

EFFECT OF THE IMPLEMENTATION OF A GUIDELINE FOR VENOUS THROMBOEMBOLISM PROPHYLAXIS IN SURGICAL PATIENTS

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ABSTRACT

INTRODUCTION. Effective strategies for prophylaxis of venous thromboembolism (VTE) are widely available, but remain underused, especially in Brazil.

OBJECTIVE. The objective of this study was to assess the effect of implementing a guideline for VTE prophylaxis for surgical patients on the behavior of the health care staff regarding prophylaxis for patients submitted to orthopedic or abdominal surgery.

METHODS. This was a retrospective pre-intervention/post-intervention study. The charts of 150 patients before (BGI) and 150 ones after guideline implementation (AGI) were selected at random from all patients over the age of 40 admitted for major abdominal or orthopedic surgery. Data registered: demographic data, reference to VTE risk factors in chart, VTE prophylaxis prescription, VTE diagnosis during hospitalization.

RESULTS. There was no difference between BGI and AGI in terms of demographic data and duration of prophylaxis (5.6 x 6.6 days). Frequency of BGI versus AGI prophylaxis before surgery was: pharmacological prophylaxis (PP), 6% versus 9%; graduated compression stockings (GCS), 4% versus 3%; intermittent pneumatic compression (IPC), 2% versus 3%. After surgery: PP, 53% versus 53%; GCS, 23% versus 40% ($p < 0.05$); IPC, 26% versus 32%. Including all patients, prophylaxis was prescribed for 60.5% of patients BGI and 66.5% AGI, but it was considered adequate for 34% of patients BGI and 32% AGI.

CONCLUSION. Adoption of the guideline, despite the greater concern with prophylaxis, as expressed by higher rates of prescription of GCS, provided only minimal quality improvements, indicating that other active and continuous interventions are needed to increase compliance.

KEYWORDS: Venous thrombosis. Pulmonary embolism. Prevention & control.

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INTRODUCTION

Venous thromboembolism (VTE), which includes venous thrombosis and pulmonary embolism, is a common illness, and has high rates of morbidity and mortality.^{1,2} In Brazil, estimates put the number of hospitalizations caused by VTE in the Brazilian Public Unified Health System (Sistema Único de Saúde, SUS) at 28,000 patients per year, 4,247 of which lead to deaths.³ Autopsy data show incidence similar to that seen in international literature, ranging from 4 to 19 percent, and being the cause of death from 3.7 to 5 percent of cases.⁴⁻⁸ Deep vein thrombosis (DVT) of the lower limbs, the primary source of pulmonary emboli, is found at rates of 0.2 to 0.7 cases per 1000 inhabitants per year in the general population;⁹ estimates put its incidence at 0.6 cases per 1000 inhabitants per year in Brazil.¹⁰

A later, non-deadly complication from DVT, though still a cause of major socioeconomic problems, is chronic venous insufficiency (CVI), in this case also known as post-thrombotic syndrome (PTS), which affects 20 to 50 percent of DVT patients treated with anticoagulants.¹¹⁻¹⁴

DVT is a complication of other clinical or surgical affections in circa 70 percent of cases.¹⁰ Using objective diagnostic methods, such as phlebography and I-125 fibrinogen, DVT incidence among patients submitted to general surgery has been estimated at 15 to 40 percent, while for major orthopedic surgery it ranges from 40 to 60 percent, including in Brazil.^{15, 16, 17.}

Genetic and circumstantial factors are known to increase the risk for VTE, and that hospitalized patients have one or more of these factors. It is also known that the factors have cumulative effects.^{18,19,20} Based on VTE frequency and the number of factors present in each group of patients, various

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risk classifications have been put forward. On the other side of this equation, thromboprophylaxis for hospitalized, surgical, orthopedic or clinical patients is now based on solid principles and scientific evidence, thus justifying their recommendation for risk patients.^{21,22}

Various protocols seeking to classify patients according to VTE risk, doctors' warnings, and prophylaxis guidelines have been put forward, both to collect data and to standardize hospital behavior.²²⁻²⁷

In 2004, a Multidisciplinary and Multiprofessional Commission was established at Hospital Sírio-Libanês (HSL), São Paulo, to develop a standard guideline for acute deep vein thrombosis and pulmonary thromboembolism prophylaxis in adult patients hospitalized for surgical or clinical care, based on controlled clinical assays, reviews, and the latest consensus of Brazilian and international literature. To that purpose, the literature from the databases MEDLINE, LILACS, the Brazilian Cochrane Center, and Brazilian and international government institutions was reviewed, using standardized search strategies to select articles relevant for the protocol. The guideline was improved during 3 open meetings, with participation of all interested clinical parties. The final draft of the Guideline included: integrated algorithm, table of prophylaxis recommendations, protocol for identifying patients at risk for VTE, to be filled out by hospitalization nurses, and a warning to be attached to patient charts. The guideline was widely publicized by invitations to consensus meetings, by being provided in full to the entire clinical staff and in print, by mail, to the physicians responsible for 80 percent of all hospitalizations at HSL for the previous 12 months. All chiefs of the backup medical teams received, along with a hard copy of the guidelines, an institutional letter introducing it to them. There were also posters on elevators and an item published on *Jornal do Médico*, a publication of Hospital Sírio-Libanês. On the units in which the Guideline was implemented, after a nurse assessed the VTE risk using the guideline algorithm, he or she would immediately present it to the primary care physician. The guideline was initially implemented starting on 2005, in two admission units for surgical patients, with the purpose of verifying its feasibility and practicality.

The objective of this study was to assess the effect of implementing that guideline for VTE prophylaxis on the behavior of the health care staff regarding prophylaxis for patients submitted to orthopedic or digestive tract surgery at HSL.

Our hypothesis was that, after implementation, there would be greater concern with the presence of risk factors for VTE on the part of the medical and nursing staff, consequently increasing rates of prescription of prophylactic measures, in accordance with the standard proposed.

METHODS

This was a retrospective pre-intervention/post-intervention study, using chart reviews of two samples of hospitalized patients, one from before guideline implementation (BGI), the other from after guideline implementation (AGI). Casuistic included patients over the age of 40, from both genders, hospitalized for digestive tract or orthopedic surgery during

2004 (BGI) and 2005 (AGI) in two HSL admission units, classified in the surgery ward's database as medium or major surgery. Patients were included if they fit the criteria described above, including those who died while hospitalized. We excluded patients whose charts were unavailable or unreadable, had missing sheets or missing medical or nursing notes from the hospital routine. Patients who had been transferred to other admission units during their stay were also excluded, as well as those who did not remain at the study units during the pre- and postoperative periods, except for immediate postoperative periods at the Intensive Care Unit. We also excluded patients who were using anticoagulants upon admission, whatever the indication for the drugs.

From a listing in the hospital's Medical and Statistical Archive Service, which included the name and records of patients meeting our criteria, 150 BGI and 150 AGI patients were drawn at random. Study criteria defined that half of the patients would have been submitted to orthopedic surgery, while the other half would have been submitted to abdominal surgery. The charts of every patient were reviewed to collect the following information: identification data, demographics, diagnosis, type of surgery, type of anesthesia, duration of surgery, length of stay, VTE risk classification (moderate or high risk), observations regarding VTE risk, presence of risk factors (according to guideline), use of any kind of pharmacological (non-fractionated heparin, low-molecular-weight heparin or coumarin) or mechanical (graduated elastic compression stockings or intermittent pneumatic compression) prophylaxis prescribed by physicians or adopted by nursing or physical therapy; signs and symptoms of VTE (for DVT: pain, cyanosis, edema on one or both limbs; for pulmonary embolism (PE), sudden dyspnea or idiopathic cardiocirculatory failure), clinical diagnosis of VTE by physician, confirmation of VTE diagnosis (ultrasound or phlebography for DVT, pulmonary radionuclide scanning or computed tomography for PE), treatment for VTE, death (date, cause, performance of autopsy). This information was then written down in a special form.

The study used descriptive statistics of the categorical variables, computing percentages over total number of patients in study and continuous variables, average followed by standard deviation or median plus extreme boundaries. The chi-square test was used to make comparisons between groups.

This study was approved by the Research Ethics Committee of HSL on August 02, 2006, under number HSL2006/01.

RESULTS

There was no difference between BGI (2004) and AGI (2005) groups in terms of demographic data. Patient characteristics and length of stay are found in Table 1.

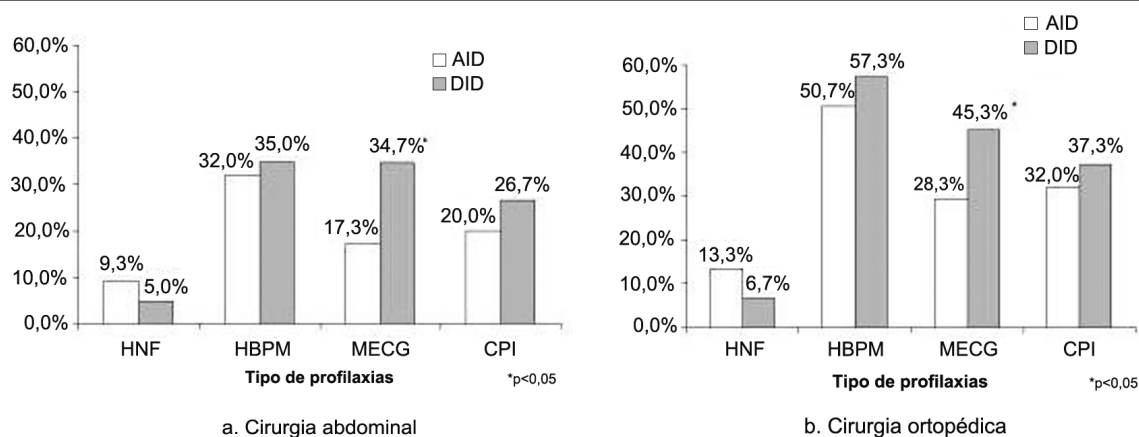
All orthopedic patients were classified as high risk in this study, following HSL guidelines, since they were submitted to hip, knee or femur surgery. Of those submitted to abdominal surgery, 82 percent of BGI patients and 86 percent of AGI ones were considered high risk, since they were over 40 and had cancer or other additional factors, such as previous history of VTE. The others were rated as being of moderate risk (patients from 40 to 60 without additional factors and

Table 1. Patient characteristics

	BGI			AGI		
	Abdominal Surgery n=75	Orthopedic Surgery n=75	Total n=150	Abdominal Surgery n=75	Orthopedic Surgery n=75	Total n=150
Female	31(41.3%)	41(54.7%)	72(48%)	34(45.3%)	43(57.3%)	77(51.3%)
Male	44(58.7%)	34(45.3%)	78(52%)	41(54.7%)	32(42.7%)	73(48.7%)
Age (years)	62.8	67.6	65.2	62.1	67.8	64.9
Length of stay (days)	12.3	7.3	9.8	9.2	10.6	9.9
General Anesthesia	75	74	149	75	75	150
Moderate Risk	13(17.3%)	0	13(8.7%)	10(13.3%)	0	10(6.7%)
High Risk	62(82.7%)	75(100%)	137(91.3%)	65(86.7%)	75(100%)	140(93.3%)
DVT	0	0	0	1(1.3%)	2(2.6%)	3(2%)
PE	0	0	0	0	2(2.6%)	2(1.3%)

Caption: BGI = Before guideline implementation. AGI = After guideline implementation. DVT = Deep vein thrombosis. PE = pulmonary embolism.

Figure 1 - Venous thromboembolism prophylaxis prescribed by physician after abdominal (a) or orthopedic (b) surgery, before and after guideline implementation.



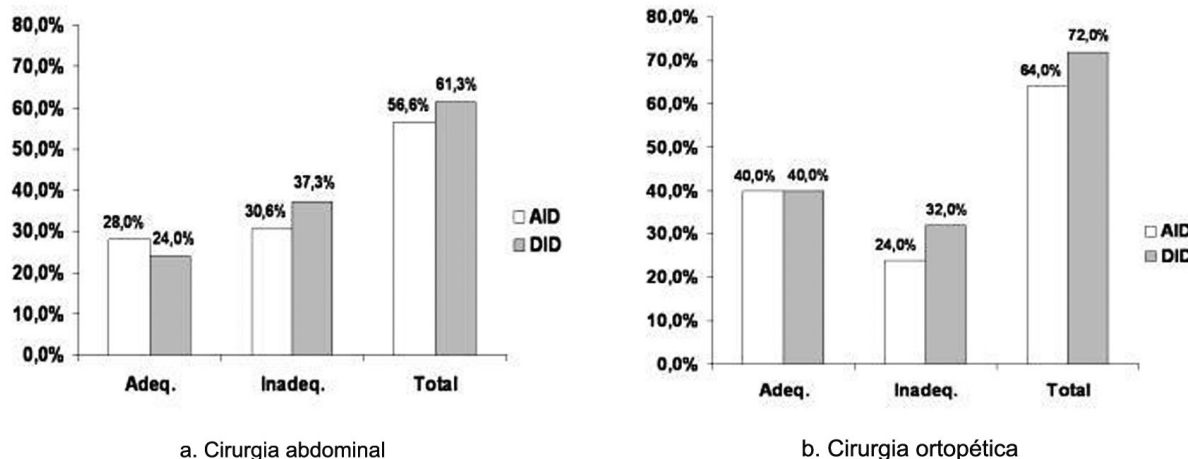
Venous thromboembolism prophylaxis prescribed by physician after abdominal (a) or orthopedic (b) surgery, before and after guideline implementation.

submitted to major surgery). Of the 150 AGI patients, 96 had the risk factors protocol filled out by the nursing staff. The attending physician noted risk classification on the chart for only one BGI patient and two AGI ones, while the presence of additional risk factors was noted for 39 BGI patients (26%) and 43 AGI ones (29%). There were 29 BGI ultrasound exams for DVT, all normal, and 27 AGI, three of which were positive for DVT. These were routine examinations, recommended by some of the orthopedists upon the patients' releases, but without clinical suspicion of DVT.

Every type of prophylaxis was prescribed by physicians before surgery BGI for 8% of patients, to wit, pharmacological prophylaxis (PP), 6%; graduated compression stockings

(GCS), 4%; and intermittent pneumatic compression (IPC), 2%. AGI, frequency of pre-surgery prescription of prophylaxis was 9%, to wit, PP, 8%; GCS, 3%; and IPC, 3%. After the surgery, BGI, prophylaxis was prescribed for 61% of patients, to wit, o PP, 53%; GCS, 23%, and IPC, 26%; AGI, it was prescribed for 67% of patients, to wit, PP, 53%; GCS, 40% (BGI x AGI < 0.05); and IPC, 32%. Frequencies of prescription of prophylaxis by physicians after each type of surgery, after the operation, are represented in Figure 1. As the numbers show, many patients received both pharmacological and mechanical methods, especially GCS, a choice listed as optional in HSL Guidelines.

Adequacy of venous thromboembolism prophylaxis after abdominal (a) or orthopedic (b) surgery, before and after guideline implementation



Caption: - BGI = Before guideline implementation. AGI = After guideline implementation. NFH = non-fractionated heparin; LMWH = low-molecular-weight heparin; GECS = graduated elastic compression stockings; IPC = intermittent pneumatic compression

Time of usage of prophylaxis was lower than length of stay in most cases. Considering time and type of prophylaxis used, prophylaxis complied to the guideline after abdominal surgery 28 percent BGI and 24 percent AGI. For orthopedic surgery, compliance reached 40 percent before and after guideline implementation (Figure 2). Including all patients, prophylaxis was prescribed for 60.5% of patients BGI and 66.5% AGI, but it was considered adequate for 34% of patients BGI and 32% AGI.

No diagnosis of deep vein thrombosis was made before guideline implementation, but two diagnoses of pulmonary embolism were. There were three diagnoses of DVT after implementation, two after orthopedic surgery and one after abdominal surgery, as well as one of pulmonary embolism after orthopedic surgery. There was one death, caused by pulmonary infection.

DISCUSSION

Though observational, this study assessed the real-life effectiveness of a guideline for use of VTE prophylaxis, implemented in two admission units at a private hospital where patients were under charge of various independent physicians.

In all study patients, prescription of prophylaxis for VTE before surgery was very low, both for patients submitted to abdominal surgery and to those submitted to orthopedic surgery. The low usage was apparently not simply connected to the fear of hemorrhage during surgery, sometimes caused by use of anticoagulants, a justification for its use only in the postoperative period or for the use of warfarin, which has retarded effect,²² since it was also connected to mechanical methods. At HSL, where most patients have private health insurance or come from private clinics, this fact may be

connected to the short length of stay before surgery, and the lack of reasonable time for its use. Considering the frequency of use of post-operative prophylaxis, it was used at higher rates at HSL than at most Brazilian hospitals in previous studies.^{23,24,27-30} Graduated elastic compression stockings and intermittent pneumatic compression devices were used at higher rates at HSL than at other Brazilian institutions,²⁷⁻³¹ possibly due to the higher socioeconomic status of patients. As for frequency of use of adequate prophylaxis, considering the protocols used as reference, our data are similar to those from other centers where studies of this type were performed, both in Brazil and abroad, reaching 62.5 percent of patients treated with prophylaxis (40 percent of total patients) for orthopedic surgery and 48 percent of patients (28 percent of total) for abdominal surgery.^{24,32-34} We should also emphasize the higher rates of use of prophylaxis by the orthopedic surgeons than by gastrointestinal ones.

Though there was great concern with venous thromboembolism in our study, both by the medical and nursing staff, there was no increase in use of prophylaxis following the guidelines developed by the hospital committee, based on available clinical evidence. The evidence indicates higher rates of use of pharmacological methods, with mechanical methods reserved for cases of greater hemorrhagic risk or for use in combination with pharmacological methods.²² We should note that the isolated increase in use of compression stockings was also seen in studies following the implementation of protocols to improve thromboprophylaxis performed elsewhere.^{25,35} Even taking in consideration the degree of anti-thrombotic protection provided by graduated elastic compression stockings,^{36,37} the results of implementing the protocol still leave much to be desired, since this method was often used for too short a period when compared to patients' total length of stay.

The absence of more effective results from implementing the DVT protocol at the two HSL Admission Units may be connected to the lack of continuous advertisement of prophylaxis guidelines, though at first HSL's Clinical Staff was firmly mobilized, and a communications campaign publicized the guidelines. Continuously spreading the guidelines was mentioned as an important factor in other successful studies, both in cases which used an electronic warning of risk of thrombosis,²⁵ and in studies which used methods similar to those implemented at HSL to provide increased thromboprophylaxis.^{38,39} On the other hand, in a hospital with the characteristics of HSL, there seems to be a certain degree of resistance on the part of physicians to what they perceive as meddling with their personal clinical management of patients; therefore, the process should be more concerned with increasing awareness of the need of prophylaxis than recommending behaviors to be followed after risk classifications assessed by other members of the health care staff. A system of auditing cases by the team in charge of implementing the guidelines, as well as feedback for the physicians, could also improve the results from implementing them.²²

The practical implications of our study are that an analysis of our result may aid the implementation of other protocols with the purpose of changing physician behavior and the behavior of other members of the health care staff. It also points at the need for guideline implementation to include a continuous process of assessment of outcomes and detection of flaws, discussing results with the clinical staff, and requiring long term intervention until all goals are met.

The research implications of this study are that we need further prospective clinical trials, as well as assays assessing each group of health workers involved in the process, as well as its impact on global design.

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