ORIGINAL ARTICLE

Knowledge and practice of prophylaxis of deep venous thrombosis: A survey among Nigerian surgeons

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Abstract

Background: Venous thromboembolism is a potentially dangerous condition that can lead to preventable morbidity and mortality among surgical patients.

Objectives: We aimed to determine the knowledge and practice of surgeons practising in Tertiary Hospitals in Nigeria about prophylaxis of deep vein thrombosis (DVT).

Materials and Methods: Eight Tertiary Institutions were selected from institutions in the geopolitical regions of the country by simple random sampling using balloting method. A semi-structured questionnaire was administered, and the response was obtained from 105 out of 254 surgeons.

Results: The mean knowledge score was 5.81 ± 1.67, and only 33.3% have good knowledge about DVT prophylaxis. No statistical difference was observed between the different groups of surgeons. The mean practice score was 5.19 ± 1.8 and only 20% of surgeons have a good practice of DVT prophylaxis. The majority (90.5%) have encountered DVT whereas 83.5% have encountered pulmonary embolism in their practice. Most commonly encountered risk factors include prolonged immobility, advanced age, and pelvic surgery. Only 13.3% have used Well's score in the clinical evaluation of their patients. The prophylactic modality adopted varies, but most surgeons (77%) utilized both the pharmacological and mechanical methods. Low molecular weight heparin is the commonly used chemoprophylactic agent while a combination of early ambulation and limb physiotherapy is the most commonly preferred mechanical method of thromboprophylaxis.

Conclusion: There is a deficiency in the knowledge and practice of DVT prophylaxis among surgeons in Nigeria. There is a need to improve both the knowledge and practice by introducing institutional guidelines or protocol for DVT prophylaxis for surgical patients.

Key words: Deep vein thrombosis prophylaxis, knowledge, practice, surgeons, surgical patients

Date of Acceptance: 03-Sep-2015

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Access this article online

Quick Response Code:

Website: www.njcponline.com

DOI: 10.4103/1119-3077.175961

How to cite this article: Kesieme EB, Arekhandia BJ, Inuwa IM, Akpayak IC, Ekpe EE, Olawoye OA, *et al*. Knowledge and practice of prophylaxis of deep venous thrombosis: A survey among Nigerian surgeons. Niger J Clin Pract 2016;19:170-4.

Introduction

Venous thromboembolism (VTE) is an important but preventable cause of morbidity and mortality among surgical patients.

Deep vein thrombosis (DVT) is not uncommon among surgical patients in Nigeria.[1] In an African study by Kingue *et al.*, the prevalence of VTE in hospitalized patients was 50.4% and 43.8% for surgical patients respectively.[2] Bâ *et al*. demonstrated that 60.3% of surgical patients were at risk of VTE.[3] Despite this, the proportion of patients at risk of DVT who receive adequate prophylaxis remain low.[4] Previous studies by Kimmerly *et al.* and Bhatti *et al*. have revealed grossly inadequate knowledge and less than the ideal practice of DVT prophylaxis among surgeons and health care workers.[5,6] The American College of Chest Physicians guideline for VTE prophylaxis has remained the most widely followed protocol, while there are no documentation of any guideline in some countries,[3] others have adopted their own national guidelines.[7,8] Implementation of already existing protocols has suffered on account of lack of understanding of clear indications and contraindications for prophylaxis and perceived risk of bleeding.[9] To overcome this fear, various ways have been used to improve the awareness of VTE prophylaxis. Recently, a protocol involving a computer-based clinical decision support and program of training seminar,[10] electronic reminders[11] and even didactic lectures[12] have been used.

In this study, we aim to assess the knowledge and practice of DVT prophylaxis among practicing surgeons in Nigeria.

Materials and Methods

The Departments of Surgery of eight Tertiary Institutions in Nigeria were chosen from[13] institutions fully accredited for training for Part 1 with or without full accreditation for Part 2 by the National Postgraduate Medical College of Nigeria. They were chosen from the geopolitical zones by simple random sampling using balloting method. They included University College Hospital Ibadan, University of Uyo Teaching Hospital, Uyo, Jos University Teaching Hospital, Jos, Aminu Kano Teaching Hospital, Kano, Usman Dan Fodio University Teaching Hospital, Sokoto, Federal Medical Center Owerri, Owerri, Imo State University Teaching Hospital, Orlu and Irrua Specialist Teaching Hospital, Irrua.

Data collection was through a semi-structured questionnaire distributed to surgeons (consultant surgeons and senior residents) in these institutions after obtaining consent. A pilot study was carried out among 16 surgeons in a university hospital to improve the reliability of the instrument. The questionnaire was modified after the pilot study. The questionnaire was based mainly on the knowledge and practice of DVT prophylaxis. Assessment of knowledge was based on statements on the usefulness of history and examination in diagnosis, pretest probability assessment, investigations, and appropriate prophylactic measure for different risk groups (high, moderate, and low-risk groups). Assessment of practice was based on statements on the presence of institutional guidelines/protocol, diagnostic modality preferred by the surgeon, application of pretest probability assessment, and preferences for the different modalities of DVT prophylaxis. A total of 10 marks were allocated to 10 statements in the knowledge section. Each statement was allocated one mark each. A score of <7 was graded as poor knowledge while 7 and above was graded as good knowledge. A total of 10 marks were also allocated to 9 out of 19 statements in practice section. Each was awarded one mark each, apart from one statement that was awarded 2 marks. We used the same scoring system as the knowledge section. The weight of the score awarded to each statement and the grading were determined independently by two academic surgeons who were not part of the study.

The questionnaire was anonymous and the respondents were told that their opinion will be analyzed and published. The data was entered into Statistical Package for Social Science (SPSS), version 16 (Chicago, SPSS Inc) for analysis. The level of significance was set at $P < 0.05$.

Results

Out of 254 surgeons working in these Surgery Departments, we received a response from 105 surgeons; 55 were surgeons with fellowship qualifications while 50 were senior residents in surgery. The response rate was 41.3%. The majority were general surgeons (28.6%), orthopedic surgeons (20%), urologists (17.1%), plastic surgeons (11.4%), and pediatric surgeons (11.4%). The demographic characteristics of respondents from the participating institutions were as stated in Table 1.

Knowledge

The mean knowledge score was 5.81 ± 1.16. About two-third of surgeons (66.7%) had a poor knowledge of VTE prophylaxis while only 35 surgeons (33.3%) had good knowledge

Table 1: Demographic characteristics of respondents

Specialty	Frequency (%)
General surgery	30 (28.6)
Urology	18 (17.1)
Orthopedics	20 (19.0)
Cardiothoracic surgery	4 (3.8)
Plastic/reconstructive surgery	12 (11.4)
Neurosurgery	8 (7.8)
Pediatric surgery	12 (11.4)
ENT	1 (0.9)
Total	105 (100.0)

ENT=Ear nose and throat

which included 16 (24.5%) senior residents and 19 (32%) consultants. No statistical difference was found between the two different groups of surgeons ($P > 0.05$) [Table 2].

The worst performance was recorded in the statements on clinical diagnosis, pretest probability assessment and appropriate prophylactic method for moderate risk patients.

Sixty-eight surgeons (64.8%) believe that history and clinical examination are reliable in making a diagnosis of DVT. Fifty-five surgeons (52.4%) do not know the correct score for "DVT unlikely." Only 61 surgeons (58.1%) knew the correct prophylactic measure for moderate risk surgical patients. Performances were above average in statements relating to pathogenesis, diagnostic modalities and choice of low molecular weight heparin (LMW heparin) for chemoprophylaxis and treatment of DVT. Only 59 surgeons (56.2%) correctly answered that proximal DVT is of greater importance than distal DVT. However, the majority of respondents correctly stated that distal thrombosis is more often associated with risk factors such as surgery and immobilization.

Practice

The mean practice score was 5.19 ± 1.8. Only 20% of surgeons appeared to have a good practice of DVT prophylaxis. The majority of surgeons (90.5%) had encountered DVT in their practice. Almost half of them (50.5%) had encountered DVT in 1–5% of cases, while 39% and 3.8% of them have seen DVT in <1% and more than 5%, respectively. A large majority of respondents (82.9%) had encountered pulmonary embolism (PE) in their practice, and 76.2% have lost patients from suspected PE.

Most surgeons (93.3%) do not have any departmental or institutional guideline to follow in recommending the appropriate prophylactic measure for VTE; however 99% of them believed that it is necessary to have an institutional guideline. The most commonly encountered risk factors for DVT were advanced age, prolonged immobilization, and pelvic surgery. Only 2.9% of surgeons have ever used a combination of clinical examination, D-dimer assay, and Doppler venous ultrasonography to establish a diagnosis of venous thrombosis. Clinical examination and Doppler ultrasound scan were used as single tools for diagnosis of DVT by 18.1% and 63.8% of surgeons respectively. Only 13.3% of surgeons routinely scored patients preoperatively using pretest probability assessment (Wells score). The surgeons (14.3%) who either occasionally, rarely or never used DVT prophylaxis did so on account of the fact that DVT is rarely seen in pediatric cases (30%), increased cost to the patients (15%) and perceived risk of bleeding (20%). Most surgeons (80%) indicated that they always or frequently emphasize DVT prophylaxis to their residents.

Table 2: Cadre of surgeons and knowledge of DVT

Cadre	Knowledge *n* (%)		Total *n* (%)
	Poor	Good	
Senior registrar	34 (68.0)	16 (32.0)	50 (100.0)
Consultant	36 (65.5)	19 (24.5)	55 (100.0)
Total	70 (66.7)	35 (33.3)	105 (100.0)

χ^2=0.076, df=1, *P*=0.782, OR (95% CI)=1.12 (0.46-2.74). OR=Odds ratio, CI=Confidence interval, DVT=Deep vein thrombosis

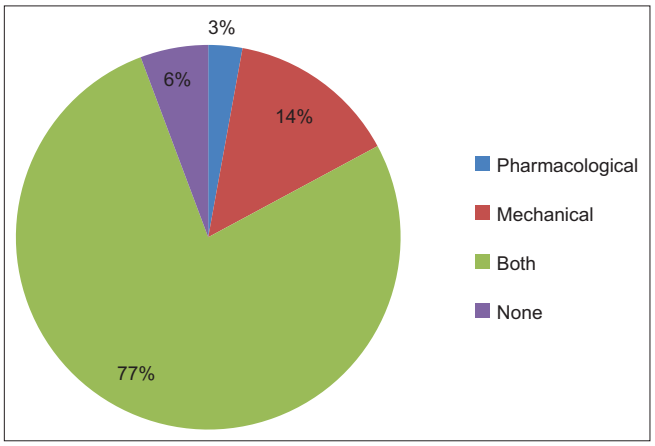

Figure 1: Commonly used thromboprophylactic agent

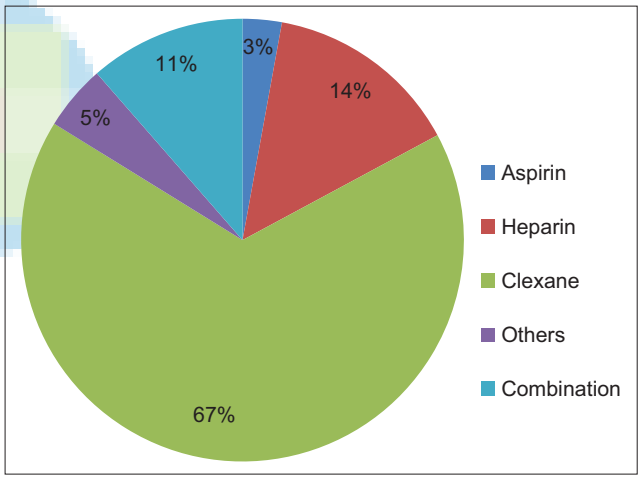

Figure 2: Pharmacological agent of choice in thromboprophylaxis

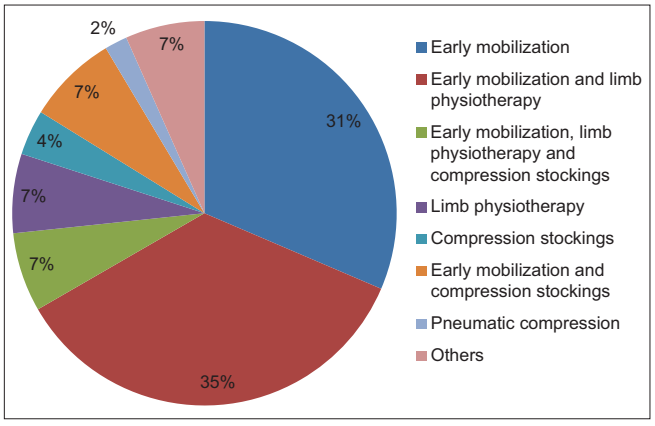

Figure 3: Mechanical agent of choice in thromboprophylaxis

Both pharmacological and mechanical measures were preferred by most surgeons in 77% of cases [Figure 1]. The pharmacological agent most commonly used was Clexane (enoxaparin), 67%, followed by unfractionated heparin, which accounted for 14% of agent used [Figure 2]. A combination of early mobilization and limb physiotherapy as a mechanical method of prophylaxis was used by 35% of surgeons. Early mobilization alone was used by 31% of surgeons [Figure 3]. Complications from pharmacological agents have been experienced by 40% of respondents. These include minor hemorrhage, major hemorrhage and wound hematoma experienced by 7 (6.7%), 11 (10.5%) and 16 (15.2%) surgeons, respectively.

Discussion

Our study has shown huge knowledge gap that existed among Nigerian surgeons regarding basic concepts of VTE prophylaxis. This is in keeping with findings in other studies.[5,14] As stated earlier, the deficiencies were more obvious in the statements on pretest probability assessment and appropriate prophylactic method for moderate risk patients.

Deep venous thrombosis and PE may not be rare among Nigerian surgical patients, as 90.5% of surgeons have encountered DVT, and 82.9% have encountered PE.

There are no established institutional or departmental guidelines, or protocol as reported by 93.3% of our respondents and almost all of them expressed their desire to have one. Hence, the time is ripe for a national guideline as obtains in other countries.[7,8] Other developing countries have expressed a desire to develop and disseminate guidelines not only for thromboprophylaxis but also for the treatment of VTE.[3,15,16]

More so, most studies have shown inadequate prophylaxis often offered to surgical patients.[2,3] ENDORSE study carried out in 32 countries among 30,827 patients revealed that the overall proportion of surgical patients at risk of VTE, who received adequate prophylaxis is 58.5%.[4]

The risk factors that were easily remembered by our respondents were advanced age, prolonged immobilization, and pelvic surgery. Kimmerly *et al.* revealed that his respondents identified obesity, immobilization, malignancy, and previous DVT as overwhelming risk factors for thromboprophylaxis but underestimated or inadequately recognized age more than 40 years, recent myocardial infarction, lupus anticoagulant, varicose veins, and factor V Leiden as risk factors.[5]

Clinical diagnosis of VTE should not be based practically on history and physical examination alone.[17,18] It is important to do a pretest probability assessment using Wells score. Wells *et al*., combined risk factors, signs, and symptoms to stratify patients suspected of DVT into two risk categories: "DVT unlikely" if the clinical score is ≤1 and "DVT likely" if the clinical score is more than 1.[4] This determines if a patient will perform a D-dimer assay, venous ultrasonography or both. Only 2.8% of our surgeons have used a combination of clinical assessment, D-dimer assay, and Doppler ultrasonography. Pretest probability assessment of surgical patients is unpopular among Nigerian surgeons as only 13.3% scored patients. This is lower than the value obtained by Venkataram *et al.* in an Indian study.[16] They stated that 64% of surgeons scored patients preoperatively. A survey of current practice among UK ENT surgeons revealed that 84.5% of surgeons routinely assessed all their patients for VTE.[13] This is higher than what Venkataram and our study observed.

A small percentage of surgeons (15%) were reluctant to give venous thromboprophylaxis citing bleeding complications, increased cost to the patient, and predominantly caring for pediatric cases as excuses. Studies have failed to demonstrate any increase in postoperative bleeding or hematoma based on chemopropylactic agent administered at appropriate doses.[19] The incidence of DVT in pediatric patients is low.[20] The low incidence may be due to decreased capacity to generate thrombin, increased capacity of alpha-2-macroglobulin to inhibit thrombin, and enhanced antithrombin potential of vessel walls.[17]

It is observed from this study that most surgeons preferred a combination of pharmacological and mechanical prophylactic measures for VTE prophylaxis. The majority also preferred to give LMW heparin (Clexane). Current studies have shown surgeons and health workers preference for LMW heparin,[6,13,21] while unfractionated heparin have been favored in previous studies.[14,22] LMW heparin has advantages over unfractionated heparin. It is given once or twice daily without need for laboratory monitoring. It is predictable, has a long half-life, less bleeding tendencies for a given antithrombotic effect, a lower incidence of heparin-induced thrombocytopenia and a lower risk of heparin-induced osteoporosis. Early mobilization and limb physiotherapy are commonly employed by most of our surgeons. Intermittent pneumatic compression and foot pump are not popular. This may be due to unavailability and the cost. In a study by Galbraith *et al*., most surgical residents did not identify early mobilization as a prophylactic measure of DVT.[21]

Our study is limited by the fact that the number of respondents was low, and some of them are not actively involved in venous thromboprophylaxis. We believe that the response of our senior residents reflects the practice of

their consultants since the final clinical decision made on any patient in a tertiary institution lies with the consultant.

Conclusion

This study showed that deep venous thrombosis and perhaps VTE are becoming important clinical challenges to us in Nigeria. Second, it appears a knowledge gap exist with respect to thromboprophylaxis among Nigerian surgeons. There is a need for institutional guidelines or protocol on thromboprophylaxis that in the near future may metamorphose into a national guideline as obtained in some other countries.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

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