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Pulmonary Embolism at the Luxembourg University Hospital in Bamako: A Cross-Sectional Study of 48 Cases

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Abstract

Introduction: The objective was to study the epidemiological, clinical, therapeutic and evolutionary aspects of pulmonary embolism at the Luxembourg University Hospital in Bamako. **Patients and Methods:** Cross-sectional study with prospective recruitment from January to December 2023 including all patients hospitalized in the cardiology department for PE. **Results:** We collected 48 cases of PE out of 580 hospitalized patients, *i.e.* a hospital frequency of 8.27%. The predominance was female, with a sex ratio of 0.92. The mean age of patients was 57.42 ± 14.66 years. The 46 - 65 age group was the most affected, at 47.91%. Risk factors for VTE were dominated by sedentary lifestyle (54.16%), hypertension (39.58%), obesity (37.50%), diabetes (22.91%), and history of heart disease (8.33%). The main symptoms were: dyspnea (91.70%), chest pain (70.80%) and cough (25%). The ECG noted: tachycardia (68.75%), S1Q3T3 (18.75%) and right block (6.25%). The simplified PESI score was ≥ 1 in 50% of our patients. Transthoracic cardiac Doppler ultrasound showed right cavitary dilation (64.58%), PAH (52.08%) and right intraventricular thrombus (6.25%). Chest CT angiography was normal at 6.30% and an embolus at 93.70%. DVT was found on venous Doppler of the lower extremities in 41.66% of patients. Treatment consisted of curative dose LMWH with VKA (56.25%) or DOAC (43.75%) relay for a duration of 6 months. Thrombolysis was used in 33.33% of patients with PE at high risk of early mortality. The evolution was favorable at 95.84% and the case fatality rate was 4.16%. **Conclusion:** Pulmonary embolism is rela-

tively common but underdiagnosed with a female predominance. Chest pain and dyspnea are the classic functional signs.

Keywords

Pulmonary Embolism, Epidemiology, Clinical, Therapeutics, Evolution, Bamako, Mali

1. Introduction

Embolism is the severe form of venous thromboembolic disease and is a diagnostic and therapeutic emergency [1]. It is secondary to deep vein thrombosis of the lower limbs in 90% of cases [2]. Embolism is underdiagnosed and undertreated in Sub-Saharan Africa, because of its difficult diagnosis, which uses clinical probability scores, the most commonly used of which are the Wells and Geneva scores [3] [4]. The objective of this work was to study the epidemiological, clinical, therapeutic and evolutionary aspects of pulmonary embolism and improve its management at the Luxembourg University Hospital in Bamako.

2. Patients and Methods

Cross-sectional study with prospective recruitment over one year from January 1 to December 31, 2023. Included were all patients of both sexes and of all ages hospitalized in the ward for pulmonary embolism confirmed by CT angiography of the pulmonary arteries and/or venous Doppler ultrasound of the lower limbs. Information was collected for each patient on an individual survey sheet after their informed consent. This card included vital statistics, clinical data including PESI score items, etiological factors for pulmonary embolism, cardiovascular risk factors, biology, ECG, cardiac Doppler ultrasound, venous Doppler ultrasound of the lower limbs, CT angiography of the pulmonary arteries, treatment and evolution data. Data were entered on Word 2016 and Excel 2007 and analyzed on SPSS version 22. Confidentiality was respected and data processing was anonymous.

3. Results

We collected 48 cases of PE out of 580 hospitalized patients, *i.e.* a hospital frequency of 8.27%. The predominance was female, with a sex ratio of 0.92. The mean age of patients was 57.42 ± 14.66 years. The 46 - 65 age group was the most affected, at 47.91%. Risk factors for VTE were dominated by sedentary lifestyle (54.16%), hypertension (39.58%), obesity (37.50%), diabetes (22.91%), and history of heart disease (8.33%). The main symptoms were: dyspnea (91.70%), chest pain (70.80%) and cough (25%). The ECG noted: tachycardia (68.75%), S1Q3T3 (18.75%) and right block (6.25%). The simplified PESI score was ≥ 1 in 50% of our patients. Transthoracic cardiac Doppler ultrasound showed right cavitary dilation (64.58%), PAH (52.08%) and right intraventricular thrombus (6.25%). Chest CT angiography was

normal in 6.30% and an embolus in 93.70%. DVT was found on venous Doppler of the lower extremities in 41.66% of patients. Treatment consisted of curative dose LMWH with VKA (56.25%) or DOAC (43.75%) relay for a duration of 6 months. Thrombolysis was used in 33.33% of patients with PE at high risk of early mortality. The evolution was favorable at 95.84% and the case fatality rate was 4.16% (Table 1).

Table 1. CV risk factors and etiological factors.

CV risk factors and etiological factors	Number	%
High blood pressure	19	39.58
Diabetes	11	22.91
Dyslipidemia	4	8.33
TOBACCO	6	12.50
Obesity	18	37.50
Sedentary lifestyle	26	54.16
History of DVT	1	2.08
History of heart disease	4	8.33
History of PE	4	8.33
CANCER	4	8.33
Contraception	2	4.16

4. Discussion

We collected 48 patients out of 580, *i.e.* a hospital frequency of PE of 8.27%. This frequency is significantly higher than the 1.7%, 2.9% and 3.1% respectively of Diall *et al.*, Ndiaye *et al.* and Pessinaba *et al.* [5]-[7]. The mean age of our patients was 57.42 years ± 14.66 years with more frequent involvement between 45 - 65 years. These data are in agreement with Diall *et al.* and Pessinaba *et al.* [5] [7] but lower than the data of Reißig *et al.* [8] who found an average age of 68 years with a predominance between 60 - 79 years. The predominance was female, with a sex ratio of 0.92 in agreement with the rest of the literature [5]-[7].

Functional signs were dominated by dyspnea (91.70%), chest pain (70.80%) and cough (25%). These figures are in agreement with the data of Ndiaye *et al.* [6] who found respectively 84.3% for dyspnea and 70.80% for chest pain. Cardiovascular risk factors were dominated by physical inactivity (54.16%), hypertension (39.58%), obesity (37.50%), diabetes (22.91%), in agreement with Owono Etoundi *et al.* and Ondze-Kafata *et al.* [9] [10]. Etiological factors of PE were dominated by cancer (8.33%), history of PE (8.33%), and contraception (4.16%). In the series of Ndiaye *et al.* [11], these factors were dominated by tuberculosis (59.25%), advanced age (14.81%), thrombophilia (9.25%). Tachycardia (58.33%) and an S1Q3 appearance (18.75%) were the most common electrocardiographic abnormalities in agreement with Camara *et al.* [12]. On transthoracic echocardiogram and in agreement with Pessinaba *et al.* [7], right cavitary dilation (64.45%) and PAH (52.08%) were the most common abnormalities. On venous Doppler ultrasound of the lower limbs,

DVT was found in 41.66% of patients. In his series Mbaye [13] found DVT in 29.72%. CT angiography of the pulmonary arteries revealed PE in 93.75% of our patients. Pessinaba *et al.* [7] in their series found an EP in 90.2%. PE was bilateral in 75.55% of cases and proximal in 42.22% close to Mbaye *et al.* [13] data which found bilateral PE in 74% and proximal in 50% of cases. Pulmonary embolism was at high risk of mortality in 50% of our patients by Mbaye *et al.* [13] and Pessinaba *et al.* [7]. PE with a high risk of mortality was found in 17.50% and 15.68% of cases, respectively. Management was conventional with low molecular weight heparins at curative doses, followed by VKA (56.25%) or DOAC (43.75%) in agreement with Ndiaye *et al.* [6], but in his series DOACs were rarely used (16.90%). On the other hand, in the series of Diall *et al.* and Pessinaba *et al.* [5] [7]. The relay was carried out only by the VKA. Thrombolysis was used in 33.33% of patients with PE at high risk of early mortality greater than the 15 in Pessinaba *et al.* [7] and 13.5% in Ndiaye *et al.* [6]. It was made from streptokinase (62.25%) and Alteplase (37.75%) but in their series it was made from streptokinase. This difference could be explained by the non-availability of Alteplase in their therapeutic arsenal or by its high cost. The trend was favourable in the majority of cases (96.36%) as in the other series [5]-[7] [12]. Hospital mortality was 4.2% lower than Diall *et al.*'s 6% [5], Ndiaye *et al.*'s [6] 6.76% and Pessinaba *et al.*'s [7] 7.4% (**Figure 1** and **Figure 2**).

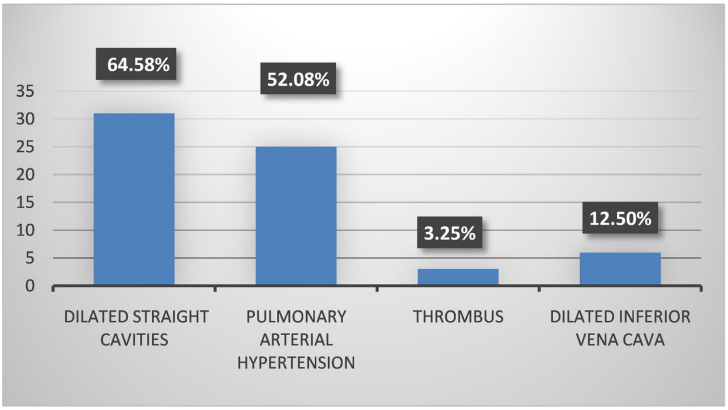

Figure 1. Echocardiographic data.

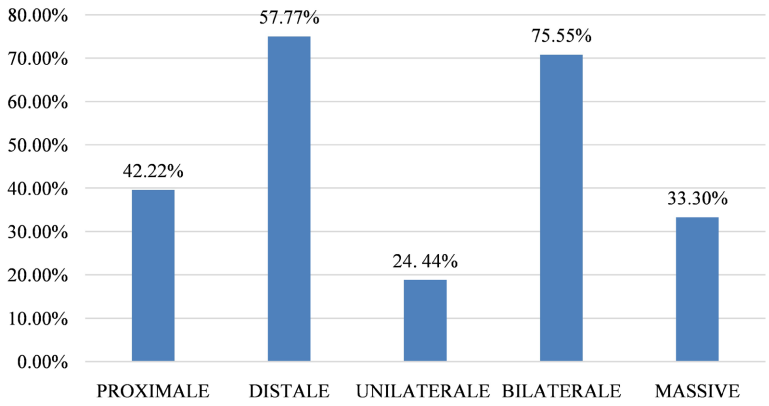

Figure 2. Pulmonary artery CT angiography abnormalities.

5. Conclusion

Pulmonary embolism is relatively common but underdiagnosed with a female predominance. Chest pain and dyspnea are the classic functional signs. Its evolution is favorable in the majority of cases under a well-conducted treatment.

6. Limitations of the Study

Single-center study, sample size limit, and non-randomization.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Abbreviations List

PE	Pulmonary Embolism
DVT	Deep Vein Thrombosis
PAH	Pulmonary Arterial Hypertension
BBD	Right Branch Block
IVC	Inferior Vena Cava
VKA	Vitamin K Antagonist
DOAC	Direct Oral Anticoagulant