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REFLECTION

From theory to practice: adherence to clinical practice guidelines for thromboprophylaxis in surgical patients in Colombia

Del papel a la práctica: adherencia a las guías de práctica clínica de tromboprofilaxis en pacientes quirúrgicos en Colombia

Natalia Quintana-Montejo[1] Neil Valentín Vega-Peña[1] Luis Carlos Domínguez-Torres[1]

[1] Universidad de la Sabana - Faculty of Medicine - Department of Surgery - Chía - Colombia.

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Corresponding author: Neil Valentín Vega-Peña. Departamento de Cirugía, Facultad de Medicina, Universidad de la Sabana. Chía. Colombia.
Email: neil.valentin@unisabana.edu.co.

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Abstract

The development of venous thromboembolism (VTE) in surgical patients is a serious public health problem since it increases morbidity and mortality rates, as well as the costs associated with in-hospital care for this population. Notwithstanding the above, and although their effectiveness has been demonstrated, prophylactic measures are not properly used in these patients in Colombia. A possible cause of this situation is the poor adherence of health professionals to clinical practice guidelines (CPG) addressing the prevention of VTE. In this regard, several methodological approaches to achieve an adequate implementation of thromboprophylaxis by transforming physicians' behaviors have been described. However, to accomplish this, it is necessary to comprehensively consider the multifactorial barriers and sociological conditions that underlie this problem.

Better adherence to VTE prophylaxis CPGs is known to lead to better clinical practice. Therefore, the aim of this paper is to carry out a reflective analysis of the causes and possible solutions to the low adherence of Colombian health professionals to these guidelines.

Resumen

El desarrollo del tromboembolismo venoso (TEV) en pacientes quirúrgicos representa un serio problema de salud pública, pues aumenta las tasas de morbimortalidad y los costos asociados con la atención intrahospitalaria de esta población. No obstante lo anterior, y a pesar de que su efectividad ha sido demostrada, en Colombia las medidas profilácticas no son utilizadas de forma adecuada en estos pacientes. Una posible causa de esta situación es la pobre adherencia de los profesionales de la salud a las guías de práctica clínica (GPC) para la prevención del TEV. En este sentido, se han descrito varias aproximaciones metodológicas para lograr una adecuada implementación de la tromboprofilaxis al transformar los comportamientos de los médicos. Sin embargo, para lograr este propósito es necesario considerar de forma integral las barreras multifactoriales y las condiciones sociológicas que subyacen a este problema.

Se sabe que una mejor adherencia a las GPC de profilaxis del TEV conduce a una mejor práctica clínica. Por lo tanto, el objetivo de este artículo fue realizar un análisis reflexivo de las causas y posibles soluciones de la baja adherencia de los profesionales de la salud en Colombia a dichas guías.

Introduction

Venous thromboembolism (VTE) is a common complication in surgical patients. It is the leading cause of preventable in-hospital death and the main cause of prolonged hospital stay, thus generating a significant burden on health services.[1,2] VTE has two main clinical presentations: deep vein thrombosis and pulmonary thromboembolism; the latter is the sequel to the former and causes up to 10% of deaths in hospitalized patients.[1]

The World Health Organization, through the World Alliance for Patient Safety, defined postoperative VTE as an incident that arises from surgical and anesthetic care, has a substantial impact on safe medical care, and thus results in increased costs of care.[3,4] It has been established that the medical costs associated with this complication in the United States amount to 7-10 billion dollars per year.[5] Guanella *et al.*,[6] in a prospective multicenter cohort study evaluating costs and cost drivers of deep vein thrombosis over a 2-year period in 355 patients enrolled in 7 Canadian hospitals, established that the average cost per patient related to this complication was 5 180 Canadian dollars, of which more than 50% were non-medical resource costs, such as productivity loss. Therefore, despite being a preventable condition, VTE is considered a public health problem.[1,3]

VTE prophylaxis is established on the basis of pharmacological and non-pharmacological measures and generally includes strategies such as the promotion of early ambulation and the use of intermittent pneumatic compression devices and anticoagulant drugs. Its effectiveness has been proven and validated in different studies and clinical practice contexts.[2,7] Furthermore, it has been established that failure to adopt these measures increases the risk of VTE by 10-50%, thus proper prophylaxis can prevent a large number of cases.[8-10]

Clinical practice guidelines (CPG) are documents designed in a methodical and consensual manner after a literature search, evaluation, and review process. They are intended to help the physician make decisions in different scenarios based on the best available evidence.[11,12] There are multiple CPGs for the prevention of VTE in surgical patients; however, poor adherence to these by medical professionals is one of the most important factors for the occurrence of this complication.[2]

With this in mind, the aim of this paper was to conduct a reflective analysis of the causes and possible solutions to the low adherence of health professionals in Colombia to VTE prophylaxis CPGs.

CPG for VTE prophylaxis

A number of CPGs for the prevention of VTE have been developed by different scientific societies and academic groups such as the American College of Chest Physicians (ACCP)[13] and the International Union of Angiology Consensus Statement (IUAS),[14] which, in line with the studies by Arcelus *et al.*,[15] Caprini *et al.*[16] and Caprini & Arcelus,[17] place emphasis on the prevention of this complication in surgical patients and make recommendations on clinical practice. Similarly, several studies, using the Rogers score, the IMPROVE (International Medical Prevention Registry on Venous Thromboembolism) score, and the guidelines of the American Society of Hematology[18] and the National Institute for Health and Care Excellence,[19] have demonstrated the usefulness of these guidelines in the prevention of VTE.[2,20,21]

The ACCP has been a major contributor to VTE prophylaxis with its publication in 1986 of a CPG that has been constantly renewed and was last updated in 2016.[13] This document includes a scoring system covering different types of surgical patients (e.g., general surgery, orthopedics, and oncology) by means of individualized risk models. International multicenter studies conducted with general surgery patients, such as the ENDORSE study (Epidemiologic International Day for the Evaluation of Patients at Risk for Venous Thromboembolism in the Acute Hospital Care Setting)[1] and the DIONYS registry[21] (a multinational, longitudinal, non-interventional registry including surgical oncology patients in Latin America, Africa, and the Middle East) are based on those guidelines and consider them as a quality standard.

In 1991, Caprini, together with his team, designed a model for VTE risk assessment and stratification in hospitalized patients[15,17] that has been validated in more than 5 million patients and has more than 200 studies worldwide.[20,22] One of the major achievements of this model is to classify patients according to their probability of developing thromboembolic events in order to recommend a specific type of prophylaxis. The Caprini model incorporates parameters such as the performance of minor and/or major surgery, the use of prolonged laparoscopy (>45 minutes), and the presence of a central venous catheter, making it an effective thromboembolic risk assessment tool for patients undergoing surgery.[8] Likewise, it is a useful tool in the perioperative period due to its dynamic and evolving nature.[20]

In turn, the IUAS CPG[14] is an international consensus developed to prevent VTE with the support of multiple institutions such as the Cardiovascular Disease Educational and Research Trust, the European Venous Forum, the North American Thrombosis Forum, the International Union of Angiology, and the Union Internationale du Phlebologie. There are 5 revisions and updates of this document, the most recent being the 2013 revision, which includes strategies for most surgical specialties including bariatric, burn, oncologic, trauma, urologic, orthopedic, and gynecologic patients. Furthermore, after stratifying patients based on risk, this consensus proposes a prophylactic intervention using a cost-effective approach according to quality-adjusted life years with an incremental cost per year of less than 50 000 GBP.[14]

Thromboprophylaxis: is it really used?

The clinical impact and prevention of VTE are topics of interest for the different health care actors, and for over 25 years several documents have been prepared reaffirming the need to implement institutional policies for the prevention of this condition.[1]

The ENDORSE study,[1] a multicenter study published in 2008, showed that there is a variability of 3% to 70% in the adherence rate of medical professionals to VTE prophylaxis measures in the participating countries. Similarly, that study described a higher risk (up to 64.4%) and better adherence to protocols (based on ACCP guidelines) in surgical patients.[1] However, in the analysis of the data obtained for Colombia, Dennis *et al.*[23] found that the figures for VTE prophylaxis in the country are below average (43% locally vs. 59% globally), thus ranking 23rd among the 32 countries with the least adherence to the available guidelines, which makes explicit the need to improve the clinical care of patients.

Other studies on VTE and thromboprophylaxis have also been carried out in Colombia, and the main findings are shown in Table 1.

Table 1. Studies on venous thromboembolism and thromboprophylaxis in Colombia.

Study	Number of patients	Main findings
Dennis *et al.*[24] 1996	740	7% VTE incidence 28% of the patients received some type of thromboprophylaxis.
Sáenz-Morales *et al.*[3] 2017	192	69%, 81%, and 92% of patients at low, moderate, and high risk of VTE, respectively, received thromboprophylaxis. Enoxaparin was used as a method of thromboprophylaxis in 67% of cases.
Cardona-Ospina *et al.*[25] 2013	210	29.5% of patients received thromboprophylaxis. 47% of internal medicine patients and 56.3% of surgery patients were at high thromboembolic risk.
Martínez-Montalvo *et al.*[26] 2018	531	Overuse of pharmacological thromboprophylaxis 42.37% of patients were at high risk of VTE. 15.81% of patients were at high risk of bleeding, of which 20.23% had a bleeding episode
Dennis *et al.*[23] 2011	761	49% of patients were at high thromboembolic risk. Thromboprophylaxis in 63.7% of medical patients and 48.4% of surgical patients.

VTE - venous thromboembolism.
Source: Own elaboration.

Gallo-Díaz *et al.*,[27] in a study also carried out in Colombia, reported that the patients at the highest risk of VTE are found in general surgery services and that hospitalization is a risk factor for not receiving thromboprophylaxis.[27] This statement is highly relevant since, despite the fact that the country follows world standards to prevent VTE in surgical patients, adherence to adequate thromboprophylaxis is not in line with the world trend. In other words, the low implementation rates of VTE prophylaxis in surgical services in Colombia are worrisome, as its effectiveness has been previously demonstrated.[2]

In this sense, the lack of adherence to thromboprophylaxis is undoubtedly a drawback for patient care and safety and has a negative impact on the institutional and social spheres. It also reflects a failure in the interaction within the institutions and among the actors in health care: patient, physician, care centers, and insurers. The implementation of policies, both medical and administrative, can change this behavior and improve the quality of care.

Non-adherence to CPGs: a complex issue

In a study in which 11 600 health professionals were interviewed on 7 topics related to the implementation of CPGs, Farquhar *et al.* (cited by Graham[12]) found that more than 70% of respondents stated that these documents were helpful as sources of advice and good educational tools designed to improve the quality of care, and that 53% considered that the guidelines were intended to reduce health care-related costs. However, these authors also established that 41% of the participants thought that CPGs increased medicolegal vulnerability, 34% thought they diminished physician autonomy, and 30% thought they were too inflexible to apply to individual patients. In this sense, the researchers concluded that although CPGs have been created to have a high impact goal, they are sometimes ignored in practice and their real effect is rather limited.[12]

The relevant literature suggests that it takes 17 years for theoretical evidence to be adopted in clinical practice,[9,27,28] which means that translating knowledge into action and experience requires time and a multidisciplinary effort. In this regard, institutions work hard to develop and publish CPGs, but few educate their professionals on the process needed to adopt and implement them,[28] hence adherence to CPGs for VTE prevention in surgical patients is no exception.[12]

It should be noted that in thromboprophylaxis most prescription errors are related to dosage and non-formulation problems. In the latter case, practitioners stress the following factors: fear of postoperative bleeding; high turnover of hospital staff (especially residents); incorrect risk stratification; lack of knowledge of CPGs; language and economic barriers; failure to remember formulation prescription; and lack of institutional policies; access to drugs, and certainty about the effectiveness of their use.[3,21,27] Therefore, a significant share of cases related to omission of prescription originates from failures during the stratification of the magnitude of VTE risk.[29]

Likewise, it must be pointed out that there are no convincing explanations for the fear of medical professionals regarding the complications derived from thromboprophylaxis.[29]

From a sociological point of view, several authors have investigated why adherence to CPGs remains low despite the known consequences, which include omission of therapies, generation of preventable harm, suboptimal outcomes, waste of resources, among others.[30] Thus, understanding the social, organizational, economic and political context factors that lead to failure to adhere to CPGs is essential to promote and generate effective changes that benefit patient safety.

It has been established that one of the central problems in achieving adequate adherence to thromboprophylaxis CPGs is the behavior of medical professionals, resulting in omissions or failures in the prescription of the strategies established in these documents. In this regard, as established by Baiardini *et al.*,[11] there are many theories that explain the difficulties encountered by physicians when including recommendations in their clinical practice and by patients when adhering to prescriptions. Some of those theories, based on human behavior, are described below:

1. Cognitive theories: non-adherence depends on access to information and level of knowledge; knowledge, feelings and behaviors influence each other.
2. Behavioral theories: changes in modulation are usually secondary to external stimuli that generate feedback and conditioning processes.
3. Andragogical theories: the adult learning process is more problem-centered than content-centered, and adults want learning to be purposeful, relevant, practical and, most of all, immediately applicable.
4. Social theories: human attitudes and behaviors are regarded as consequences of interpersonal interactions.
5. Marketing theories: emphasis on the importance of the message conveyed as an essential intermediary for the outcome/change.

In agreement with these theories, 7 barriers to the implementation of CPGs have been proposed, which are based on 293 obstacles found in the literature that could explain the lack of adherence to CPGs (Table 2).[11,12]

Table 2. Barriers to the implementation of clinical practice guidelines.

Barrier	Type of change required	Characteristics
Lack of awareness	Knowledge	10% of medical professionals are unaware of the availability of CPGs.
Lack of familiarity	Knowledge	Up to 56% of medical professionals are not familiar with CPGs (knowing that they exist does not equal understanding them).
Poor credibility in the guidelines	Attitude	Nearly 10% of medical professionals disagree with the CPGs (different interpretation of the evidence) and claim that they limit autonomy, lack flexibility, and interfere with the patient-physician relationship; some medical professionals even consider them to be simple documents and, therefore, inapplicable.
Lack of self-effectiveness	Attitude	There is a variable credibility criterion regarding the ability of medical professionals to apply CPGs.
Lack of anticipation of success/outcome	Attitude	Low confidence on the part of medical professionals in the favorable clinical impact of the CPGs, which makes them less likely to implement them.
No motivation and lack of consolidation of habits	Attitude	Inertia in previous practice and difficulty in changing established routines.
External barriers	Behavioral	The complexity of CPGs, the time to implement a recommendation, the environment, institutional factors, lack of institutional resources, and patient-specific factors.

CPG: clinical practice guideline.
Source: Own elaboration based on Baiardini *et al.*[11] and Graham.[12]

On the other hand, it should be noted that an evidence-based approach to medicine, taken by some professionals, questions the quality of CPGs because they provide "weak" practice recommendations that result in low physician adherence, even in the context of the "best available evidence".[12]

Is it possible to improve adherence to thromboprophylaxis CPGs?

To improve adherence to thromboprophylaxis in surgical patients, it is necessary to consider the level of medical knowledge about this therapy of all the actors involved, their interpretation of this knowledge, and the behaviors secondary to this interpretation. This can facilitate the modification of routines and enable a lasting change in practice. However, there are individual characteristics that are difficult to standardize, such as time availability, the cognitive style of each physician, conformity to practices, customs, and sensitivity to the subject matter.[11]

Based on the foregoing, different strategies have been designed to improve adherence to CPGs among medical professionals, considering the evidence on the ineffectiveness of passive dissemination of these documents.[25,27] In turn, taking this into account, strategies have been developed to ensure proper VTE prophylaxis, such as the use of alarms (electronic and human) that warn of the need to evaluate the risk in patients depending on their clinical condition, current diagnoses, and history. An example of the effectiveness of these strategies is the experience of Brigham and Women's Hospital in Boston, where the use of an electronic alarm system resulted in a 41% reduction of VTE.[3] Similarly, human alarm systems with individual risk calculation tables have documented a decrease of up to 21% in VTE.[3]

Benefits similar to those described in the last paragraph have been obtained through the use of printed documents and pocket guides, personal feedback in periodic audits, and educational sessions.[2,3,9,25,27] However, despite the interventions, both passive and active, even when mandatory, the rate of adherence to proper thromboprophylaxis based on CPGs is still far from a satisfactory level.[2,23]

In this sense, it is advisable to redefine the objective of thromboprophylaxis CPGs in accordance with broader and more concrete purposes and considering a more practical understanding. Graham[12] outlines six points to keep in mind in this process, the understanding of which will lead to a gentler transformation.[12] A modification to this theoretical model applied to the VTE prophylaxis scenario is presented in Table 3.

Table 3. Strategies for successful implementation of CPGs in the prevention of venous thromboembolism.

Strategies	Responsible for theory
Working on behavioral changes as a process	Institutions and physicians
Establishing agents of change that collect the opinions of attending physicians	Institutions
Assessment of the conditions required to attain a change in physicians and institutions, and identification of barriers to achieve it	Institutions and physicians
Promoting a strategy with multiple simultaneous interventions	Institutions, insurers, and physicians
Asserting the importance of social factors in a transformation process	Physicians
Mobilizing institutional support in favor of the objective (patient safety policy)	Institutions and insurers

Source: Own elaboration.

In 2011, Pannucci *et al.*[28] published a study conducted on 945 patients admitted to a plastic surgery service, which presents a practical guideline for the implementation of a VTE prophylaxis protocol based on the sociological diffusion model described in 1943 by Ryan and Gross; this model considers the appropriate adoption of innovations as an outcome derived from the cost-effectiveness of a practical and safe change supported by scientific evidence. Thus, Pannucci *et al.*,[28] conducted an intervention involving agents of change (physicians and other professionals) who adopted the following strategies over four time periods: learning sessions, continuing education, daily review of formulations, direct feedback in real time, and continuous e-mailing on the use of protocols. From the findings, the authors provided readers with a practical approach to implement a VTE prophylaxis protocol.[28] To achieve better results, the aforementioned strategies should be gradually incorporated with interventions such as mandatory risk stratification of patients at the start of care using the Caprini score, which can lead to sustained adherence rates of >80%.[12,28]

Quality of health care: thromboprophylaxis as an outcome indicator

According to the health care quality assessment model described by Donabedian, an outcome indicator would be the sum of the processes and the institutional structure established within a defined health care policy.[31-33] In the case of thromboprophylaxis, this perspective is relevant, since its level of adoption is an indicator that summarizes hospital quality and allows for the articulation of actors, the implementation of processes, active monitoring, and strict auditing, provided it is done in a standardized and reasonable manner. Thus, the American Heart Association has set as one of its goals to reduce hospital-acquired VTE by 20% by 2030.[2]

Since the early 2000s, the Agency for Healthcare Research and Quality developed in the United States a set of patient safety indicators to detect adverse events related to their hospital stay; these included VTE, which is considered a preventable hospital-acquired condition.[2] The Centers for Disease Control and Prevention and The Joint Commission, institutions internationally recognized for their high standards of quality and care, have

joined this initiative. Likewise, these three entities, together with the National Quality Forum, in 2008 established the framework for considering in-hospital thromboprophylaxis as an indicator of a quality outcome in health care.[2] This statement makes it possible to establish, according to the rates of implementation and adherence to thromboprophylaxis CPGs, the level of VTE thromboprophylaxis as an effective interinstitutional indicator of the level of quality.

Finding an appropriate multidisciplinary and multifaceted theoretical model of medical behavior that allows for behavioral, attitudinal and knowledge modifications in health professionals so that they use thromboprophylaxis CPGs, can be a turning point. In this sense, a protocol for feedback designed to include admission, hospital progression, and perioperative period, is a key strategy to evaluate the care process in a comprehensive manner. Moreover, its replicability, cost-effectiveness and simplicity are essential points for its design considering that VTE has been identified as a standard quality indicator of health care given its nature as a preventable complication.[12]

The superlative effectiveness achieved in the prevention of VTE in other countries makes it necessary to implement rigorous adoption policies in Colombia and to prioritize efforts to improve the quality of care and patient safety. The identification and mitigation of the problem in real time are linked to a prior educational, explanatory and substantiation process that requires the support of public and private health institutions in order to achieve effective interventions from a social, economic, and health point of view. In this way, physicians will be responding to their commitment to act with beneficence, autonomy, justice, and nonmaleficence by implementing a comprehensive intervention that improves clinical practices.

Conclusions

Thromboprophylaxis should be considered in a comprehensive manner by the institutions through an educational and regulatory intervention aimed at medical professionals in order to generate a policy to improve the quality of health and patient safety. Thus, ongoing evaluation of processes and outcome indicators, as well as increased adherence to thromboprophylaxis CPGs, are key elements for the success of this strategy.

There is a gap between the literature and medical practice regarding the adequate implementation of thromboprophylaxis in surgical patients in Colombia; therefore, VTE prevention should be a priority for clinical activity, especially in surgical services. All this considering that VTE is a public health problem with a high potential for improvement. Similarly, it should be noted that the efforts made in Colombia have been insufficient and should be strengthened and reoriented in light of the strategies and possible causes considered above.

Conflicts of interest

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