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Research

Pattern of venous thromboembolic diseases in a resources-limited setting in Cameroon

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Abstract

Introduction: Admission for a medical illness is associated with an increased risk of venous thrombo-embolism; however reports addressing at this issue are rare in Cameroon. We sought to assess the pattern of thrombo-embolism among in-medical patients of a semi-urban hospital. **Methods:** We prospectively included 79 hospitalized medical patients of the Military Hospital of Bamenda (north-west region-Cameroon). From July 2010 and December 2013, we collected baseline demographic data, risk factors of venous thromboembolism, clinical presentation, diagnostic process and treatment. **Results:** In the 1445 patients admitted for medical illnesses, a total of 79 venous thrombo-embolic diseases were detected (55 deep vein thrombosis, 14 pulmonary embolism, 9 post-phlebitic syndrome and 1 cerulae alba dolens). The leading risk factors were prolonged immobilization (100%), age > 40 years (78.9%), obesity (43%), long distance travel (30.4%) and HIV-AIDS (21.5%). Thirty one (40.5%) had ≤ 2 cumulative risk factors, and 8 (10.1%) more than 4. All the patients in the group had a significant risk of deep vein thrombosis: 5 (6.3%), 34 (43%) and 40 (50.6%) with moderate, high and very high risk respectively. Increasing number of deep vein thrombosis was associated with increasing level of the risk and the clinical probability scores. Lower limb location of deep vein thrombosis was the most frequent with 75 (94.9%) cases. Almost all the patients received appropriate therapy with heparin and oral anticoagulant during their hospital stay. The mean length of hospital stay was 17.5 +/-15 (range 4- 62) days; disability and death occurred in 15 (19%) and 17 (21.5%) respectively. **Conclusion:** Venous thromboembolism is also a common concern in a semi-urban practice of our country. Long distance travel, one of the leading risk factors merits to be more specifically studied.

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Introduction

As reported in Western countries, venous thromboembolism (VTE) is now a well-established major concern among in-patients in sub-saharian Africa [1-3]. Venous thromboembolism includes deep vein thrombosis (DVT) and its acute complication, pulmonary embolism. Although their cause is still unknown, the Virchow triad of venous stasis, hypercoagulability and endothelial injury, permits to define risk factors of these affections. Studies have established that VTE is a multifaceted disease [4]. In both surgical and medical wards, these risk factors accumulate, increasing the incidence of VTE, and worsening the prognosis of in-patients (morbidity, disability, impaired recovery and mortality). Unfortunately, because of missed or delayed diagnosis, the true incidence of VTE remains unknown, especially in medical wards [5, 6]. Consequently, it is still under-estimated among medically-ill patients. It is estimated that only 16% to 33% of such patients receive thromboprophylaxis as compared to up to 90% of at-risk surgical patients [7-9]. In Cameroon, there is scarcity of studies, all conducted in reference hospitals in an urban area, that have assessed risk factors (mainly clinical and environmental), prevention and treatment of VTE [1,10]. Hence, we sought to study, in a semi-urban and rural hospital setting, the pattern of VTE in terms of risk factors, clinical presentation, diagnostic process and treatment.

Methods

Design and setting

This cross-sectional study was carried out in Military Hospital of Bamenda from the 1st July 2010 to the 31st December 2013. Physicians of the so-called hospital were among the most aware of the VTE risk in this semi-urban region of Cameroon. The estimated 1.500 000 inhabitants of the Region was made of public servants, students, farmers, livestock farmers and traders. Daily, they tackled uncomfortable trips in overloaded old cars, going round bad roads for long hours to join the nearer town or village. In the other hand, health facilities were both under-equipped and of very limited access. Hence, efficacious involvement for prevention, diagnosis and treatment of VTE could hardly been achieved.

Patients

We included consecutive adults aged 18 years or above. The patients were ill with a diagnosis of DVT and/or PE at or during their hospitalization. The ethics committee of the medical region approved the study protocol, and an informed consent was obtained from each patient (or a family member) prior to enrollment.

Data collection

Data were collected using a pre-designed questionnaire. They consisted of demographic characteristics (age, gender), risk factors of VTE, diagnostic process (clinical presentation of DVT and/or PE, diagnostic testing), treatment outline and prognosis components (days of hospital stay, disability, death). Inclusion of each patient started by listing out the clinical and environmental risks factors of VTE (genetics could not be assessed). Each risk factor was ranked according to a point scale proposed by a consensus statement in 2001 [11,12]: Risk factors weighting 5 points (stroke < 1 month), 3 points (age of 75 years or more, prior VTE); 2 points (age 60 to 74 years, cancer, immobilization with a plaster, patient confined to bed for 72 hours or more, central venous access); and the 1 point (age 40 to 60, obesity, bed rest, varicosise, acute heart failure, sepsis, serious lung disease, acute myocardial infarction, inflammatory bowel disease, hormone-replacement therapy, oral contraceptive). A cumulative score of 0-1 defined a low risk, 2 a moderate risk, 3-4 a high risk and 5 or more a highest risk of VTE. Even though it is not included in this scaling risk score, we also considered long distance travel, defined as a trip of 4 hours or more, by car, plane, train or ship. Thereafter, a general clinical exam was conducted, taking in symptoms and detailed examination of the lower limbs, the respiratory and cardiovascular systems to search for signs of DVT and PE. The clinically suspicious DVT and PE were scaled by well-known probability scores [13-15]. For DVT, the Wells' score of DVT: low probability for a score of 0 or less; intermediate probability for a score of 1 to 2; and the high probability for 3 and above. For PE, the Wells' score for PE (low probability between 0 to 1; intermediate probability between 2 to 6; and high probability for a score of 7 and more); and the reviewed Geneva score (low probability 0 to 3; intermediate probability 4 to 10; and high probability for a score of 11 and more). After these clinical estimations of the probability of VTE, venous ultrasound and computerized tomographic pulmonary angiography (CTPA) were performed by consultant radiologists. Venous Doppler was performed using a 7.5-10 MHz linear transducer of sonographic machine (Sonoscape S2/S2BW; GE logiq

400). For a confirmed DVT, a progressive compression of veins in 1 to 2 cm increments from the thigh to the calf showed a lack of vein compressibility with the transducer held transversely; the visualization of the clot with color flow and pulsed Doppler wave terminated the diagnosis. Computerized tomographic pulmonary angiography was performed to diagnose PE. After intravenous injection of Meglumine Loxilamalate, anatomic views were obtained. Testing was positive for PE when an intravascular filling defect was present on one or more views of pulmonary artery branches. Patients were definitely included when DVT or PE testing were positive. Treatment included mechanical (stocking) and pharmacological elements (low-molecular-weight heparin, unfractionated heparin, acenocoumarol, warfarin). Number of disable patients (with large chronic ulcers secondary to post-phlebitic disease) and deaths was also registered.

Analysis

Data analysis used the Statistical Package for Social Sciences version 13.1 (SPSS Inc Chicago, IL). Continuous data, presented as means and standard deviation were compared using the t-test. Categorical data were presented as frequencies and proportions, and compared using chi-square test or Fischer's exact test as appropriate.

Results

Of the overall 1445 patients admitted for a medical-illness during the 3 years of recruitment, 143 (9.9%) had a suspicion of VTE. Thirty seven of them (25.9%) had not run for radiologic testing (33 for venous Doppler and 5 for CTPA); and 27 (18.9%) presented negative testing (23 negative for DVT and 7 for PE). Finally, 79 patients with a positive testing for VTE were included. Of these 41 (51.9%) were men. The mean age of the participants was 56.4 ± 15.8 years. The mean age of men (59.1 years) was not statistically different of that of women (53.5 years) ($p = 0.11$). Table 1 summarized the primary causes of admission. They were not exclusive. DVT and PE ordered admission in 18 (22.8%) and 4 (5.1%) cases respectively, high blood pressure 30 (38%), acute heart failure 18 (22.8%) and Stroke 8 (10.1%). Table 2 and Table 3 detailed demographic characteristics, risk factors and clinical presentation in the group. The leading risk factors were immobilization (100%), obesity (34 (43%)), long travel (24 (30.4%)), and HIV infection and its opportunistic diseases (17 (21.5%)). Of the 79 patients, 31 (40.5%) had ≤ 2 risk factors, 40 (50.6%) 3 to 4 risks factors and 8 (10.1%) ≥ 5. No patient was at low risk. The risk was moderate on 5 (6.3%) patients and high to highest in 74 (97.7%). Figure 1 shows a distribution of VTE (DVT and PE) among the clinical ranking of DVT risk (A), and probability scores (B, C, D), preceding the radiologic testing. Regarding the level of DVT risk, no patient was at low risk, being it among those suffering of DVT or PE; and the increasing level of the risk was associated with an increasing number of both DVT and PE (moderate, high and very high level of risk corresponded respectively to 4, 24 and 27 cases of DVT, and 1-6-8 cases of PE). Identical observation could be made with the Wells' score for DVT (12, 22 and 31 DVT and 1, 5, 8 PE for the low, intermediate and high probability respectively). In the other hand, all the patients with PE had intermediate-to-high clinical probability of PE; no patient suffering of PE had a low probability score for PE. The overall diagnostic result showed 55 (69.6%) DVT, 14 (17.7%) PE, 9 (11.3) post-phlebitic diseases, and 1 (1.3%) phlegmasia cerulea dolens. DVT had lower limb location in 75 (94.9%) patients, strictly proximal in 42 (53.2%) and proximal + distal in 12 (15.2%). Other location (cerebral, upper limb) represented 4 (5.1%) of all the cases of DVT. The recommended tools in the treatment of VTE were implemented for almost all the patients. Unfractionated heparin was never used. Mechanical consisted mainly in stocking and early ambulation. The mean length of hospital stay was 17.5 ± 15(4-62) days; disability and death occurred in 15 (19%) and 17 (21.5%) respectively. The mortality rate was significant higher among pulmonary embolism group (47.6%) than in DVT group (15.6%) ($p = 0.015$).

Discussion

Being a prospective study that enrolled consecutive patients admitted for medical illness, our population closely reflects the pattern of illness that a physician specialized in internal medicine may encounter in a typical semi-urban care unit. Thus as expected, our population consisted mostly of severely ill patients, and this may explain why many presented a wide spectrum of critical risk factors for VTE such as strokes, prior VTE and cancer; and these risk factors were commonly cumulative. Both high-to-highest risk of VTE cumulation of risk factors was associated with high frequency of VTE. Almost this same sharing in risk factors was found in some

other works in urban areas of sub-saharian Africa (SSA) [10, 16, 17]. Studies have well demonstrated an increased risk of VTE in the presence of multiple risk factors [11]. Even when there is an adequate thromboprophylaxis, incidence of VTE is still between 10 to 25% when risk factors cumulate [18, 19]. Implication of HIV-AIDS in the occurrence of VTE was significant. This has been well demonstrated in many studies [20, 21], and is just an increasing concern. Such a finding illustrates the burden of this infection and its opportunistic diseases in SSA. Long travel was among the most common risk factors in our study. Even though earlier studies demonstrated that it was a minor risk factor [22-24], we may mention it considering the travelling conditions in rural and semi-urban areas of SSA. As reported by others, we found that obesity and age of ≥ 40 years were commonly present on patient with VTE [25, 26]. Another re-statement was that scaling suspicious patient with a pretest probability score for DVT or PE, by increasing the predictive value of venous Doppler and CTPA, simplifies and improve the diagnostic process. This statement has clearly been made by Wells et al, and many other studies [13-15]. This conclusion is of great importance in SSA where diagnostic testing, when available, needs to be more accurately performed. Furthermore, even if there are no recommendations on how to manage such cases, when pretest probability is high, it may be very useful to initiate an effective treatment in our area where tests are usually delayed or not performed. As malpractices in the diagnostic process, we noticed that all the patients with a suspicion of VTE could not undergo testing, some because of its cost and others when the scarce diagnostic tools had a breakdown, or the unique radiologist was absent. This situation most likely led to under-diagnosed VTE. Elsewhere, it was the D-dimers testing that could not be performed when indicated. Concordant prospective studies have clearly shown that D-dimers testing combined with pretest probability allows rapid and safe exclusion of VTE, preventing costly serial radiologic testing when the testing was negative [27, 28]. Difficulties in the proper implementation of the diagnostic process of VTE are common in SSA and have been stated in some studies [10, 29]. This highlights the under-equipment and low-access to health facilities in our area. Another reason is an insufficient number of specialists trained for management of VTE in medical wards. This emphasizes the need to increase the number of internists and radiologists in semi-urban areas of our country. Almost all the positive cases of VTE received appropriate therapy with low-weight molecular heparin, oral anticoagulant and non- pharmacological treatment. Mortality and disability are significant ensues among our population. It was cluster of some comorbidities and the worse evolution of VTE as such [30, 31]. Our study has several limitations. It showed concern only in the in-hospital treatment. The ambulatory compliance and follow-up is another important point that was not assessed here. Elsewhere it was conducted in only one hospital, even though there was exercising one of the scarce health team aware of the VTE risk in the area. This is reducing the global overview of the disease in our region.

Conclusion

Our study demonstrates that VTE remains a common condition in medical wards of a semi-urban hospital. Long distance travel is among the leading risk factors, and thus merits to be furthermore assessed. These results indicate a quick on the implementation of guidelines addressing the practice on these affections.

What is known about this topic

- Venous thromboembolism is a major health concern in sub-Saharan Africa, sharing the same trend as in western countries;
- Management of venous thromboembolism faces problems related to under-equipped hospitals and availability of trained personnel;
- Data on VTE are scarce in semi-urban and rural area.

What this study adds

- Increase the number of available data on venous thromboembolism in a region where studies on the topic are scarce;
- Describe a trend of management of the disease in a semi-urban area where under-equipment and availability of trained personnel are more underlined;
- Immobilization, obesity and long distance travel are the most common risk factors for VTE.

Competing interests

The authors declare no competing interest.

Authors' contributions

All authors have read and agreed to the final version of this manuscript and have equally contributed to its content and to the management of the case.

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Table 1: Primary causes of admission

Variables	**Number**	**Percent (%)**
Deep vein thrombosis	18	22.8
Pulmonary embolism	4	5.1
HIV and opportunistic infections	9	11.4
Other infectious conditions	5	6.3
Malignancy	3	3.8
Acute heart failure	18	22.8
High blood pressure	30	38
Acute diabetic decompensation	1	1.3
Decompensation of Chronic pulmonary disease	7	8.9
Acute uremic syndrome	5	6.3
Stroke	8	10.1
Rheumatic disease	2	2.5
Coma	2	2.5
Hepatic disease	6	7.6
Psychiatric disease	3	3.8
Others	4	5.1
These primary causes are not exclusive		

Table 2: Demographic profile and risk factors of DVT (N=79)		
Variables	**Number**	**Percent (%)**
Demographics		
Number of admissions	1445	
Suspicious cases of VTE	143	
Number of tested patients	106	
Confirmed VTE cases	79	100.0
Age, year [mean±SD (range)]	56.4±15.8 (23 - 90)	
Weight, kilogram [mean ± SD (range)]	28.0±6.9 (16 – 45.7)	
Gender (males)	41	51.9
Duration of admission, days [mean ± SD (range)]	17.5±15 (4 – 62)	
Handicap	15	19.0
Death	17	21.5
Risk factors		
Past history of venous thromboembolism	6	7.6
Varicosis	9	11.4
Age over 40 years	56	78.9
Obesity	34	43.0
Malignancy	6	7.6
Cancer chemotherapy	2	2.5
Smoking	3	3.8
Stroke	8	10.1
Prolonged immobilization	79	100.0
Central venous access	2	2.5
HIV and opportunistic diseases	17	21.5
Long distance travel	24	30.4
Oral contraceptive	2	2.5
Anemia	7	8.9
Cumulative risk factors		
≤2 risk factors	31	40.5
]2 – 4] risk factors	40	50.6
>4 risk factors	8	10.1
Venous thromboembolism risk		
Low risk	0	0
Moderate risk	5	6.3
High risk	34	43
Very high risk	40	50.6

Table 3: Clinical and diagnostic presentation of patients, and treatment (N=79)		
Clinics	**Number**	**Percent (%)**
Lower limb swelling	68	86.1
Spontaneous lower limb pains	58	73.4
Lower limb warmth	65	82.3
Tenderness	42	53.2
Red or discolored skin	42	53.2
Dilation of superficial veins	9	11.4
Ulcer	15	19
Fever	33	41.8
Tachycardia	48	60.5
Chest pains	22	27.8
Sudden cough	19	24.0
Shortness of breath, dyspnea	15	19
Hemoptysis	7	8.9
Hypotension, sweeting, cyanosis	7	8.9
Right heart failure	11	13.9
Lower limb ischemia	4	5.1
Deep vein thrombosis Well's Score:		
Low probability	13	16.4
Intermediary probability	27	34.2
High probability	39	49.4
Pulmonary Well's Score:		
Low probability	40	50.6
Intermediary probability	11	13.9
High probability	18	22.8
Pulmonary Geneva Score:		
Low probability	43	54.4
Intermediary probability	13	16.4
High probability	13	16.4
Positive tests		
Deep vein thrombosis	55	69.6
Pulmonary embolism	14	17.7
Post-phlebitic disease	9	11.3
Phlegmasia dolens	1	1.3
Localization of DVT		
Lower limb proximal	42	53.2
Lower limb distal	21	26.6
Lower limb proximal + Distal	12	15.2
Other localization	4	5.1
Treatment		
Non-fractioned heparin	0	0
Low-molecular-weight heparin	75	94.9
Antivitamine K	67	84.8
Stocking	69	87.3

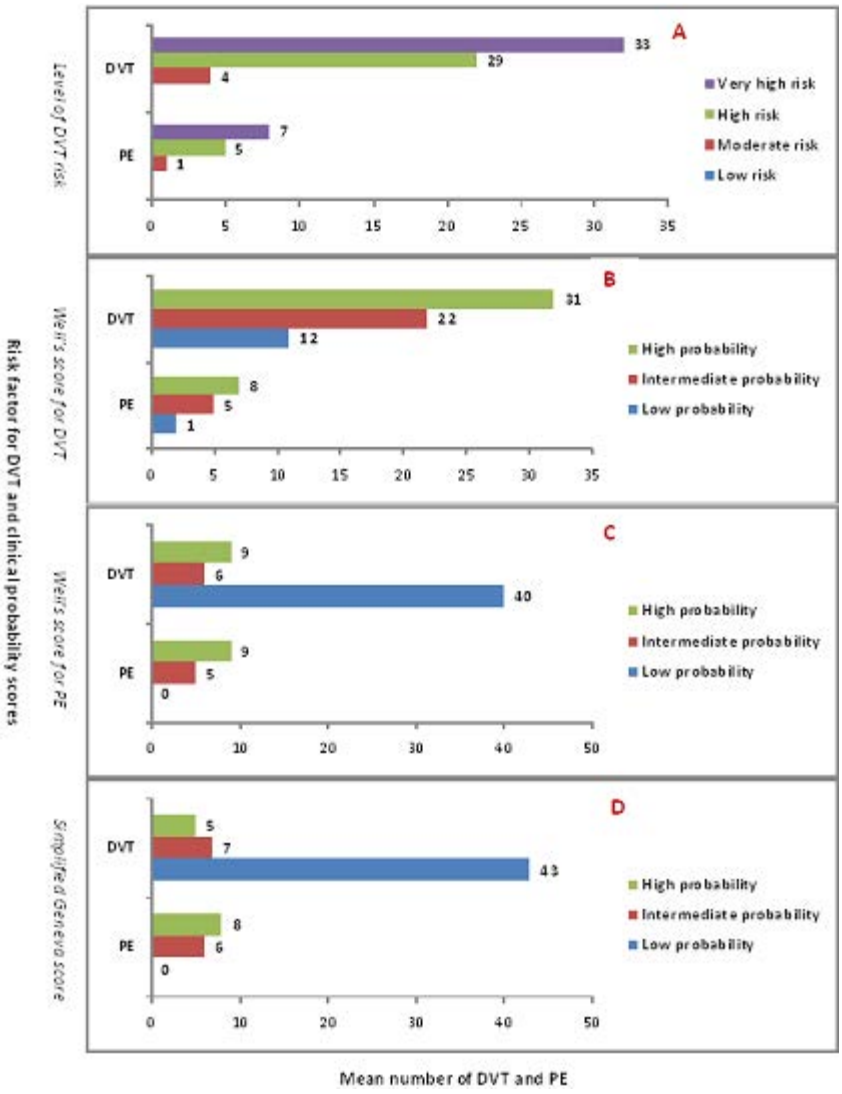

Figure 1: Distribution of VTE (DVT and PE) in the clinical steps used in the diagnostic process of VTE: level of the DVT risk (A), well's score for DVT (B), well's score for PE (C), and Geneva score (D); each criteria is ranked low, moderate, high and very high (A), and low, intermediary and high (B,C,D); data is expressed as mean number of DVT and PE among each rank; the 9 cases of post-phlebitic diseases and 1 case cerulea alba dolens were taken into account as DVT to built this figure