

The Management Problem of Miliary Tuberculosis in the Service of Pneumo-Phtisiology at the National References University Teaching Hospital of N'Djamena (Chad): About 103 Cases

Mahamat Ali Bolti¹, Rangar Ngakoutou², Abdoulaye Ahmet², Mad-Toingue Joseph², Dluida Dieudonné², Lodoum Mbainadji², Josephine Toralta², Meurde Nemian², Lucien Allawaye², Koboye Bonté Adjougoult², Yusra Aboulbchar¹, Hamit Mahamat Alio^{1*}

¹Faculty of Human and Health Sciences and The Renaissance University Teaching Hospital of N'Djamena, N'Djamena, Chad

²Faculty of Human and Health Sciences and The National Reference University Teaching Hospital of N'Djamena, N'Djamena, Chad

Email: *hamitalio@yahoo.fr, hamitalio@gmail.com

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Abstract

Introduction: Miliary tuberculosis (MT) is a rare form of tuberculosis (TB) and it is a major public health problem in our countries with limited resources. **Materials and Methods:** It is a retrospective and descriptive study that started from 1st January 2018 to 31 December 2020 at the pneumo-phtisiology service of the CHU-RN of N'Djamena., All records of patients aged at least 15 years treated for miliary tuberculosis confirmed by X-ray chest were included in our study. **Results:** The prevalence of TD was 1.5% (n = 103) of all TB diagnosed in the service. The sex ratio was 1.34. The average age was 37.7 years with extremes ranging from 19 to 80 years. A low social economic level was found in 75.7%. The principal comorbidity found in this study was HIV with the prevalence of (22.3%). The general signs were dominated by deterioration of general condition (96.1%) and fever (91.3%). The main symptoms were cough (85.4%) and dyspnea (52.4%). The radiology of chest found a homogeneous dissemination and symmetrical in both lung fields in 100% of cases. Our study reported that 14 (13.6%) of death cases were found among patients. **Conclusion:** TM is a severe form of TB; it affects a young population in our context. Mortality remains high with prevalence of 13.6% of cases. Early management would improve the prognosis.

Keywords

Miliary Tuberculosis, CHU-RN, N'Djamena (Chad)

1. Introduction

Miliary tuberculosis (TM) or granulia is the diffusion of one or more point(s) of the organs especially in the lungs. Nowadays, the term “granulia” has been abandoned in favor of that of “miliary tuberculosis”. Several studies have shown that black people and Americans native are the most vulnerable to this form of tuberculosis (TB) [1]. The granulations can reach and affect all the viscera including meninges, retina, brain, liver, spleen, kidney, digestive tract and the bone marrow. On the pleura, which often contains an effusion, the granulations form slightly raised yellowish or grayish dots, more numerous on the diaphragmatic pleura and in the fissures [1]. It is a rare form of TB, defined by its hematogenous or lymphatic dissemination of the tubercle bacillus from a pulmonary or extra-pulmonary focus, which can be life-threatening, it is a diagnostic and therapeutic emergency [2]. It is a relatively infrequent condition, representing less than 2% of TB according to the literature and about 8% of extra-pulmonary TB [3]. Factors favoring the occurrence of TM include overwork; undernourishment; immunosuppression; poverty, pregnancy, childbirth; lack of BCG vaccination; chronic alcoholism; long-term corticosteroid therapy; diabetes, hematological malignancies, and accidental or surgical trauma [4]. TB is among the principal leading causes of death and also is it is among the dangerous infections agent responsible for human death in worldwide [3] [5]. Chest X-ray plays a key role in diagnosis of TM [6]. The treatment is identical to that of pulmonary TB. Corticosteroid therapy was indicated in the case of hypoxemic miliaria and other forms such as tuberculous pericarditis, tuberculous meningitis [7]. According to the WHO, about 10 million people were infected by TB in 2017 and 1.5 million died from it, considering that TM is one of these variants [3] [5]. In France, out of 5092 of reported cases TB was the miliary form representing 132 (2.6%) of cases, [8]. On the other hand, in Cameroon, TB represented 16.1% [9] and in Bangui 6.81% [10]. In Chad, few studies have been carried out on TM. In the view of this context, we decided to conduct this study to describe the epidemiological, diagnostic, therapeutic and evolutionary aspects in order to improve the management of patients suffering from it.

2. Methods

Type and period of study

It is a retro-prospective and descriptive study carried out in the pneumo-phtisiology service of the CHU-RN of N'Djamena over a period of 3 years that started from 1st January 2018 to 31 December 2020.

Study population

The study population consisted of hospitalized patients in pneumo-phtisio-

logy service of CHU-RN of N'Djamena during the above-mentioned period. Included in this study, all the Patients who completed their medical record considered as symptoms and diagnosed with TM.

Inclusion criteria

Our study population was consisted from hospitalized in the pneumo-physiology service of the CHU-RN of N'Djamena and whose aged ranged from 15 years or less during the above-mentioned period. Included in this study all the patients who completed their medical records with symptoms and who diagnosed from TM.

Exclusion criteria

Not included in our study, all the patients who had incomplete records and whose aged range under 15.

Technical data collection

The sampling technique was based on consecutive recruitment of patients meeting the inclusion criteria as they are admitted to the pneumo-phthysiology service during the study period. Data were collected using a pre-designed survey form containing the following parameters:

- socio-demographic data (age, sex, profession, social-economic level, origin service);
- clinical data (consultation reason, life history, lifestyle);
- paraclinical data (thoracic X-ray, HIV serology, bacilloscopy);
- therapeutic and evolutionary data.

Diagnosis method

The diagnostic method recommended in this study was X-ray chest, bacilloscopy and GeneXpert. The X-ray chest showed classic images is essential for these diagnosis [11]; the image have been taken with a very short exposure time in apnea and it was read using a negatoscope [11]. A positive TM image, according to [11] and [12] has two aspects:

- Typical appearance was characterized by a scattering of fine opacities of the size of a millet grain with a low density with clear contours that distributed regularly in all of two pulmonary fields.
- Atypical aspects produce nodules which can be:
 - 1) Either unequal, confluent in opacities with polycyclic contours, unequally distributed, predominant in the perihilar regions or unilaterally;
 - 2) Either associated with a reticular image producing a reticular-nodular appearance. Sometimes the reticulo-nodular appearance, homogeneous or associated with larger nodules, testifies the confluence of smaller lesions.

Data analysis technic

Data have been analyzed by using SPSS Version 20.0 software, also chi-square test was used to compare two or more proportion to find the significant between them.

Ethical aspects

The confidentiality of information's contained in the patients' files have been respected.

3. Results

Social-demographic data

During the study period, 6700 cases of pulmonary tuberculosis were recorded in the pneumo-physiology service of CHU-RN of N'Djamena, in which 103 (1.54%) cases of miliary tuberculosis have been represented.

Age and sex:

Our study was dominated by the present of female sex with 59 (57.3%) of cases. The sex ratio was 1.34; the age average was 37.7 years with extremes ranging from 19 to 80 years. The majority of our patients were young people (16 to 44 years old) or 73.78%. The most age group affected was that of 25 - 34 years with the prevalence of 37.9% (Table 1).

Residence and social economic level:

According to residence and social economic level; 83.5% of our patients came from the urban area and 78 (75.7%) from them had a low social-economic levels (Table 1).

Table 1. Patients distribution according to sociodemographic data.

| Socio-démographic data | | F (%) | M (%) |
|-----------------------------|-----------------|------------------|-------------------|
| Sexe | | 59 (57.3) | 44 (42.71) |
| | | n | (%) |
| Age (year) | 19 - 24 | 12 | 11.6 |
| | 25 - 34 | 39 | 37.9 |
| | 35 - 44 | 25 | 24.3 |
| | 45 - 54 | 13 | 12.6 |
| | 55 - 80 | 14 | 13.6 |
| Total | | 103 | (100) |
| residence | | Urban (%) | Rural (%) |
| | | 86 (83.5) | 17 (16.5) |
| | | n | (%) |
| marital status | Married | 62 | (60.2) |
| | Singles | 26 | (25.2) |
| | Divorce | 2 | (2) |
| | widowers | 13 | (12.6) |
| Total | | 103 | (100) |
| | | n | (%) |
| Socio-economic level | Low | 78 | (75.7) |
| | Mean | 23 | (22.33) |
| | Higher | 2 | (2) |
| Total | | 103 | (100) |

Legend: n = number of patients with TM; (%) = percentage; ≥greater than or equal; F = feminine; M = masculine.

Marital status:

Married people were the most represented in this study with the frequency of 62 (60.2%) (**Table 1**).

Clinical data**Filled and Comorbidities:**

The majority of our patients had HIV as the main comorbidity with a frequency of 23 cases or 22.3% (**Table 2**), corticosteroid therapy was found as part of the treatment of systemic disease (SLE).

Admission and diagnosis time:

The most moment between the beginning of symptoms and diagnosis was found in the first 7 days.

Symptoms found:

Our study revealed that 96.1% of our patients had fever and 91.3% had deterioration of general condition. The most common respiratory functional signs were dry cough (85.4%) followed by dyspnea (52.4%) (**Table 2**).

Paraclinical data**Types of X-Ray Lesions**

The micronodular was found in 84.4% and their opacities had a homogeneous distribution, regular and symmetrical in the two pulmonary fields was found in 97.1% (**Table 2**).

Table 2. Distribution of patients according to: Clinical data, paraclinical data and evolution.

| | Distribution of patients | Effective (n) | Percentage (%) |
|--------------------------|---|---------------|----------------|
| Clinical data | VIH | 23 | (22.3) |
| | Fever | 99 | (96.1) |
| | Deterioration of general condition. | 94 | (91.3) |
| | Dry cough | 88 | (85.4) |
| | dyspnea | 54 | (52.4) |
| Paraclinical data | micronodular | 87 | (84.4) |
| | micronodular with opacity | 100 | (97.1) |
| | leukocyturia | 5 | (4.9) |
| | Bouchut tubercles | 4 | (3.8) |
| Evolution | Healing (guerison) | 35 | (40) |
| | Processing completed (Trai terminé) | 25 | (24.2) |
| | Discontinuation of treatment (abandon du trait) | 11 | (10.7) |
| | Lost view (perte de vue) | 18 | (17.5) |
| | Death (deces) | 14 | (13.6) |
| | Total | 103 | (100) |

Assessment of extension:

The study of cytobacteriological urine was performed in 10 patients and revealed that the leukocyturia presented in 5 cases with the prevalence of (4.9%) (**Table 2**). The examination also revealed that the Bouchut tubercles was present in 4 (3.88%) patients (**Table 2**). The searches for tubercle bacilli (BK) who carried out were all negative.

Therapeutic and evolutionary data

Hospitalization period:

The most hospitalization time was found that ≤ 7 days with 51 (49.5%) of cases.

Table 2 summarizes the clinical, paraclinical, and outcome data of patients on anti-tuberculosis therapy.

4. Discussion

Our study revealed that, out of 6700 cases of diagnosed TB in the pneumo-physiology service at the CHU-RN in N'Djamena, the TM represented 1.54% of cases. This proportion was lower than that of Touré *et al.* [13] in 2011 in Senegal, and that could be explained by the size of our sample and by the duration of our study. In the literature, the predominance of male is classic [12] [13] [14] [15] [16]. However, a slight predominance of female was described by some authors [2] [4] [17], in our study the female sex represents 57.3% (**Table 1**). This patients' predominance in this study could be related to the hospitalized patients' population who is characterized by a predominance of infected women with HIV, on the other hand the majority of African population and particularly in Chad, they force women to stay at home, thus limiting their empowerment and exposing them to tuberculosis. The TM predominance in young subjects was a reality in the majority of series from countries with high tuberculosis endemicity, particularly in Africa [18] [19] and India [20]. The age groups 25 to 34 years were most represented in our survey with the prevalence of 37.9% with an average age of 37.7 years (**Table 1**), similar to some result found in several studies, such as Touré *et al.* [13] who found the prevalence of (73.4%) in the age group 15 to 35 years with an average age of 37.5 years. This predominance could also be due to the fact that the African population and particularly Chadians are mostly doing some activities at young ages and that exposing them to the risks of contamination by TB and particularly to TM [21] [22].

In our study, patients with a low social economic level represented 75.7% of cases (**Table 1**). This result made it possible to conclude on the precariousness of our patients. The achievement of this social economic group could be due to their financial low income and reduction in accessibility to health care centers. Our result was consistent with the literature that TB is a poverty-related disease [23]. The 83.5% of our study population are living in the city of N'Djamena (**Table 1**). This result is comparable to those of Tékpa in Bangui and Agodokpessi *et al.* in Cotonou [10] [14]. The 60.2% of our patients were married (**Table 1**). Same result found by several studies such as [13] [15] [24]. The explanation

is that in the cities, the TM diagnosis is following by the existence of specialists and technical platforms, unlike the married patients who lives in rural areas [13] [14].

As the main comorbidity the majority of our patients (22.3%) had an HIV (Table 2). This result was higher than that of Touré *et al.* [13] who noted the prevalence of 29%, and lower from that of Haloui *et al.* [18] who found 10 (77.7%) of TM cases among the patients whos had HIV. The association between TB and HIV was well established and reported by several authors, and that could be corroborated with the lifestyle of our patients who were mostly young. The searches for bacilli tubercle (BK) who carried out were all negative, this research was not successful as observed in the literature [13] [14] [23] [25].

We observed in our study that 49.51% of our patients that the delay between beginning of symptoms and the moment of diagnosis was less than one week. Our result differed from that of Msaad S *et al.* [24] in Tunisia and Riah *et al.* [3] who found a delay of 1 to 3 months and more than 2 months. These differences could be explained by the fact that our study period coincided with the COVID-19 pandemic; and also the similarity of the symptomatology with TM was motivated in earlier consultation of our structure by patients who are mostly living in N'Djamena city (Table 1).

In our study, (91.3%) of our patients had impaired of general condition and (96.1%) from them had fever (Table 2). same observation was made by Mbouandi *et al.* [25] in 2021 in Cameroon and Ouattara *et al.* [26] in Mali in 2018 who found that 96.7% of patients had impaired of general condition and 44.6% of had fever, that could be explained by the patient's self-medication before their admission to different hospitals which would mask the symptomatology and also could be explained by the fact that fever and poor living condition are among the most frequent reasons for TM consultation. In addition, the study shows that, the dominant respiratory functional signs were cough in 85.4% and dyspnea in 52.4% of cases (Table 2). This result corroborated with that of Ouattara *et al.* [26] who found 86.2% in the 2 signs and slightly lower than that of Touré *et al.* [13] who found cough was the main sign in 96% of cases. This high frequency of functional signs in our series could be explained by the fact that cough and dyspnea disturb the patient and those who living around them, thus motivating a consultation in our structure.

The X-ray chest is the only imaging examination was performed in all our patients. This result is similar to that of Ouattara *et al.* [26] and Cherkaoui *et al.* [12], and that could be explained by the lower cost and accessibility of X-rays chest, unlike other analyses. As an extension of assessment, 4.9% of our patients had leukocyturia and 3.8% Bouchout tubercles (Table 2). These results are consistent with that of literature including Bouchut tubercles which are a consequence of TM in the eye [11] [13] [26].

In our study micronodular images were the most signs found in our patients with the prevalence of 84.4% (Table 2). Our result is comparable to that of Touré *et al.* [13] and Kanouté *et al.* [27] who noted the rate of 88% in each, and

significantly higher than that of Bitchong *et al.* [28] who found 64% of micronodular images. This result could be explained by the fact that the aspect of micronodular lesions was the most typical and the most frequent in TM. In our study, images of pleurisy associated with miliaria were found in 2.9%. This result was lower than those of Hedhli *et al.* [29] and Ouattara *et al.* [26] who found 16.7% and 16.9% of them respectively. This could be explained by the size of the sample and by the particularity of the study of Hedhli *et al.* [29] in the immunocompromised.

In addition, according to the standard regime of the National Tuberculosis Control Program (PNT) concerning the anti-tuberculosis treatment, corticosteroid therapy was initiated in 54 (52.4%) of patients (these are all patients with dyspnea) (Table 2). This result was lower than that of Hedhli *et al.* [29] and Ouattara *et al.* [26] who found 66.7% and 83% of them respectively. The low using of corticosteroid therapy in our therapeutic protocol could be explained by the fact that the majority of our patients were admitted for consultation for febrile non-hypoxemic miliaria.

5. Conclusion

Although our study did not take into account the other antecedents and predisposing factors of the patients such as diabetes, sickle cell disease type and anemia, our investigation was able to highlight the epidemiological factors of TM which mainly affects the young population with an average age of 37.7 years. It is a medical emergency and mortality remains high in 13.6% of cases of our study. T M remains the severe form of TB and early management would improve the prognosis.

Authors' Contribution

All the authors were contributed of achievement of this work and to the drafting of the manuscript. All authors have read and approved the final version of the manuscript.

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Conflicts of Interest

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

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