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Epidemiology, Clinical Presentations and In-Hospital Mortality of Venous Thromboembolism at the Douala General Hospital: A Cross-Sectional Study in Cameroon, Sub-Saharan Africa

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Abstract

Background: Venous thromboembolism (VTE) is a major cause of morbidity and mortality worldwide. It is also the most common complication in hospitalized patients. Aims: To study the in-hospital prevalence of VTE, describe the socio-demographic characteristics of patients, determine the frequency of risk factors, describe the clinical presentations, and determine the short term outcome of VTE in hospitalized patients in a low-income tertiary hospital setting. Methods: We carried out a cross-sectional descriptive retrospective study over a period of 6 years and 4 months (January 2008 to April 2014) in the Douala General Hospital—Cameroon. Patients were cases of confirmed venous thromboembolic disease (VTE). Results: A total of 78 case files were retained for this study, giving an in-hospital prevalence of 4.4 per 1000 admissions. There were 42 (53.8%) males and 36 (46.1%) females. Their ages ranged from 18 to 89 years (median: 53 years, [IQR: 40 - 61]). There were 37 (47.4%) cases of Deep Vein Thrombosis (DVT), 31 (39.7%) cases of Pulmonary Embolism (PE), and 10 (12.8%) cases of PE associated with DVT (12.8%). The main risk

factors were obesity (44.9%), hypertension (37.2%), immobility (20.5%), and long-haul travel (17.9%). The most frequent clinical presentations in PE were dyspnea (80.5%) and chest pain (65.9%). There were 8 (10%) in-hospital deaths. Conclusion: About twelve cases of VTE are seen yearly at the DGH, with an in-hospital mortality of ten percent. Obesity and hypertension were the main risk factors, with dyspnea and chest pain being the main clinical manifestations in PE, and lower limb swelling the main symptom in DVT.

Keywords

Epidemiology, Clinical Presentation, Mortality, Venous Thromboembolism, Cameroon, Sub-Saharan Africa

1. Introduction

Venous thromboembolism (VTE) is a major cause of morbidity and mortality worldwide. It is also the most common complication in hospitalized patients in high income settings [1] [2]. Autopsy reports showed a prevalence of 2.9% to 3.8% [3] [4], with an in-hospital incidence of 0.1% in Nigeria [5]. Data on the epidemiology of VTE are scarce in sub-Saharan Africa (SSA), with an in-hospital prevalence of 7% [6] [7] [8]. The yield for acute pulmonary embolism (PE) was 37.5% for suspected cases [9]. The pattern of the epidemiology of VTE in SSA is comparable to that reported in the Asian sub-continent [10]-[15]. Deep Vein Thrombosis (DVT) of the legs has been shown to be more frequent than PE. The incidence of VTE has been shown to increase with age [16]. Emergency surgical procedures have been shown to be associated with higher rates of VTE.

Data on the epidemiology of VTE are scarce in our setting. We carried out this cross-sectional descriptive study with the aim of reporting the epidemiology, main risk factors, clinical presentations and short term in-hospital outcome in patients with a diagnosis of VTE at the Douala General Hospital—Cameroon, a low-income setting in SSA.

2. Methods

Ethical statement: This study was approved by the institutional review board of the University of Douala, and the administration of the Douala General Hospital. This work was carried out in accordance with the Declarations of Helsinki. We report this work in accordance with the standards for reporting epidemiological studies (STROBE) guidelines.

Study Design and setting: We carried out a cross–sectional descriptive retrospective study at the Douala General Hospital (DGH). We recruited cases that were hospitalized in the internal medicine and the intensive care unit (ICU) of the hospital. The DGH is a tertiary health institution in Cameroon, central Africa sub-region. It serves as a teaching hospital of the University of Douala, and has a catchment population of about 3 million inhabitants. It is equipped with 2

ultrasound machines, and a 16 barrette multi-detector CT scan.

Participants: We reviewed the medical files of cases of VTE hospitalized in the hospital between January 2008 and April 2016 (6 years and 4 months). We included in the study confirmed cases of VTE disease. Confirmed cases had either contrast enhanced CT scan of the lungs, and or venous ultrasound performed after the primary diagnosis. Those with incomplete medical records (no confirmatory test done) were excluded.

Variables and measures: For each patient, we collected the following data: Socio-demography (age and sex), origin (home, other wards, and other hospitals), hospitalization ward (internal medicine, ICU), risk factors of VTE (medical, surgical, and social), clinical presentations (pulmonary embolism, deep vein thrombosis of the leg), electrocardiographic presentation, location of thrombus on vascular ultrasound (proximal, distal, or both), treatment (short and long term), and outcome (alive at discharge or death).

Sample size and Statistical analysis: This was a cross-sectional study. A convenient sample of all eligible cases seen during the study period was considered. We analyzed the data with the software IBM SPSS version 20. We have presented continuous variable (age) as median (interquartile range), and discrete variables as frequencies and percentages. A p value < 0.05 was considered significant for observed differences or associations.

3. Results

Patients: During the period of the study, a total of 17703 patients were admitted in the internal medicine and ICU. Of these, 113 patient cases were identified as potential cases of VTE. We excluded 35 cases (4 missing files, 22 incomplete files, and 9 diagnoses were changed). A total of 78 case files (about 12 cases seen per year) were retained for this study. This gives an in-hospital prevalence of VTE of 4.4 cases per 1000 admissions (**Figure 1**).

Descriptive data: **Table 1** shows the general characteristics of the study population. There were 42 (53.8%) males and 36 (46.1%) females. Their ages ranged from18 to 89 years (median: 53 years [IQR: 40 to 61], $p = 0.81$ between sexes). Of these, 42 were come from home, 27 were referred from other hospitals, and 9 were transferred from other wards to either the ICU or the internal medicine ward. These patients were hospitalized in the internal medicine ward (74 cases) and in the ICU (4 cases).

Outcome data and main results: **Figure 2** shows the proportion of VTE. There were 37 (47.4%) cases of DVT, 31 (39.7%) cases of PE, and 10 (12.8%) cases of PE associated with DVT.

Table 2 shows the distribution of risk factors of VTE. The most frequent risk factors were-Obesity in 35 (44.9%) cases, hypertension in 29 (37.2%) cases, immobility in 16 (20.5%) cases, and long-haul travel in 14 (17.9%) cases.

Table 3 shows the clinical presentation of VTE. In PE cases, the most common presentations were dyspnea in 33 (80.48%) cases, and chest pain in 27 (65.85%) cases. The most common clinical presentation in the DVT cases was a

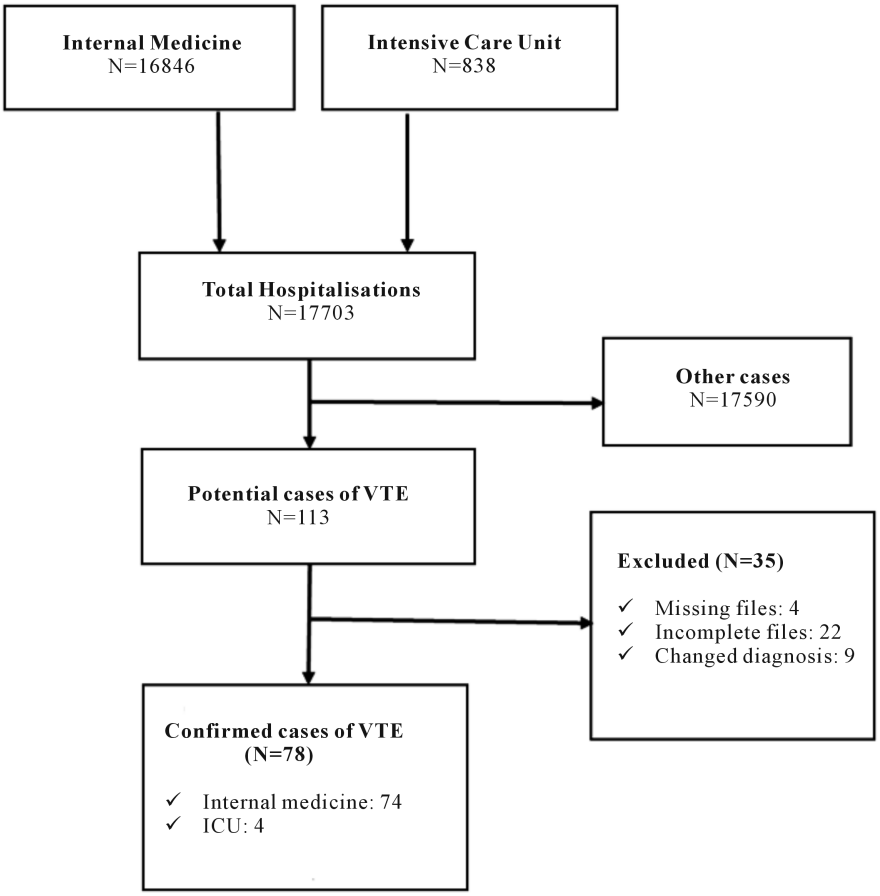

Figure 1. Flow of patients.

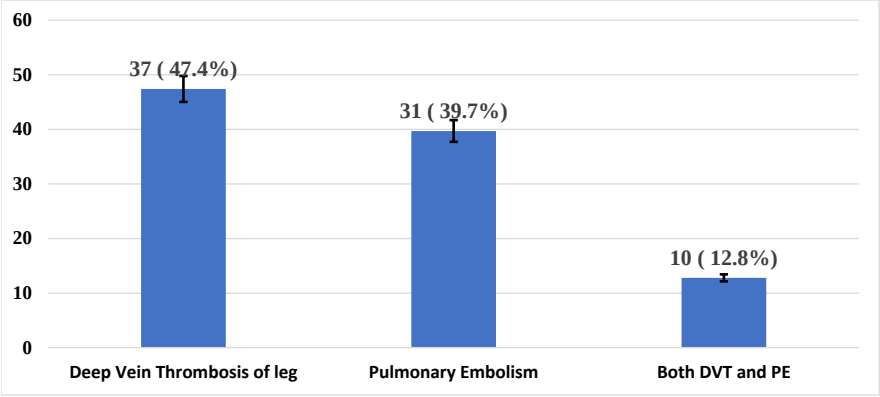

Figure 2. Proportion of VTE in the study population.

swollen inferior limb in 42 (89.4%) cases. In order to confirm the diagnosis of PE, a pulmonary angiography was done in 38 (92.7%) cases. Endo-luminal defects were present in 36 (94.7%) cases. There was a parenchymal involvement in 27 (71.1%) cases, with 6 (15.8%) cases of pulmonary infarction, and 6 (15.8%) cases of pleural effusion. In all, 37 ECGs were performed with 29 (78.4%) being abnormal. The most frequent findings were sinus tachycardia in 19 (51.35%) cases, anterior T-wave inversion in 13 (35.14%) cases, and S1Q3 pattern in

Table 1. General characteristics of the study population (n = 78).

Variables	Frequency (%)
Gender	
Male	42 (53.8)
Female	36 (46.2)
Age Group	
<35	12 (15.4)
35 - 44	17 (21.8)
45 - 54	13 (16.7)
55 - 64	20 (25.6)
65 - 74	11 (14.1)
>75	5 (6.5)
Origin	
Home	42 (53.8)
Referred from other hospitals	27 (34.6)
Transferred from other wards	9 (11.5)
Hospitalisation Ward	
Internal medicine	74 (94.9)
Intensive Care Unit	4 (5.1)

Table 2. Risk factors of venous thrombo-embolism in the study population (n = 78).

Variable	Frequency (%)
Medical risk factors	
Hypertension	29 (37.2)
Previous VTE	9 (11.5)
Autoimmune disease	1 (1.3)
Cancer	5 (11.5)
Pulmonary tuberculosis	3 (3.8)
Cardiovascular disease	10 (12.8)
HIV infection	11 (14.1)
Dyslipidemia	3 (3.8)
Central venous catheterization	4 (5.1)
Others	15 (19.2)
Recent surgical intervention	
Gynecology/obstetrical	4 (5.1)
Obstetrical	
Pregnancy	1 (1.3)
Puerperium	2 (2.6)
Abortion	1 (1.3)
Social risk factors	
Exogenous hormones	1 (1.3)
Immobility	16 (20.5)
Smoking/toxicomania	8 (10.3)
Obesity	35 (44.9)
Long-haul travel (≥4 hours)	14 (17.9)
Family history of VTE	3 (3.8)

Table 3. Clinical presentation, electrocardiographic findings, location, and treatment of VTE.

Variables	Frequency (%)
Pulmonary Embolism (n = 41)	
Dyspnea	33 (80.5)
Chest pain	27 (65.9)
Syncope	4 (9.8)
Heamoptysis	3 (7.3)
Respiratory distress	7 (17.1)
Shock	2 (4.9)
Right heart failure	1 (2.4)
Altered state of consciousness	3 (7.3)
Deep Vein Thrombosis (n = 47)	
Calf stiffness	21 (44.7)
Homanns sign	24 (51.1)
Pain	37 (78.7)
Inferior limb swelling	42 (89.4)
Electrocardiogram (n = 37)	
Right Ventricular hypertrophy	1 (2.4)
Incomplete right bundle branch block	5 (12.2)
S_1Q_3 pattern	11 (26.8)
Anterior T-wave inversion	13 (31.7)
Tachycardia	19 (46.3)
Echography of leg Veins (n = 47)	
Proximal location only	**25 (53.2)**
External iliac vein	2 (4.3)
Femoral vein	6 (12.8)
Ilio-femoral vein	5 (10.6)
Popliteal vein	8 (17)
Ilio-femoro-popliteal vein	1 (2.1)
Popliteo-femoral vein	18 (38.3)
Distal location only	**4 (8.5)**
Sural vein	17 (36.1)
Peroneal vein	2 (4.3)
Posterior tibial vein	1 (2.1)
Both Distal and proximal locations	**16 (34)**
Venous Thrombo-Embolism Treatment (n = 78)	
Low Melecular Weight Heparin	73 (93.6)
Vitamin K antagonists	62 (79.5)
Unfractioned heparin	8 (10.3)
New oral anticoagulants	1 (1.3)
Elastic compressive stockings	15 (19.2)
Patient education	21 (26.9)

11 cases (29.73%). DVT cases were all confirmed by compression ultrasounds performed on all 47 cases, which showed the locations of the thrombi. On establishment of a diagnosis, patients were placed on treatment. These treatments included unfractionated heparins, Low-Molecular-Weight Heparin (LMWH), and vitamin K antagonists. New oral anticoagulant was used in a one case. Thrombolysis and embolectomy were not used as means of treatment. The duration of hospitalization ranged from 1 to 36 days (median: 11days [IQR: 8 - 16]).

Figure 3 shows the short term mortality of VTE. There were 8 (10.3%) cases of death. This was highest in those with PE. A secondary pulmonary infection occurred in 6 (14.6%) cases of PE. Of these 8 fatal cases, 2 had a DVT associated with: advanced age (71years), hypertension and a severe sepsis in one case, and a thrombosis of the inferior vena cava with a military tuberculosis in the other. In the other 6 cases, 5 had PE, and 1 had a PE associated with DVT. In these 6 cases, the association of risk factors was advanced age, HIV infection cigarette smoking; advanced age, hypertension, recent surgery; advanced age, hypertension, obesity; surgery, immobility, sepsis; advanced age and cancer; and finally, advanced age and hypertension.

4. Discussion

The objective of this cross-sectional descriptive study was to describe the epidemiology, clinical presentations, and outcome of VTE at the Douala General Hospital (DGH). VTE was seen in 4.4 cases per 1000 admissions in the internal medicine unit and ICU. About twelve cases of VTE are seen yearly at the DGH, with an in-hospital mortality of ten percent. Obesity and hypertension were the main risk factors, with dyspnea and chest pain being the main clinical manifestations in PE, and lower limb swelling the main symptom in DVT.

The male predominance this study is similar to the 55% reported by Kingue *et al.* in Yaoundé—Cameroon [17], and different from that reported by that reported by Ogeng'o *et al.* at an East African tertiary referral hospital [6]. The mean age of or patients was lower than the 60 ± 11.7 years reported by Aissa

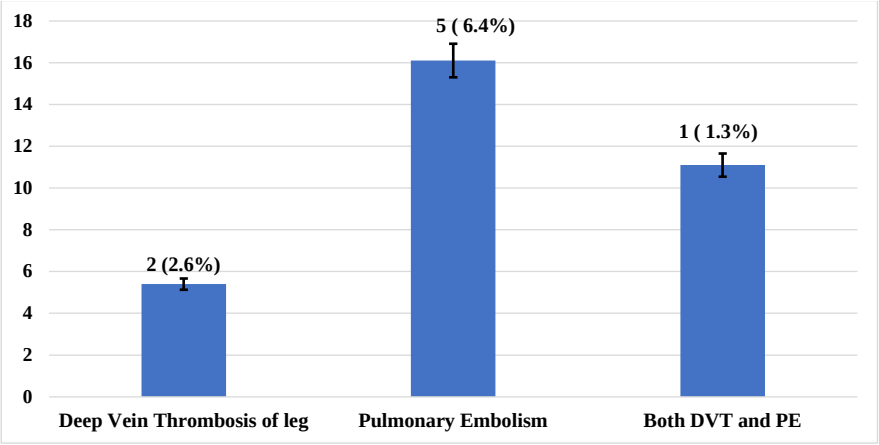

Figure 3. Short term mortality according to the type of VTE.

et al. [7] in Tunisia, but higher that reported by Kingue *et al.* [17] and Ogengo'o *et al.* [6], who reported a mean age of 46 and 40.8 years respectively.

The most frequent risk factors of a VTE in this study were morbid obesity (44.9%), hypertension (37.2%), immobility (20.5%), long-haul travel (17.9%) and HIV infection (14.1%). These results were partly similar to those obtained by Ogeng'o *et al.* who reported as main risk factors DVT, hypertension, pulmonary tuberculosis, HIV infection, puerperium, diabetes mellitus and cigarette smoking [6], Kingue *et al.* who had as main risk factors surgery, history of VTE and morbid obesity [17]. Sotumbi *et al.* reported as risk factors hypertension, phlebitis, chronic cor Pulmonale, and heart failure [3]. In India, Lee *et al.* had as main risk factors malignancy and post-operative status [13]. Yamada *et al.* in Japan had as main risk factors; female gender, prolonged immobilization, history of prior VTE, lower extremity varicose veins, BMI ≥ 25 kg/m^2, extremity paralysis and gout/hyperuricemia [18]. Ishida *et al.* reported as risk factors for PE, advanced age, DVT, cancer, fracture, obesity and surgery [19]. The differences observed in the predominance of the risk factors can be explained by the fact that a prophylactic VTE treatment is given to cases with predisposing factors such as surgery, phlebitis and heart failure thus reducing the occurrence of VTE in these patients at the Douala General hospital. The different lifestyles, diets and disease predominance in these different populations can also be a cause of the difference in frequencies of the different risk factors of VTE observed.

In this study, the most recurrent clinical presentation of a PE was a dyspnea and chest pain. This was similar to Igun *et al.* who reported severe dyspnea and central chest pain as main clinical presentation, associated to loss of consciousness, hemoptysis, and mental confusion [20]. Sotunmbi *et al.* in Bamako had respiratory distress, hemoptysis, syncope and circulatory collapse as clinical presentation [3]. In Pakistan, PE presented with tachypnea and tachycardia. These differences in clinical presentations may be due to the different severities of the disease on admission at the different health institutions. In the case of DVT, our results and those of Igun *et al.* [20] were similar, with the most common clinical feature being limb swelling.

The in-hospital mortality rate during a VTE was 10%. Sotunmbi *et al.*, Husain *et al.*, and Lee *et al.* [3] [13] [19] reported similar results with respective mortality rates of 11.3%, 13% and 13.5%. This was lower than that reported by Kingue *et al.* who had a 16.6% death rate [17].

5. Limitations

The main limitation of this study is the retrospective collection of data. This led to many case files being excluded because of missing key data. The result is a reduction in the power of the study, and alterations in the true in-hospital prevalence of VTE, its risk factors, and the outcome rate. This also, did not permit us to the study the incidence of VTE, which can only be assessed in Cohort studies.

6. Conclusion

The objective of this cross-sectional descriptive study was to describe the epidemiology, clinical presentations, and outcome of VTE at the Douala General Hospital (DGH). VTE was seen in 4.4 cases per 1000 admissions in the internal medicine unit and ICU. About twelve cases of VTE are seen yearly at the DGH, with an in-hospital mortality of ten percent. Obesity and hypertension were the main risk factors, with dyspnea and chest pain being the main clinical manifestations in PE, and lower limb swelling the main symptom in DVT.

Disclosure

None to declare.

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None.

Authors' Contributions

Study conception: FK, BH, MSD, HL, and BHMN. Study design: FK, BH, AD, MSD, HL, BHMN. Data collection: FK, BH, AM, JFK, CK, MSD, MS, HN, AC, SM, YW, RH, AK. Data analysis and Interpretation: AM, AMJ, FK, HL, BH, AD, YW, and MSD. Drafting of the manuscript: FK, BH, AM, AMJ, JFK, CK, SM, HN, RH, AK. All the authors have read and approved of the final draft for publication.

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