

CLINICAL AND THERAPEUTIC ASPECTS OF TUBERCULOSIS IN CHILDREN AT THE CENTRE HOSPITALIER UNIVERSITAIRE DE LA MÈRE ET DE L'ENFANT**Toralta Nodjitouloum Gueguila Josephine^{*1}, Ngakoutou Rangar², Ngaringuem Adrienne¹, Ildjima Kedallah Ousmane¹, Youssouf Hagre Djiditta¹, Mahamat Zalba Guillaume³**¹Department of Pediatrics, CHU- Mother and Child – N'Djamena- Chad.²Pneumology Department, CHU- National Reference.³Department of Nephrology, CHU- La Renaissance.***Corresponding Author: Toralta Nodjitouloum Gueguila Josephine**

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ABSTRACT

Introduction: Tuberculosis (TB) is difficult to diagnose in children and is responsible for many deaths in children under 15 years of age in developing countries. The objective of our work was to contribute to the management of tuberculosis in children in the pediatric department of the CHU-ME (N'djamena). **Methods:** This was a descriptive cross-sectional study over 2 years (January, 2021 to December, 2022) consisting of a review of the records of children aged 0 to 15 years, treated for tuberculosis in the pediatric department of CHU-ME (N'Djamena). Data were collected from follow-up registers and medical records. Children with a complete medical record were included, and the diagnosis of tuberculosis was based on the presence of a combination of anamnestic, clinical, biological and radiological evidence. The collected data were entered and analyzed in SPSS 18.0, Microsoft word, and Excel 2013 software. **Results:** A total of 116 cases of tuberculosis were collected among 3898 hospitalized patients (2.97%). The sex ratio is 1.15. The mean age of the patients was 6.58 years. Tuberculosis infection was suspected in 50 children (43.1%). Koch's bacillus was detected in 44 children (37.9% positive). Pulmonary and lymph node localizations were the most common. There were 84 cured children (72.4%). Among the sick children, 23 were lost to follow-up (19.8%) and 7 died (6.1%). **Conclusion:** Tuberculosis in children is a public health problem in Chad, due to its rich and polymorphic clinical picture. Its biological diagnosis remains difficult. Pulmonary localizations are more frequent. The majority of patients have a favorable outcome.

KEYWORDS: Tuberculosis- Child- CHU-ME- Chad.**INTRODUCTION**

Tuberculosis (TB) is a contagious infectious disease of an endemo-epidemic nature and primarily human-to-human transmission. It is caused in the vast majority of cases by *Mycobacterium tuberculosis*, also called Koch's bacillus (BK) which is an alcohol-acid-resistant bacterium (BAAR).^[1]

According to the World Health Organization (WHO), more than 10 million people contract active TB and 1.6 million die from it each year.^[2,3] The prevalence of tuberculosis in Chad is estimated at 209 cases per 100,000 inhabitants.^[4] and an incidence of 159 new cases per 100,000 inhabitants per year was reported by the national tuberculosis control programme (PNT) in Chad in 2015.^[5,6] The strengthening of TB management interventions has slightly reduced this incidence from 2015 to 144/100,000 inhabitants in 2021. The therapeutic success rate is 81% (PNDS 4). The objective of this study is to evaluate the management of tuberculosis in children at the CHU-ME of N'Djamena with a view to

improving the survival of children suffering from this pathology

II- MATERIALS AND METHOD

This was a study, cross-sectional for descriptive purposes, which took place in the pediatric department II of the University Hospital of Mother and Child (CHU-ME) of N'Djamena from January 1, 2020 to December 31, 2021, or 2 years. The Paediatric II department has a capacity of 58 beds and receives children from 29 days up to 15 years, suffering from all paediatric pathologies. A wing with 7 beds is intended for the care of children with tuberculosis. The occupancy rate is on average 1500 children / year. The study consisted of a review of the medical records of children of both sexes, aged 0 to 15 years, treated for tuberculosis. The diagnosis of tuberculosis was selected on the basis of the presence of bundles of anamnestic, clinical, biological and radiological arguments, namely: a notion of tuberculosis contagion, chronic cough, deterioration of the general condition, fever of more than 15 days, haemoptysis,

pulmonary abnormalities on chest radiography and / or discovery on direct microscopic examination of Koch's bacillus by Ziehl-Nielsen staining in a biological sample (sputum, gastric tubing fluid, lymph node puncture...) and/or a GenXpert test, and having a complete record. The file was said to be complete when it included anamnestic, clinical, paraclinical, therapeutic and evolutionary parameters. Not all children with a history

of non-specific lung infection and atypical mycobacterial lung disease were included in the study. The following variables were studied: clinical, biological and radiological sociodemographic variables. The treatment regimen adopted would be the one recommended by the National Tuberculosis Control Program (PNT) free of charge for all patients.^[15,16]

a) Recommended dosages

Table I: Dosage of anti-tuberculosis drugs (PNLT).

Medicine	Dosage	Maximum dose
Isoniazid (H)	10 mg/kg (7 to 15 mg/kg)	300 mg/day
Rifampicin (R)	15 mg/kg (10 to 20 mg/kg)	600 mg/day
Pyrazinamide (Z)	35 mg/kg (30 to 40 mg/kg)	
Ethambutol (E)	20 mg/kg (15 to 25 mg/kg)	
Streptomycin (S)	15 mg/d	

a) Treatment regimens used

* **Figure 1: 2RHZE/4RH** for new cases (1st line treatment or standard treatment). With a duration of treatment 6 months:

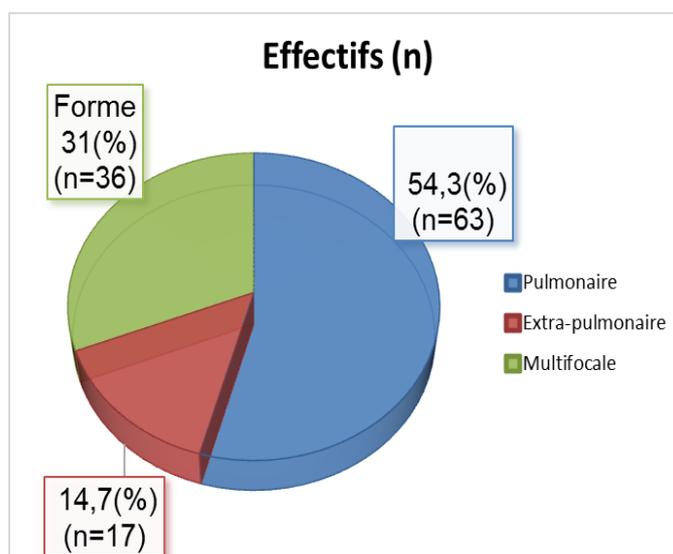
- Intensive phase (2 months): **R, H, Z and E (2RHZE)**
- Maintenance phase or continuation phase (4 months): **R and H (4RH)**

Data from clinical records were collected, captured and analyzed using SPSS 18 software. The results are presented in the form of tables, graphs and figures produced in Word and Excel 2007. The study had received prior authorizations from the management of the CHU-ME. The data entered had remained anonymous, confidentiality and medical secrets are respected.

III- RESULTS

Out of a total of 3898 children hospitalized during the study period, 116 cases were included or a prevalence of 2.9%, with a male predominance of 53.4% (62/116 cases). The average age of the children was 6.58 years

Clinical forms



with extremes ranging from 2 months to 15 years. Patients (N=86) or 74.1% had a low socioeconomic level.

Concept of tuberculosis contagion

The concept of tuberculosis contagion was found in 43.1% of children (N=50), 19 of whom were infected by the mother and 9 by the father. The others were infected either by an uncle (8), an aunt (2), a brother/sister (4), a cousin (3) or by the neighborhood (5). Passive smoking was found in 11 children or 9.5%. BCG vaccination coverage was 87.9% or 102 cases. Forty-seven children or 40.5% were malnourished and 18 children or 15.5% were infected with HIV.

Clinical data

Symptomatology

The most common clinical signs were: long-term fever with 105 cases (90.5%), deterioration of general condition 94 cases (81%) and chronic cough 83 cases (71.6%).

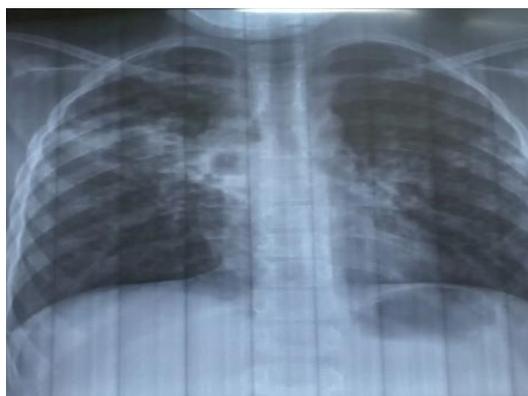
Fig. 1: Different locations of childhood tuberculosis.

Pulmonary TB accounted for 54% (N=63), extrapulmonary localization was 14.7% (N=17), with 26.4% of lymph node involvement. The combination of pulmonary and extrapulmonary involvement was present in 36 children or 31%.

Paraclinical data

The BAAR research was positive in 44 children or 37.9%. The GenXpert/MTB/RIF test carried out on 67 children, 44 of whom were positive, i.e. 37.9%.

Chest x-rays were abnormal in 65 children. Lung damage in study patients was varied, dominated by bronchial syndrome.

**Fig. 2: Pulmonary Rx of a TB child.**

Therapeutic data

Once the diagnosis of TB was confirmed, anti-bacillary therapy was initiated in all patients according to the national protocol of the (PNT).

Scalable data

Table II: Distribution of children according to therapeutic progress.

Evolution	Staff (n)	Percentage (%)
Healing	84	72,4
Therapeutic failure	2	1,7
Death	7	6,1
Lost to follow-up	23	19,8
Total	116	100

In the study series, 84 patients (72.4%) were cured, 23 patients (19.8%) lost to follow-up, and 7 patients (6.1%) died.

IV. DISCUSSION

1-Epidemiological aspects

The prevalence of TB in this study was 2.97%, this proportion was only indicative of the fact that this service is not the only one that provides care for children with TB in the city of N'Djamena. Barry *et al.*^[6] in Conakry in 2020 finds an almost similar figure with an attendance rate of 2.3%.

The mean age of the children was 6.59 years (78.99 months) with extremes ranging from 2 months to 15 years. Our results are comparable to those of the authors in the subregion.^[7,8,9] where the average age of children was 4.6 years, 5.4 years and 6.21 years, respectively. The age group from 0 to 59 months was the most represented (42%). This may be explained by the low immunity of children in this age group living in an environment conducive to BK transmission; and lack of isolation of TB patients.

2- Socio-economic and medical profile of children with TB

Families of low socio-economic level represented 74.10%, which is in line with data from Landa in Morocco in 2015^[10] which obtains 87.2% of children with a low socio-economic level. Living conditions and overcrowding have an impact on the spread of TB.

➤ Concept of tuberculosis contagion

The concept of tuberculosis contagion was found in 43.1% of children. The majority had intrafamilial contamination. A frequency similar to ours was reported by Millogo and Barry *et al.*^[11] who found 42.9% and 43.04% respectively. Having a person on TB treatment in the family is twice as likely as having a chronic cough, as well as late detection of TB patients or those around them.

Vaccination au BCG

BCG vaccination coverage was 87.9% in our study. This is superimposed on that found by Barbara *et al.*^[12] and Millogo.^[11] who obtain a vaccination coverage of 84.50% and 92.9%. This figure confirms the data of the SARA Chad 2019 survey.^[13] which gives a BCG vaccination coverage rate of 86%.

Forty-seven children, or 40.5%, were malnourished. Every TB child is routinely tested for HIV, 18 children (15.5%) were infected with HIV. These children are put on treatment according to the national protocol for the management of severe or moderate acute malnutrition and HIV.

IV.3- Clinical aspects

In the study series, fever (90.5%), altered general condition (81%) and prolonged cough (71.6%) were the main signs found in children. The same observation was made in the series of other authors represented in Table II:

Table II: Comparison of symptoms/clinical signs found in other studies.

Symptoms /Clinical signs	Landa Morocco 2015	Aminata Mali 2011	Mate Burkina Faso 2017	Moussa Mali 2019
Fever	75,6%	100%	92,9%	62,50%
AEG	69,5%	53,30%	78,6%	50%
Prolonged cough	50,2%	100%	67,9%	87,50%

These symptoms/clinical signs are the most encountered in the literature.^[3,10,11,14] They are the most common telltale mode and are often present in all forms of TB localization.

4- Bacteriology

The identification of *Mycobacterium tuberculosis* makes it possible to make a definite diagnosis of TB. However, this formal argument is often lacking in children. The search for BAAR was positive in 54.3% of children. These data are comparable to those of Landa and Moussa which obtain respectively 64.3% and 75%. In general, infantile TB is paucibacillary, indeed direct examination reveals the BAAR in less than 10-15% of cases, and culture increases this rate to 30-40% of cases at most.^[15] The sample positivity rate will increase with the evolution of the disease.^[16]

GenXpert MTB-RIFTM, which is a very promising real-time PCR method, allows the rapid and simultaneous detection of TB and rifampicin resistance.^[8,17] Studies show that the sensitivity of the test varies between 93 and 98%, with specificity ranging from 83 to 99%. In the study, GenXpert's test was positive 65.7% of cases.

5- Type of location

Pulmonary localization was predominant with 54.3% of cases, which is comparable to the results of Doro *et al.*^[15] and Millogo.^[11] which find respectively 55% and 50%. The high frequency of pulmonary localizations is due to the fact that the initial involvement is almost always pulmonary with localization secondary to the other

organs. In extrapulmonary locations, lymph node localization was predominant in this study with 26.4%, as well as that conducted by Soumana and Millogo who report respectively 27.79% and 35.7%. Lymph node involvement during TB is common. Indeed, the spread of the infection occurs from the primary site most often pulmonary, then by the lymphatic or hematogenous route to the hilar and mediastinal nodes.

6- Therapeutic regimen

The 2RHZE/4RH treatment regimen was adopted in the majority of cases according to the national protocol.

7- Evolving data

The course is generally favorable under early anti-tuberculosis chemotherapy, well conducted and for a sufficient period of time. It is judged on the rapid improvement of the general condition and the disappearance of clinical signs that are obtained during the first weeks of treatment, while radiological signs most often persist after 3 months.

In the study, the evolution is difficult to assess in all patients, because only 80% of patients were followed until the end of treatment, 19.8% were lost to follow-up. The evolution was favorable in 72.4% of patients declared cured; 6.1% of patients died and 1.7% of patients with a case of relapse.

This result is comparable to those found by the other authors presented in the table below.

Table: III Comparison of evolutionary data found in our study with other studies.^[9,3]

Evolution	This study 2022	Landa 2015	Barry2020
Healing	72,4%	47,4%	84,54%
Failure/Relapse	1,7%	2,4%	0%
Lost to follow-up	19,8%	36,4%	10,05%
Death	6,1%	5,3%	5,41%

CONCLUSION

TB remains a global infectious disease of concern. In Chad, childhood tuberculosis remains a major public health problem. It remains a disease with predominant respiratory contamination and manifestations. Nevertheless, all organs can be affected and the clinical forms are very diverse.

Limiting the spread of childhood TB requires infection control in adults because childhood TB is almost always

indicative in adults. The management of paediatric tuberculosis at the CHUME is acceptable with a good cure rate, however a mechanism must be put in place for the active search for patients lost to follow-up.

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