patients were classified as medium-risk and 99 (64.7%) high-risk. Only 9 patients (6%) were given drug prophylaxis, and four of them (44%) received the treatment in compliance with SBACV guidelines (Graph 1).

Among the nine patients who received drug prophylaxis, six (66.7%) were older than 60 years, and all of them were given LMWH in the highest prophylactic dosage.

Discussion

It is known that victims of trauma are prone to thromboembolic events (PE and DVT) and their consequences[11]. In 1934, McCartney suggested the association between trauma and death due to PE, especially in patients who suffered lower limb fractures[11]. This information was confirmed years later by many necropsy studies[11-13]. In 1961, in series of necropsies performed in victims of multiple traumas, the incidence of PE was 16.6% and, later on, prophylaxis for this group of patients was suggested[12].

Trauma is the leading cause of death among individuals younger than 40 and, therefore, constitutes a public health problem[13]. The incidence of thromboembolic events in these patients surpasses 50%[13-15].

PE is the most common thromboembolic complication in the postoperative period, and often asymptomatic. However, it is known that at least 40% of patients with DVT present any significant radiologic sign to suggest PE, which explains the high morbimortality rates related to it. Besides clinical consequences, this type of complication may result in legal issues, for PE is considered the leading cause of avoidable death among patients undergoing surgery[16].

Gillies et al. analyzed 57 death occurrences due to PE in surgical patients in a one-year period in Scotland. Among all necropsies performed, 36 were shown to be part of the group of patients with high risk of DVT, and only two were low-risk. Twenty-five patients (44%) had received DVT prophylaxis, and none of them had contraindications for mechanical and drug prophylaxis. The patients who received less prophylaxis were medium-risk and those admitted to the emergency room[17].

Prophylaxis reduces DVT incidence, as well as the time of treatment and costs, but it is not prescribed in many hospitals[11,18]. Franco et al. carried out a cross-sectional study in seven specialties and found that prophylaxis were not performed in 74% of the cases, and in 2.4% is was not adequate[14].

Engelhorn et al. evaluated the use of prophylaxis in a University Hospital. They assessed 228 patients in various specialties and showed that 87.28% were not given a prophylactic treatment. Only 18.52% of medium-risk patients and 20.9% of high-risk patients received prophylaxis[19]. Garcia et al. performed a similar study and identified 80.34% of surgical patients in need of prophylaxis, but stated that only 17.02% received it[20].

Our study found similar data. The analysis of 153 medical records of patients who underwent surgery due to trauma showed that 94% of them were not given drug prophylaxis. Although 100% of the patients had indication for prophylaxis, bring classified as medium and high risk for DVT, only 6% of them received it. Besides that, prescription was inadequate in most cases. Only 2.61% of the medical records were in accordance with SBACV guidelines for prophylaxis.

Geerts et al. found a high prevalence of thrombotic events in patients admitted to a trauma unity in Canada. A cohort study was performed with 716 patients who did not receive DVT prophylaxis. Among 88 patients presenting tibia fracture, 66 (77%) had thrombotic events. Among 74 patients with femoral fracture, 50 (80%) presented thrombi. The authors concluded that venous thrombosis is a common complication in patients who suffer major trauma, and an adequate prophylaxis is highly recommended[13]. In our study, we found that few patients were given prophylaxis, which makes them more prone to thromboembolic events.

The prolonged time of surgery is also a risk factor for the development of DVT. In our analysis, mean surgery length of time was 146.38 minutes. According to Barros-Sena and Genestra, 25% of patients submitted to major surgeries, lasting over 60 minutes, develop DVT[21].

One possible reason for not performing an adequate prophylaxis is the risk of major bleeding during surgical procedures due to the use of anticoagulant agents[22]. However, in a systematic review of literature addressing the complications of DVT prophylaxis in cases of trauma showed a 2 to 4% risk of major bleeding with the use of LMWH in proper dosage[8].

In this same study, DVT prophylaxis with LMWH is considered to be level of evidence A in trauma patients[8]. Geerts et al. compared the safety and efficacy of unfractionated heparin in lower dosage and LMWH for trauma patients, and showed that the risk of bleeding for both drugs was low (1 to 3%). They concluded, therefore, that prophylaxis must be given to victims of major trauma, and indicated LMWH as the drug of choice[23].

Besides surgeons' insecurity, the high cost is a reason for not using DVT prophylaxis. However, the cost-benefit relation is proven positive, for social and financial consequences of thromboembolic events are more significant[24]. Difficulties in risk stratification may also explain that[19,24].

There is also a mechanic method of prophylaxis that consists of intermittent pneumatic compression or the use of elastic stockings. It is indicated as DVT prophylaxis and their use may be isolated in low-risk patients. Medium and high-risk patients, on the other hand,

should be given drug prophylaxis in conjunction with the stockings[9]. Mechanical prevention may be an anternative for patients with risk of bleeding[25].

Based on the sample analyzed, the authors conclude that DVT prophylaxis in medium and high-risk patients undergoing trauma surgery was underused, and often inadequate.

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