

# Venous Thromboembolic Disease in a Regional Hospital in Mali

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## Abstract

**Introduction:** Venous thromboembolism (VTE) is a nosological group which mainly includes deep vein thrombosis (DVT) and pulmonary embolism (PE), it is frequently associated with high morbidity and mortality. We initiated this study with the aim of studying VTE in a cardiological hospital environment in a regional hospital in Mali. **Methodology:** This was a descriptive study with prospective recruitment over 1 year from June 20, 2019 to June 20, 2020, covering patients hospitalized and followed in consultation in the cardiology department of the Ségou regional hospital in Mali. **Results:** We collected 31 cases of VTE out of 366 patients, representing a frequency of 8.47%. The sex ratio was 0.88. VTE risk factors were dominated by immobilization (29.03%), pregnancy and postpartum (16.12%), heart failure (16.12%). The reason for consultation was dyspnea (93.54%) followed by chest pain (83.87%). On admission the clinical manifestations were tachycardia (74.19%), tachypnea (90.32%), muffled heart sounds (70.96%), global heart failure syndrome (51.6%). According to VTE probability scores; 51.61% of patients had an intermediate clinical probability according to the simplified Wells score for PE and 54.84% had an intermediate clinical probability for the simplified Geneva score for DVT. D-Dimers were only performed in 12 patients (38.70%) and were elevated in all. A chest CT angiogram showed PE in 90% of patients (n = 28/31). Venous Doppler ultrasound of the lower limbs showed venous thrombosis in 3 patients. **Conclusion:** Venous thromboembolism, although underdiagnosed, is common in our health structures. Prevention, particularly heparinoprophylaxis and early recovery in a hospital environment, remains

the effective means of combating this condition.

## Keywords

Venous Thrombosis, Pulmonary Embolism, Nianankoro Fomba Hospital, Ségou

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## 1. Introduction

Venous thromboembolism (VTE) is a nosological group that mainly includes deep vein thrombosis (DVT) and pulmonary embolism (PE). Between 70% to 80% of PEs are the complication of a DVT of the lower limbs [1]. This nosological entity is frequently associated with high morbidity and mortality [2].

The assessment of venous thromboembolism risk must be systematic in patients at risk of VTE and must lead to the initiation or not of prophylaxis [3].

The annual incidence of PE is between 60 cases per 100,000 inhabitants and is responsible for 10,000 to 20,000 deaths per year worldwide [1].

In the United States, VTE is the third cause of cardiovascular disease with mortality between 100,000 and 180,000 patients per year due to its complications [4]. In France, it affects approximately 0.2% of the population and is associated with a mortality rate of 10% [2]. In Ivory Coast, the prevalence of DVT is 0.95%, and 1.17% in Senegal [5] [6].

In Mali, a study carried out by Coulibaly found a hospital frequency of 4.95% in a cardiology department [7]. Pulmonary embolism accounted for 1.21% of hospitalizations at the Gabriel Touré University Hospital in 2018 [8].

Our study is a first study at the Ségou regional hospital; we were interested in this nosological entity to determine its epidemiological-clinical aspects.

## 2. Methodology

This was a descriptive study with prospective recruitment over 1 year from June 20, 2019 to June 20, 2020, covering patients hospitalized and followed in consultation in the cardiology department of the Ségou regional hospital in Mali. The sampling was exhaustive with systematic recruitment of all patients in whom the diagnosis of thromboembolic disease was retained. Patients were recruited during outpatient consultations or those evacuated from other peripheral health structures.

All patients hospitalized or followed up in the said department during the study period for venous thromboembolism documented by chest CT angiography and/or venous Doppler ultrasound of the limbs were included.

Data collection was done from individual patient monitoring sheets covering epidemiological (age, sex, profession, length of hospitalization), clinical (clinical constants and signs), paraclinical (biological parameters, electrocardiogram, frontal chest x-ray, cardiac and venous Doppler ultrasound, chest CT angiography).

**The diagnosis of pulmonary embolism was made on the basis of:**

**-Clinical:** The typical picture associates dyspnea and spontaneous and sudden basi-thoracic pain with phlebitis, right heart failure and more or less normal pulmonary auscultation on examination.

**-Paraclinical:** On chest CT angiography the image suggestive of PE is a partial or complete endoluminal defect defined by an area of endoluminal hypoattenuation of central, peripheral location or occupying the entire vascular section. Cardiac Doppler ultrasound may be normal or show signs of acute cor pulmonale.

**The diagnosis of venous thrombosis was made on the basis of:**

**-Clinic:** unilateral painful swelling of a limb, dilation of superficial veins, reduction of tossing of the calf, Increased local heat; erythema.

**-Paraclinical:** On venous Doppler ultrasound, the diagnosis was made on the incompressibility of the vein or the partial compressibility of the vein by the ultrasound probe, the visualization of a venous clot, the absence of venous flow during the hunting maneuvers and when breathing.

**The clinical probability scores used were:****WELLS SCORE IN CLINICAL ASSESSMENT OF DVT****Predisposing factors**

**Active cancer** (undergoing active or palliative treatment or discovered less than 6 months ago) 1 point

**Paresis, paralysis or** recent cast immobilization of the lower limbs 1 point

Recent bed rest > 3 days or major surgery < 4 weeks 1 point

**Physical examination**

Pain at palpation of the course of the deep veins 1 point

Swelling (= generalized edema) of an entire limb 1 point

Unilateral swelling of a calf (>3 cm difference between the 2 sides) 1 point  
NB.: measured 10 cm below the anterior tibial tuberosity

**pitting edema** 1 point

(non-varicose) **collateral venous circulation** 1 point

**Alternative diagnosis at least as likely as DVT** -2 points

LOW clinical probability (3%) score: 0 points

Clinical probability INTERMEDIATE (17%) score: 1 - 2 points

HIGH clinical probability (75%) score > 3 points

**Modified Geneva Score****Wells Score****Predisposing factors**

Age > 65 years 1 point

ATCD of TVP or EP 3 points

Recent surgery or fracture (<1 month) 2 points

Active cancer 2 points

**Predisposing factors**

ATCD of TVP or EP 1.5 points

Recent surgery or immobilization 1.5 points

Active cancer 1 point

**Continued**

<b>Symptoms</b>		<b>Symptoms</b>	
Spontaneous calf pain 3 points		Hemoptysis 1 point	
Hemoptysis 2 points			
<b>Clinical signs</b>		<b>Clinical signs</b>	
HR 75 - 94/minute 3 points		HR > 100/minute 1.5 points	
HR > 95/minute 5 points		Signs of DVT 3 points	
Pain provoked on palpation and edema of a calf 4 points		Other diagnosis less likely than PE 3 points	
<b>Clinical Probability</b>		<b>Clinical Probability</b>	
Weak	0 - 3	Weak	0 - 1
Intermediate	4 - 10	Intermediate	2 - 6
Strong	Sup 11	Strong	Sup at 7
		PE unlikely	0 - 4
		Probable PE	Sup at 5

Word processing was carried out with Microsoft WORD 2016 software, data analysis with SPSS Version 22.0 software and diagrams and tables with Microsoft Office EXCEL 2016 software.

Confidentiality was essential and rigorous, anonymity was respected among all patients.

### 3. Results

During the study period, out of 366 patients, 31 presented with VTE, representing a hospital frequency of 8.47%. The sex ratio was 0.88 (M/F) and the mean age was  $54.74 \pm 19$  years (**Table 1**). Around 3/4 of our patients, or 62.8%, came from outside Ségou city. The predominant cardiovascular risk factor was hypertension (32.2%). On the other hand, the risk factors for VTE were dominated by immobilization (29.03%), pregnancy and postpartum (16.12%), heart failure (16.12%), hormonal contraception and orthopedic surgery with each (6.45%). The reason for consultation was dyspnea (93.54%) followed by chest pain (83.87%).

On admission the clinical manifestations were dominated by tachypnea (90.32%), tachycardia (74.19%), muffled heart sounds (70.96%), global heart failure syndrome with 51.6% (**Table 2**).

According to VTE probability scores; 51.61% of patients had an intermediate clinical probability according to the simplified Wells score for PE and 54.84% had an intermediate clinical probability for the simplified Geneva score for DVT (**Table 3**).

Given these probability scores, D-Dimers were only performed in 12 patients (38.70%) and were elevated in all.

A chest CT angiogram showed PE in 90% of patients ( $n = 28/31$ ). The pulmonary embolism was bilateral proximal and distal in 74% of cases ( $n = 23/31$ ) (**Table 4**). Chest x-ray cardiomegaly was the predominant sign with 74.19% followed by PAH with 61.29%.

On the electrocardiogram, sinus tachycardia was observed in 64.51% of cases

**Table 1.** Distribution according to sociodemographic characteristics.

Age groups	Workforce	Percentage
20 - 40	7	22.6
41 - 60	11	35.48
61 - 80	11	35.48
81 and up	2	6.45
Total	31	100
Sex	Number N = 31	Percentage
Male	16	48.4
Feminine	18	51.6

**Table 2.** Distribution of patients according to clinical symptoms at entry.

Signs/syndrome	Number N = 31	Percentage
General Signs	Fever	10 32.3
	Tachypnea	28 90.32
	Tachycardia	23 74.19
Physical Signs	IMO	10 32.3
	Muting of BDCs	22 70.96
	BSA	4 12.90
	DX on palpation of the calf	6 19.35
	HOMANS sign	6 19.35
Syndrome	Global heart failure	16 51.6
	Right heart failure	1 3.2

**Table 3.** Distribution of patients according to VTE probability scores.

Scores	WELLS simplified for EP	GENEVA simplified for TVP
Weak	9 (29.03%)	9 (29.03%)
Intermediate	16 (51.61%)	17 (54.84%)
Strong	6 (19.36%)	5 (16.13%)
<b>Total</b>	<b>31 (100%)</b>	<b>31 (100%)</b>

**Table 4.** Distribution of patients according to chest CT angiography.

Diagnostic	Number	Percentage
Bilateral proximal and distal massive pulmonary embolism	23	74
Massive left proximal pulmonary embolism	1	3.2
Left proximal and distal pulmonary embolism	1	3.2
Bilateral distal pulmonary embolism	3	9.6
Unrealized	2	6.4
<b>TOTAL</b>	<b>31</b>	<b>100</b>

with an SIQ3 appearance in 32.22% and left ventricular hypertrophy in 32.22%.

Cardiac Doppler ultrasound showed systolic dysfunction of the RV in 74.19% of patients, dilatation of the right cavities and PAH in 64.51% and 61.29% respectively. Venous Doppler ultrasound of the lower limbs showed venous thrombosis in 3 patients.

#### 4. Discussion

The limitations of our study were the small sample size, the financial difficulties in carrying out paraclinical examinations, particularly chest CT angiography.

During the study period, out of 366 patients hospitalized or followed in consultation, 31 were for VTE, representing a hospital frequency of 8.47%. Two previous studies carried out in cardiology departments in Bamako showed results superior to ours; 4.95% for Coulibaly [7] and 4.02% for Menta [8]. This difference is explained by the fact that these studies only concerned hospitalized patients.

The average age in our study was  $54.74 \pm 19.734$ , comparable to that of Coulibaly [7] and Camara [9] who reported  $54 \pm 17.79$  and  $52.9 \pm 16.4$  years respectively.

There was a female predominance of 58.1% with a sex ratio of 0.97; rate close to the 63.22% of women in Coulibaly's study [7] and 64% from Ello [10].

VTE risk factors were dominated by immobilization (29.03%), pregnancy and postpartum (16.12%), heart failure (16.12%); Menta [8] found bed rest and HIV infection as etiological factors for VTE. On the other hand, Coulibaly [7] and Diall [11] respectively found emboligenic heart disease in 30.58%, trauma and cancer in 17.64%.

Dyspnea was present in 93.54% of our patients followed by chest pain in 83.87% on admission, the same observation was made by other authors [12] [13].

More than 3/4 of our patients, *i.e.* 90.32%, had tachypnea and 74.19% had tachycardia. Approximately 51.6% of the patients received arrived in a global IC picture indicating a delay in treatment.

According to VTE probability scores; 51.61% of patients had an intermediate clinical probability according to the simplified Wells score for PE and 54.84% an intermediate clinical probability for the simplified Geneva score for DVT. Coulibaly [7], found in DVT of the limbs a high clinical probability according to the Wells score in 17.65% of patients, and in PE it was intermediate according to the Geneva score in 52.94% of patients. Camara [9] found an intermediate estimated clinical probability of 86.1% according to the modified Geneva score in cases of pulmonary embolism and according to the Wells score a high probability of DVT in 91.3%.

D-Dimers were elevated in 100%, *i.e.* all of the 12 patients who had it in our study, a finding similar to that of Coulibaly [7] and Menta [14].

Sinus tachycardia was present in 64.51% of cases, much higher than Coulibaly's 39.18% [7]; an SIQ3 appearance was present in 32.22% of our patients com-

pared to 18.91% in Coulibaly [7] on the electrocardiogram. Camara [9] found in his study that tachycardia, right bundle branch block and S1Q3 appearance were the most striking electrocardiographic abnormalities with 71.4%, 17.9% and 14.3% respectively.

Cardiomegaly was the predominant radiographic sign with 74.19% followed by PAH with 61.29%, Menta [14] found cardiomegaly in 25% and ascension of the diaphragmatic hemi dome in 37.5%.

Approximately three quarters of our patients (74.19%) presented with right ventricular systolic dysfunction. RV dilatation was observed in 64.51% of our patients, associated with pulmonary arterial hypertension in 61.29% of cases. These results are superimposable to those of Damourou [15] and Camara [9].

On chest CT angiography, pulmonary embolism was proximal and distal bilaterally in 82.15% of cases, higher than the 60.92% of Coulibaly [7] as well as the 50% of Camara [9].

Three patients presented with venous thrombosis (9.67%) compared to 1.15 in Coulibaly [7].

## 5. Conclusion

Venous thromboembolism, although underdiagnosed, is common in our health structures. Prevention, particularly heparinoprophylaxis and early recovery in a hospital environment, remains the effective means of combating this condition.

## Conflicts of Interest

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

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