Epidemiological, Clinical, Paraclinical and Evolutionary Profile of Patients Hospitalized for Tuberculosis in the Pneumology Department at Fann Hospital

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Abstract

Introduction: Pulmonary diseases are responsible for at least 6 million hospitalizations worldwide. These pathologies are dominated in our countries by infections, particularly pulmonary tuberculosis, which makes it a major public health problem.

Methods: We collected all the records of patients hospitalized for pulmonary tuberculosis during 2 years: From January 2019 to January 2021.

Results: We collected 791 cases of tuberculosis among the 2060 patients hospitalized during the study period, i.e. a hospital prevalence of 38.40%. In this population we had a clear male predominance with a sex ratio of 2.22. The distribution of tuberculosis was as follows: pulmonary localization in 92% of cases, bifocal pleural and pulmonary localization in 1.7% of cases, isolated pleural involvement in 5.83% and one case of lymph node tuberculosis. The comorbidities found were diabetes (7.4%), HIV (2.28%), sickle cell disease (0.83%). The average length of stay was 15 days. Complications were dominated by bacterial superinfections (15.8%), pulmonary embolism (11.2%), hemoptysis (6.4%) and pneumothorax (5.3%). We deplored a death rate of 2.23%.

Conclusions: Tuberculosis remains a concern in our emerging countries and access to prevention and the search for comorbidities are essential for good management of the disease.

Keywords: Patients • Hospitalization • Tuberculosis • Comorbidities • Death

Introduction

Tuberculosis is a cosmopolitan infectious disease. It constitutes a major public health problem in the world whose magnitude requires special attention. According to the World Health Organization, tuberculosis is one of the ten leading causes of death in the world and the leading cause of death due to a single infectious agent (before HIV/AIDS) [1]. The HIV pandemic and the emergence of multidrug-resistant and extensively drug-resistant bacilli have aggravated the impact of this disease. The WHO in its report estimates that in 2018, 10 million people contracted tuberculosis worldwide and 1.5 million died from it (including 251,000 HIV carriers). Although the improvement in socio-economic level, the effectiveness of anti-tuberculosis treatment and BCG vaccination have led to a clear decline in the disease, they have not made it an endangered disease. It continues to be talked about because of the disparity it has generated between the low prevalence in developed countries and the high prevalence in poor countries. Indeed, more than 95% of cases and deaths occur in developing countries, particularly those in Africa and Asia [2]. In Senegal, in 2018, 13,250 cases of tuberculosis, including 3% deaths, were recorded [3]. However, its treatment has been completely free for several years. Although the lethality of tuberculosis is decreasing in Senegal, from 4% in 2017 to 3% in 2018 [3], efforts still need to be made to further reduce the number of infected subjects and consequently the number of deaths. To achieve this goal, it would be necessary to identify and reduce the factors that promote the occurrence of tuberculosis and the causes of death among tuberculosis patients. It is in this context that we undertook this study in the pulmonology department of the CHNU of Fann with the following objectives:

General objective

The objective of this study is to determine the epidemiological, clinical, paraclinical profile and the evolution of patients hospitalized for tuberculosis in the pneumo-phthisiology department of the CHNU of FANN over a period of two years (2017 and 2018).

Specific objectives

-To describe the socio-demographic and clinical profile of hospitalized patients

-To identify the main complications of the disease in these patients

- Studying the risk factors for mortality of tuberculosis in patients.

Materials and Methods

Type of study and period of the study

We carried out a descriptive and analytical retrospective study based on records of patients hospitalized for two years from 2019 to 2021.

Target population

Our study will focus on all the records of patients hospitalized for pulmonary tuberculosis in the pneumology department during the pre-established period of our work.

Inclusion criteria

Were included all the records of patients hospitalized in the pneumophthisiology department during the period of our study and having benefited from a genexpert of sputum that came back positive and sensitive to Rifampicin and who received anti-tuberculosis treatment.

Non-inclusion criteria

The following will not be included in the study:

- Patients whose records are incomplete and/or unusable.

- Patients whose genexeprt reveals multidrug-resistant tuberculosis

- Patients who died before the start of antituberculosis treatment

Data collection: The data of each patient were collected and entered on the basis of a questionnaire pre-established by the sphinx2 software version 5.

Parameters studied

The following parameters were studied:

- Hospital prevalence

- Sex

- Age

- Professional sector:

Primary sector: The primary sector corresponds to activities related to the extraction of natural resources: agriculture, fishing, forestry and mining.

Secondary sector: This sector corresponds to activities related to the transformation of raw materials, oil refining, the wood industry, aeronautics and electronics, industrial production, etc.

Tertiary sector: This is a sector that groups together economic activities such as consulting, insurance, education, mass distribution, tourism, catering and real estate agencies, etc.

- Origin:

Inter-structure: Different services within the same hospital structure

Public structure: Health establishment subject to the obligations of the public health code.

- Marital status

- Place of residence

- Reason for consultation

- Comorbidities, conditions, history

- Syndromes found

- Biological assessment requested

- Radiological assessment requested

- Suspected and/or retained diagnoses

- Etiology

- Type of treatment received

- Evolution

- Death

Statistical analysis and data collection

Data collection will be carried out on a survey form from hospital records and registers. Data entry will be done with sphinx plus2 version 5 and statistical analysis with the same software. The significance threshold for statistical tests was set at 5%.

Results

Descriptive part

Frequency: We collected 791 cases of tuberculosis among the 2060 patients hospitalized for 2 years: from January 2019 to January 2021, i.e. a hospital prevalence of 38.40%.

Sociodemographic characteristics

Age distribution: The average age is approximately 47 years, the minimum age is 15 years while the maximum age is 93 years.

The distribution of patients by age group showed that the age groups of 20 to 40 years (33.01%) and those of 60 to 80 years (30.18%) were the most represented (Figure 1).

Distribution by gender: The majority of patients in the study were men (n=550) or 69.05% and women (n=241) or 31.95% with a sex ratio of 2.22.

Distribution by marital status: Concerning the marital status of patients, the results show that married people represented more than a quarter of the study population with 27.04%, followed by single people with 15.87%. It should be noted that for more than half of the responding files (51.60%), the marital status was not specified (Table 1).

Distribution by professional sector: Information on the profession was found for 179 patients, representing a response rate of 22.6%. It appears that the majority of patients worked in the tertiary sector (35.20%) (Figure 2).

Distribution by type of care: In most cases (64.15%) patient care was provided by the patient himself or his family. The IPRES (Institut de Prévoyance et de Retraite Sociale) provided the lowest share (3.72% or 29 patients). Twenty percent of patients were provided by the Sésame plan (Service de Soutien et d'Accompagnement sur les Marchés Extérieurs) (Figure 3).

Clinical profile

History, background and comorbidities:

Smoking: Information on smoking was provided for 212 patients, or 21.99% of patients. A detailed analysis of smoking shows that 45.7% of these patients were active smokers (Figure 4).

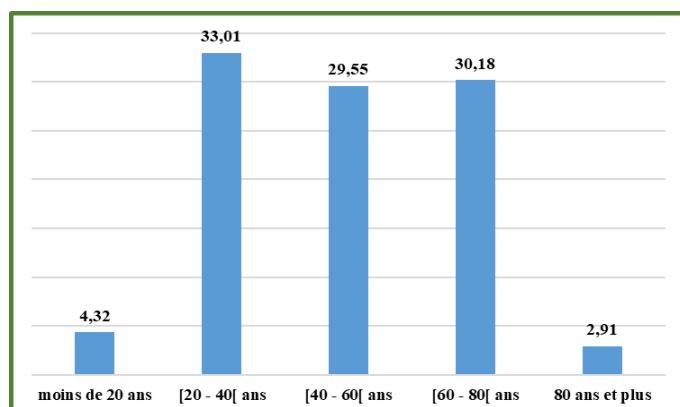**Tuberculosis:** A history of tuberculosis was found in 18% of our patients - Other conditions.

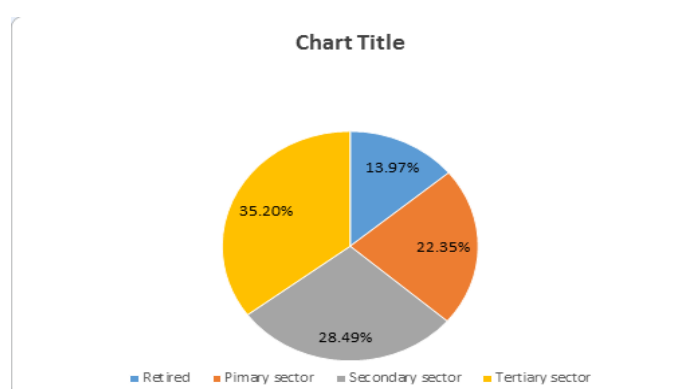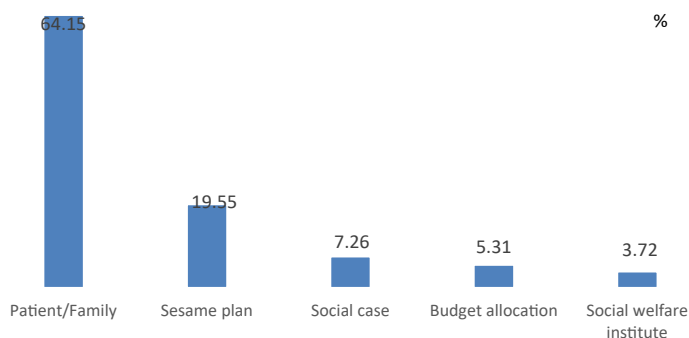**Figure 1.** Distribution of patients by age group.

Figure 2. Percentage distribution of patients by professional sector.

Table 1. Distribution of patients according to their marital status.

Marital Status	Effective (N)	Percentage (%)
Widowed	41	2.48
Divorced	79	3.01
Single	234	15.87
Maried	427	27.04
Undeclared	10	51.60
Total	791	100

Figure 3. Distribution in percentage of patients according to the type of care.

Figure 4. Percentage distribution of patients concerning smoking.

The comorbidities found were dominated by diabetes and hypertension respectively 7.04% and 5.48% (Table 2).
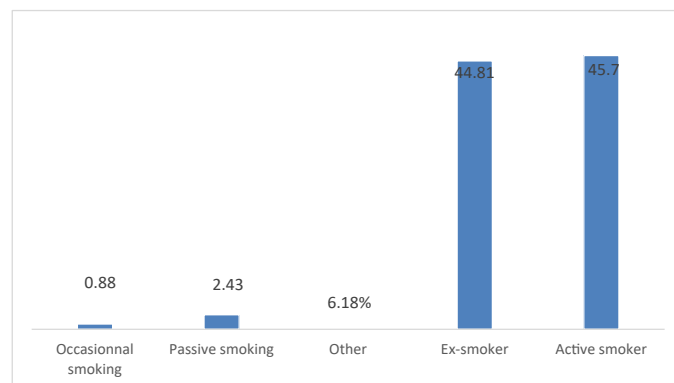
Consultation time of the disease: The consultation time of the respiratory disease had been specified for 775 patients, and the majority had a progression time of between 1 and 3 months, namely 50% and the time grouping the least patients is 6-12 months (1.8%).

Distribution according to the reasons for consultation

Dyspnea was the most frequent reason for consultation and concerned 84.37% of patients. This reason was followed by cough 84.13% of cases and chest pain in 77.86% of patients (Table 3).

Paraclinical profile

The results of the cytobacteriological study (ECB) of pathological products showed that for 279 patients 96.87% (out of a total of 288) the result was positive, the sputum with 53.05% represented the majority (Table 4).

Retroviral Serology (SRV)

Retroviral serology had been specified for 79 patients and for these 9.98% (i.e. 73 patients) had HIV1. Note that 2 patients had both HIV1 and HIV2.

The CD4 count had been specified for 36 patients. It varied between 1 and 406 with an average value of 104.86. Furthermore, half of these patients had a CD4 count lower than 59.50.

Chest X-ray

The results of the chest X-ray were indicated for 698 patients. The most common result for patients was related to infiltrates, for a little over 75% (more precisely 76.22%) (Table 5).

Table 2. Number and percentage of patients according to other history, conditions and comorbidities.

Variables	Effectif (N)	Percentage (%)
Diabeties	60	7.04
HTA	44	5.48
Surgery	46	4.56
Cancer	19	3.11
HIV	17	2.28
Asthma	9	1.12
BPCO	8	1.02
Sickle Cell disease	3	0.83
PID	1	0.15

Table 3. Number and percentage of patients according to the reasons for consultation.

Variables	Effectif (N)	Percentage (%)
Dyspnea	664	84.37
Cough	662	84.13
Chest pain	609	77.86
Sputum	601	76.55
Hémoptysis	189	23.59
Hippocratisme digital	2	0.10
Edema of the lower limbs	87	11.02

Table 4. Number and percentage of patients following the ECB.

Variables	Effectif (N)	Percentage (%)
Sputum	113	14.05
Pleural effusion	76	9.60
Cerebrospinal fluid	10	0.01
Urine	10	0.01
Blood	3	0.37
BAL	2	0.10
Pus	1	0.12

Table 5. Chest X-ray results.

Results	Effective (N)	Percentage (%)
Infiltrates	601	76.22
Excavation	253	32.29
Liquid effusion	87	11.58
Gaz effusion	47	6.14
Hydroaeric image	37	4.60
Miliary	25	3,28
Parenchymal destruction	22	2.79
DDB	20	1.81
Pulmonary emphysema	9	1.11
Pulmonary mass	5	0.70
Cardiomegaly	4	0,63
Atelectasis	3	0.42
Mediastinal mass	2	0.28
Parahilar mass	1	0.14
Epaississement pleural	1	0.14
Aspergillus graft	1	0.07
Pulmonary fibrosis	1	0.07
Normal chest X ray	1	0.07

Distribution according to the treatment received

Nutritional intake and rehydration were included in almost all patients, namely 775 patients (i.e. a rate of 98.50%) and 767 patients (i.e. 97.38%) respectively. Analgesics (91.31%) and antipyretics (81.60%) (Table 6).

Evolutionary profile

The majority of patients hospitalized (71.41%) in the department had a favorable evolution allowing them to return home. However, it should be noted that many deaths had also been recorded, with a rate of 22.23% of patients (Figure 5).

Analytical part

Age: Performing statistical tests to compare the mean age of patients and infectious/non-infectious complications allows us to conclude that there is a statistically significant difference between the mean age and the type of

Table 6. Distribution of patients according to the treatment received.

| Treatment	Effectif (N)	Percentage (%)
Nutritional Intake	775	98.50
Rehydratation	767	97.38
Analgesic	719	91.31
Antipyretic	640	81.60
Anticoagulant	632	80.05
Antibiotics	601	76.50
Oxygen therapy	904	43.88
Antituberculosis	340	37.09
Nébulization	158	20.15
Corticothérapy	134	17.57
Hémostatic	127	16.80
Antitussive	126	16.26
Respiratory physiotherapy	217	10.53
Evacuation puncture	79	9.51
Pleural drainage	78	8.74
Bronchodilatateur	25	3.20
Antiretrovirals	15	2.91
Non-invasive ventilation	1	0.05
Others (anti-hypertension, antidiabetic, transfusion, antiemetic, anxiolytic, laxative, etc.)	112	14.81
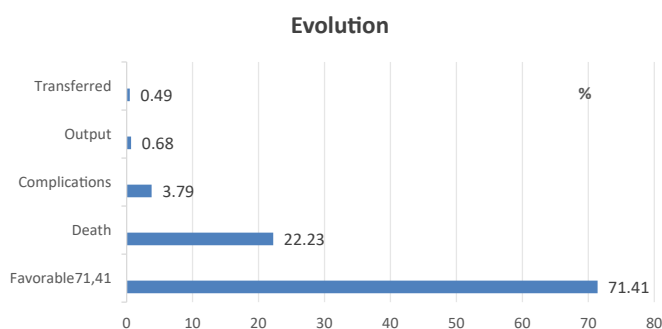
Evolution

Figure 5. Proportion of patients following the evolution.

etiology (Table 7).

Sex: It appears that there is a statistically significant difference between gender and etiology (infectious/non-infectious) (Table 8).

Discussion

Frequency of hospitalized patients

During the period of our study from January 2019 to December 2021, we collected 791 files of patients with tuberculosis who were admitted. While Diallo BD, et al. [1] in Guinea Conakry, had in their case collected 913 tuberculosis patients hospitalized over a study period longer than ours, which explains the frequency of the disease in our countries in a tuberculosis endemic zone.

The average age of the patients was 46 years, lower than the 60 years found

Table 7. Percentage distribution of patients according to complications and age group.

Age (years)	Infectious (n= 279)	Non-Infectious (n= 126)	Standard Deviation	p
Age group (5)	Average =45.75	Average =59.72		
Under than 20 ans	1 (4.86%)	-		
20-40 ans	100 (36.65%)	10 (8.02%)	0.82	0.00
40-60 ans	80 (29.64%)	33 (26.72%)		
60-80 ans	72 (26.02%)	78 (62.21%)		
More than 80 ans	7(2.83%)	2 (1.91%)		

P=0.00

Table 8. Percentage distribution of patients according to complications and sex.

Sex (n=)	Infectious/(n=550)	241 Non-Infectious (n=)
Man	368 (67.82%)	185 (77.10%)
Female	176 (32.18%)	53 (22.9%)

P= 0.01
P= 0.01

by Jabli S, et al. [4], in fact this may be the result of the quality of life (smoking, transition to autoimmune diseases) and the late onset of bronchopulmonary cancers, note that for several of our patients the age was not always known and verifiable, it is therefore perfectly possible that our results differ from other studies carried out

Sex: The male predominance in our study was reported for both etiological groups, men were the most represented, our result is comparable to a study conducted in Guinea Conakry which found 509 women for 1404 men, i.e. a sex ratio of 2.74 [5]. Several factors can explain the MSR, but smoking is the most important modifiable factor [6], despite the evolution of society, female smoking is still underestimated [6], which goes in the direction of male predominance. The question remains whether there is a genetic and/or other specificity that could explain this strong male predominance in our African context remains.

Smoking: With regard to smoking, it was found to be passive in 45.70% of cases, which is in agreement with a study conducted in Guinea Conakry [7]. The tobacco epidemic is one of the most serious threats ever to global public health. It causes more than 8 million deaths each year worldwide. More than 7 million of them are users or former users, and about 1.2 million non-smokers are involuntarily exposed to smoke. More than 80% of the 1.3 billion smokers in the world live in low- and middle-income countries, where the burden of tobacco-related morbidity and mortality is the heaviest. Smoking contributes to poverty because households spend money on tobacco that they could have spent on essential needs such as food and housing [8].

Paraclinical aspects: An ECB for 13.98% of patients, its daily use remains

important due to the dominance of bacterial superinfections of tuberculosis, which is in agreement with Diallo BD, et al. 202 cases of bacterial pneumonia, 154 cases of superinfection of Tuberculosis sequelae, 104 cases of purulent pleurisy, 25 cases of COPD, and 15 files classified as *other* [7].

-Also for (53.63%) of patients, moderate anemia was revealed. For several respiratory diseases (DDB, cancer, pulmonary tuberculosis, etc.) found, hemorrhage is a very present mechanism. -SRV was found in 17 patients, which is a very low rate compared to those carried out in Conakry, for whom HIV serology was available in 575 files with a co-infection rate of tuberculosis patients of 26.7% [7]. This difference could be due to problems occurring at the time of collection or notification of the result.

Complications: They were dominated by bacterial superinfections. Infections are the leading cause of hospitalization in pneumology. The level of equipment must be raised for better patient care [7]. The findings of these different series are similar to our results, they all corroborate the fact that infectious etiology dominates our different services, we are witnessing an evolution with regard to tumor etiology which is gaining ground and also the advent of autoimmune diseases.

Treatment: Almost all patients had received nutritional support (98.50%) and rehydration (97.38%), knowing that many of them arrive in a state of significant malnutrition and dehydration, due to late consultations, hospital wandering and the precariousness of a large part of the population. In equally high rates, patients had received analgesics 91.31%, antipyretics 81.60%, anticoagulants 80.05%, oxygen therapy 43.88%, non-tuberculous ATB

76.50%, anti-tuberculosis 37.09%, etc. It should be noted that non-tuberculous antibiotics are widely used, while waiting for the results (BAAR, ECB, etc.) a broad-spectrum treatment is often initiated in order to stabilize the infectious picture that accompanies a large part of hospitalized patients. It should be noted that the management of patients hospitalized in pneumophthisiology is often multidisciplinary and requires the use of several therapeutic classes.

Mortality: In our series, we deplored a high death rate of 22.23%, which is not negligible, similar to a study carried out in Togo, and the reported mortality rate was 22.22% for Adambounou TAS, et al. [9]. As we can see in the literature, 600,000 people die each year from respiratory disease in the EU, almost half of these deaths are due to respiratory infections, lung cancer or COPD. For many diseases, hospitalizations and deaths are only the tip of the iceberg. Respiratory diseases are expected to cause 1 in 5 deaths worldwide [3]. This high death rate is attributable to the addition of several elements in our context (lack of financial resources, long consultation times, often failing technical platform, heavy care, access to expensive treatments, etc.).

Conclusion

We concluded that the COPD patients with PBEC≤170 /µL and PBER≤1,15% were more frequently transferred to ICU and, intubated and died at the hospital while suffering less from recurring exacerbations in the short (12 months) and long-term follow-up. Low eosinophils during admission with acute exacerbation were related to poor short-term prognosis in COPD patients.

Acknowledgement

Conflict of Interest

There is no conflict of interest in this study.

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