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Pulmonary Embolism in Young Patients: About 24 Cases at the Cardiology Department of Dakar Principal Hospital in Senegal

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Abstract

Introduction: Pulmonary embolism is a relatively common life-threatening cardiovascular emergency. It remains a diagnostic problem because of its nonspecific clinical signs. **Objective**: The general objective was to study pulmonary embolism in young patients admitted to the cardiology department of Dakar Principal Hospital in Senegal. **Methodology**: This was a retrospective, descriptive and analytical study in the cardiology department of the Dakar Principal Hospital over a period of two (02) years from January 1, 2015 to December 31, 2016 in young patients admitted for pulmonary embolism. **Results**: We collected 24 patients with a hospital prevalence of 2.18%. The average age was 42.29 years ± 8.41 years with a male predominance (sex ratio of 1.6). The Wells probability score was low in 54.16% of patients and medium in 45.83%. Functional signs were dominated by chest pain (83.33% of cases) followed by dyspnea (79.16% of cases). The thromboembolic risk factors found were gynecological-obstetrical in 16.6% of cases followed by prolonged bed rest. One case of thrombophilia was present with a deficiency of protein C and antithrombin III. The electrocardiogram recorded sinus tachycardia in 29.16% of patients; the Mac Ginn White sign (S1Q3T3) was found in 25% of cases. Echocardiography showed pulmonary arterial hypertension in 12.48% of cases, dilation of the right ventricle and a paradoxical septal motion in 14.28% of cases. CT pulmonary angiography showed 63.63% of cases with bilateral pulmonary embolism; it was unilateral in 22.72% of cases. Long-term anticoagulation was based on acenocoumarol 4 mg (66.7%) and Rivaroxaban (33.3%). 62.5% of the patients were seen at the 3rd month, when a checking was made to evaluate the tolerance of the treatment, and the evolution of the patient. **Conclusion**: Pulmonary embolism is not a rare con-

dition in young subjects but is often underdiagnosed. Gyneco-obstetrical factors are predominant in this age group. Direct oral anticoagulants are more and more prescribed in our countries.

Keywords

Pulmonary Embolism, Young Patients, Dakar (Senegal)

1. Introduction

Pulmonary embolism is a relatively common cardiovascular emergency obstructing the pulmonary arterial lay, and may be life-threatening but potentially reversible in right ventricular failure [1] [2]. It is the manifestation of the most serious venous thromboembolic disease and is a major cause of mortality, morbidity and hospitalization [1].

However, it remains a diagnostic problem because of its non-specific clinical signs [3].

Very little data has been collected in sub-Saharan Africa on this pathology in young people, which is why we wanted to study the prevalence of pulmonary embolism in young patients admitted to the cardiology department of the Dakar Principal Hospital, in order to identify etiological factors and to appreciate the diagnostic, therapeutic and evolutionary aspects.

This was a retrospective, descriptive and analytical study over a period of two (02) years from January 1st, 2015 to December 31st, 2016, conducted in the cardiology department of Dakar Principal Hospital in Senegal.

Patients aged 60 and under, admitted for pulmonary embolism during the study period, were included.

The data were collected using a counting sheet from the hospitalization register. Epidemiological, clinical, paraclinical, therapeutic and evolutionary data were collected. The entry mask was made on SPHINX epidemiology software, version 5.1.0.3.

After the data entry, the database was transferred to the statistical software SPSS 20.0 (Statistical Package for the Social Sciences) for data mining and analysis.

The working out of tables, figures and the writing of our study were made under Office 2013.

2. Materials and Method

This was a retrospective, descriptive and analytical study over a period of two (02) years from January 1st, 2015 to December 31st, 2016, conducted in the cardiology department of Dakar Principal Hospital in Senegal.

Were included patients aged 60 and under, admitted for pulmonary embolism during the study period. Pulmonary embolism is defined as partial or complete

obstruction of the pulmonary arteries or their branches by emboli, most often of fibrino-crustal origin.

The data were collected using a counting sheet from the hospitalization register. Epidemiological, clinical, paraclinical, therapeutic and evolutionary data were collected. The entry mask was made on SPHINX epidemiology software, version 5.1.0.3.

After the data entry, the database was transferred to the statistical software SPSS 20.0 (Statistical Package for the Social Sciences) for data mining and analysis.

The working out of tables, figures and the writing of our study were made under Office 2013.

3. Results

During this period, twenty-four patients were admitted with a hospital prevalence of 2.18%. The average age was 42.29 years ± 8.41 years (range 30 to 60 years) with a male predominance (sex ratio of 1.6). The Wells probability score was low in 54.16% of patients and medium in 45.83%. Functional signs were dominated by chest pain (83.33% of cases) followed by dyspnea (79.16% of cases). Ten patients presented with cough (41.16%) and hemoptysis was present in 29.16% of cases. Etiologies were dominated by gynecological and obstetric factors in 16.6% of cases followed by prolonged bed rest; recent surgery, history of venous thromboembolic disease and obesity were noted in 12.5% of cases each (Table 1).

Phlebitis was found in 8.3% of patients.

One case of thrombophilia was present with a deficiency of protein C and antithrombin III. Note that 20.8% of patients were hypertensive and smoking was found in 16.6% of patients. On the electrocardiogram, we noted sinus tachycardia (29.16%), a Mac Ginn White sign (S1Q3T3) (25%), a right bundle block, an inversion of the T wave in 12.5% of cases each and a right atrial hypertrophy (4.16%) (Table 2).

Echocardiography showed pulmonary arterial hypertension in 12.48% of cases with average systolic pulmonary arterial pressure at 67.66 mmHg; a dilation of the right ventricle, a paradoxical septal motion and a chronic lung heart aspect in 14.28% of cases.

Venous Doppler ultrasonography of the lower extremities revealed thrombosis of the right common femoral vein and soleus vein thrombosis in 4.16%.

CT pulmonary angiography revealed bilateral pulmonary embolism in 63.63% of cases, and was unilateral in 22.72% of cases.

Anticoagulation was based on low molecular weight heparin in all patients, subcutaneous injection at a dose of 100 international units/kg twice daily.

It was started at the same time as the anti-vitamin K, whose early relay was performed as soon as you obtain an effective INR (International Normalized Ratio) (between 2 and 3 in the absence of particularity).

Table 1. Distribution by risk factors for pulmonary embolism.

Risk factors	Number	Percentage %
Surgery	03	12.5
Previous VTE	03	12.5
Cardiopathy	01	4.16
Gyneco-obstetrical factors	04	16.6
Cancer	01	4.16
Immobilization	03	12.5
Obesity	03	12.5
Diabetes	01	4.16
Hypertension	05	20.83
Smoking	04	16.6

VTE: Venous thrombo-embolism.

Table 2. Distribution by electrocardiographic signs (n = 24).

Signs	Number	Percentage (%)
Sinus tachycardia	07	29.16
S1Q3T3 aspect	06	25
Right bundle branch	03	12.5
T-wave inversion	03	12.5
Q3 waves	01	4.16
Q3T3 waves	01	4.16
Right atrial hypertrophy	01	4.16
Left ventricular hypertrophy	01	4.16
T-wave inversion	01	4.16
Normal ECG	04	16.66

Acenocoumarol 4 mg was used in 66.7% and Rivaroxaban was the direct oral anticoagulant used in other cases.

Patients were followed at 3 months to evaluate the anticoagulant therapy. Fifteen patients were reviewed, *i.e.* 62.5% of cases. Of these patients, four (26.66%) presented symptoms upon consultation. Chest pain was noticed in 1 case, exercise dyspnea in 1 case, and cough in two cases.

One case of death occurred at home.

4. Discussion

Pulmonary embolism is a rare condition in young African subjects. This observation was also made by Souleymane [4] in Lomé.

The sex ratio was 1.66 in favor of men. This male predominance was found by Haifa [5] in Tunis and Natalia in Bulgaria [6]. However, in the literature, it is

more frequent in women, because of the gyneco-obstetrical risk factors added to those of men. Thus, the same observation of female predominance is made by Souleymane in Togo [4] and Diall in Mali [7].

Surgery was the dominant etiological factor (12.5%). Natalia found 16.6% of after surgery embolism in her study [6]. This can be explained by the greater thrombogenic risk after surgery and it should be remembered that in the literature, it is in orthopedic surgery where this risk is highest, ie 40% to 80% of cases [8].

Phlebitis was found in 8.3% of cases. Haifa reported 18% of thrombophlebitis in her study [5], compared to 45% in Natalia's study [6]. The PIOPED study showed that 15% of patients with embolism had symptoms suggestive of deep vein thrombosis [9].

Prolonged immobilization was done in 12.5%. Haifa scored 19% in her series [5]. This risk is even more incriminated as it is associated with other factors. The notion of estrogen-progestative contraception was noted in 33.33%. This finding could be explained by the approximately 4-fold increase in the risk of venous thromboembolic disease with estrogen-progestin pills. This risk is even greater if the progestin combined with estrogen is of the third generation [10] [11].

We also found a case of progressive pregnancy of 32 weeks of amenorrhea. If the risk is 5 times higher in pregnant women, due to venous stasis and changes in hemostasis, it is particularly increased during the 3rd trimester and up to the 5th week postpartum [8]. Obesity was noted in 12.5% against 5.4% in the Haifa study [5]. However, if the risk of developing pulmonary embolism is greater in obese individuals, it increases even more if there is an association with other thromboembolic risk factors [12].

Chest pain was present in 83.33% of cases. Yen-Yi found chest pain in 52.2% of cases [13] and Haifa [5] in 79% of cases.

With chest pain, dyspnea is the most common functional feature in pulmonary embolism studies and even in young patients. We found it in 79.16% of cases, while Yen-Yi observed it in 91.3% against 47% in the Haifa series [5] [13].

Syncope was found in 4.33% against 28.3% in Yen-Yi [13].

In our patients, the clinical probability was estimated according to the Wells score with an average of 1.83 ± 1.4 points and extremes of 0 and 4.5 points. Natalia scored an average Wells score of 5.24 ± 1.7 points [6].

A deficit in protein C (reduced to 54%) and antithrombin III (rate at 76%) was found in 4.16% against 81% in Natalia's [6]. Three patients had a plasminogen activator inhibitor mutation, two patients with a factor V Leiden mutation, a prothrombin gene mutation in one patient, a protein S deficiency in two patients, and a syndrome of anti-phospholipid antibodies in one patient. They also noted in four patients a combined heterogeneous mutation.

Constitutional thrombophilias and Behcet's disease are the most common causes of venous thrombosis in young patients [14] [15]. These low rates in our study are explained by the high cost of these tests which limits the dosages in our patients who are mostly poor.

The Mac Ginn White sign (S1Q3T3) was noted in 25% of cases against 5.7% at Nurdan's [16].

Doppler echocardiography showed an acute cor pulmonale appearance in 57.15% of subjects, whereas 44.8% was found in the Nurdan study [16].

Venous Doppler ultrasonography of the lower extremities revealed deep vein thrombosis in 8.33% of cases. Haifa, Nurdan and Natalia scored respectively 18%, 44% and 45% in their studies [5] [6] [16].

This difference can be explained by the small size of the sample.

The CT pulmonary angiography showed the pulmonary embolism in 91% where it could be realized. Haifa reported 30% of pulmonary embolism found by CT angiography among the 53 young patients who benefited [5]. This difference is explained by the non-availability of CT angiography in certain emergency situations where we used cardiac ultrasound to make the diagnosis and the therapeutic decision-making.

Anticoagulation was based on low molecular weight heparin in all patients, via subcutaneous injection at a dose of 100 international units/kg twice daily. It was started at the same time as anti-vitamin K, which early relay was carried out as soon as an effective International Normalized Ratio was achieved (between 2 and 3 in the absence of particularity).

Acenocoumarol 4 mg was the anti-vitamin K used in 66.7% and Rivaroxaban was the direct oral anticoagulant used in 33.3% with 15 mg twice a day for the first 3 weeks, then 20 mg once per day. The anticoagulation duration was dependent of the etiology.

In our study, there were 4.16% of deaths after discharge from hospital. Sakuma reported that deaths from pulmonary embolism are higher in young people, especially in the age group between 20 and 39 years, with mortality slowly but significantly rising in young people in Japan [17].

5. Conclusions

Pulmonary embolism of the young subject is not rare in Sub-Saharan Africa.
Surgical factors were the main etiologies found.
The diagnosis is often difficult because of its clinical polymorphism.
Direct oral anticoagulants have revolutionized the management.

Conflicts of Interest

None.

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