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Pulmonary tuberculosis in children: sociodemographic, clinical and progressive aspects in the pediatric department of Kamsar hospital

Conde Ibrahima[1,3], Diallo Fatoumata Binta[1,3], Kouyaté Moustapha[2,3], Kaba Bangoura[2,3], Fofana Hawa[3,4] , Barry Mamadou Cire[3,4],Camara Yalikhatou[3,4], Camara Emmanuel[2,3]

[1] Pediatrics department of Kamsar hospital

[2] Pediatrics Department CHU Donka Conakry

[3] Gamal Abdel Nasser University of Conakry

[4] Pediatrics Department CHU Ignace Deen conakry

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***Corresponding author:** Conde Ibrahima

Pediatrics department of Kamsar hospital, Gamal Abdel Nasser University of Conakry

Abstract

Introduction

Pulmonary tuberculosis in children is a public health problem. First of all, it remains a major health problem worldwide, with more than a million new cases each year in children under 15 years old.

The objective of this study was to determine the sociodemographic, clinical and progressive characteristics of pulmonary tuberculosis in children in the pediatric department of Kamsar hospital.

Methods

This was a prospective, descriptive study over a period of 12 months (January 1 to December 31, 2022) in the pediatric department of Kamsar Hospital. The study concerned all children aged 0 to 15 years admitted to the service for confirmed pulmonary tuberculosis.

Results

The hospital frequency was 2%;%), the average age was 8.45±4.67 years; the M/F sex ratio was 2.42. The average time to admission was 38.2±25.1 days; the reasons for admission were dominated by fever 24(100%), chronic cough 24(100%) and breathing difficulties21 (87.5%). IDR was positive in 8(34.78%) and AFB positive in 8(33.33%) of the cases; the frontal chest x-ray was abnormal in 21 (87.5%). 21 (87.49%) were left improved; 2 children died (8.34%) and 1 (4.17%) was lost to follow-up.

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Conclusion

Prevention of pulmonary tuberculosis involves protecting children from adults with tuberculosis through awareness-raising measures in the media and public places.

Keywords: *pulmonary tuberculosis, child, pediatrics, kamsar.*

Introduction

Pulmonary tuberculosis in children is a public health problem. First of all, it remains a major health problem worldwide, with more than a million new cases each year in children under 15 years old, according to the World Health Organization (WHO)(1).

Of the approximately 1.1 million children who had tuberculosis during 2020, only 399,000 (36.5%) were notified to the NTPs. This underreporting is particularly significant among children aged <5 years, with only 27.5% of those with tuberculosis being notified (2).

The low case detection rate in (young) children is due to several factors, including the following: the fact that in young children, tuberculosis is rarely bacillary and the excretion of bacilli is insufficient for them to be detected by available bacteriological examinations; the absence of a sensitive diagnostic test to be performed at the point of care; difficulties in collecting appropriate respiratory samples for bacteriological confirmation; and diagnostic errors due to the non-specific symptoms of tuberculosis being the same as those of other common childhood illnesses(1).

Primary tuberculosis infection or childhood illness is the constant expression of a failure to manage adult tuberculosis and the witness of recent transmission (3).

In 2013, Guinea was classified among the countries with a high incidence of tuberculosis and a high incidence of TB/HIV co-infection (4).Since the strategies were put in place in 1990, the fight against tuberculosis has made significant progress. The performance indicators, in particular the therapeutic success rate, is 89% in 2018 for an MDG target set at 90%. Despite these satisfactory results, weaknesses persist especially in terms of diagnosis and management of tuberculosis, prevention and control of tuberculosis infection, and community involvement (5).

The objective of this study was to determine the sociodemographic, clinical and progressive characteristics of pulmonary tuberculosis in children in the pediatric department of Kamsar hospital.

Methods

This was a prospective, descriptive study over a period of 12 months (January 1 to December 31, 2022) in the pediatric department of Kamsar hospital.

The study concerned all children aged 0 to 15 years admitted to the department for pulmonary tuberculosis confirmed by a range of anamnestic, clinical, biological and radiological arguments. namely: a notion of tuberculosis contagion, a chronic cough, a deterioration in general condition, a fever lasting more than 15 days, hemoptysis, pulmonary opacities on chest radiography, a positive intradermal reaction to tuberculin by the Manthoux method (the threshold for positivity of the intradermal reaction was 5 mm in the case of HIV infection and/or malnutrition and 10 mm for other children regardless of their BCG vaccination status) and/or the discovery on direct microscopic examination of Koch's bacillus by Ziehl-Neelsen staining in a biological sample (sputum, gastric tubing fluid). The treatment adopted was that recommended by the National Tuberculosis Control Program (PNLCT)(5) free for all patients.

Scheme 1(2RHZE/4RH) was the standard treatment and scheme 2(2SRHZE/1RHZE/5RHE) was the retreatment scheme used in case of failure of scheme 1.

NB: Rifampicin (R), Isoniazid (H), Pyrazinamide (Z) and Ethambutol (E)

Results

Epidemiological

We collected 24 cases of pulmonary tuberculosis in children during the study out of a total admission of 1206, with a hospital frequency of 2%; the children were under 5 years old 6(25%) and over 5 years old 17(70.83%), the average age was 8.45±4.67 years. There was a male predominance (65.50%) compared to girls 7 (29.1%). The majority of children lived in the rural area 15 (62.5%) and the others in urban areas 9 (37.5%); the fathers were liberal professions 10 (41.67%), farmers 7 (29.1%) and employees 7 (29.1%) and the mothers were mostly not educated 15 (62.5%); educated 9(37.5%),

Clinics

The average time to admission was 38.2±25.1 days with the extremes of 14-120 days; fever 24(100%), chronic cough 24(100%) and breathing difficulties 21(87.5%); physical asthenia 23(95.83%); anorexia 20(83.3%); weight loss 15(62.5%), deterioration of general condition were 12(50%); pallor 13(54.17%); vomiting 9(37.5%), hemoptysis 1(4.17%); malnutrition 12(50%) were common signs. Vaccination was not up to date in 15 (62.5%) of the children, there was a notion of contagion in 20 (83.33%)

Biological assessment and chest x-ray

IDR was positive in 8(34.78%) and AFB positive in 8(33.33%) of cases; the average hemoglobin level was 8.64±2.31 with extremes of 5-12g/dl, the average white blood cell was 24.57 ± 11.76x 109 with extremes of 5 and 45 X 109; mean CRP 27.55 ± 13.68 mg/l with extremes of 12 - 48 mg/l; positive Retro Viral serology in 4 (16.67%); the frontal chest x-ray was abnormal in 21 (87.5%).

Evolution

Hospital stay ≤ 15 days in 9 (37/5%) and > 15 days in 15 (62.5%); during hospitalization, 21 (87.49%) left improved; 2 children died (8.34%) during treatment and 1 (4.17%) case of loss to follow-up was observed.

Table I: Distribution of cases of pulmonary tuberculosis according to epidemiological characteristics in the Kamsar pediatric department.

Epidemiological characteristics	Number	Percentage
Age		

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≤5 years	6	25
>5 years	18	75
Sex		
Male	17	70.83
Female	7	29.7
Residence		
Urbain	15	62.50
Rural	9	37.5
Father's profession		
Liberal professio	10	41.67
Farmer	7	29.17
Employee/worker	7	29.17
Mother education		
Schooled	9	37.5
unschooled	15	62.50

Mean age 8.45±4.6 [0-15 years]; sex ratio M/F: 2.42

Table II: Distribution of cases of pulmonary tuberculosis according to clinical characteristics in the Kamsar pediatric department.

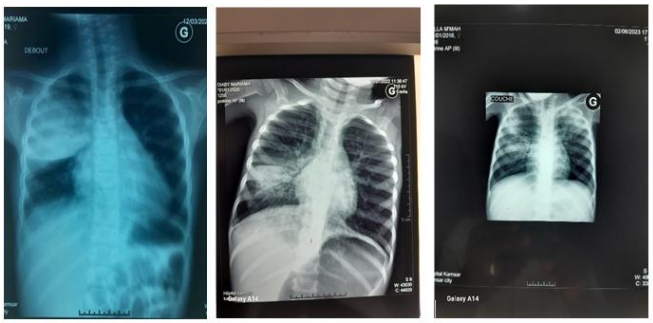
Clinical features	Number	Percentage
Symptoms		
Fever	24	100
Cough	24	100
Anorexia	20	83.33
Physical asthenia	23	95.83
Weight loss	21	87.50
Vomiting	9	37.50
Concept of storytelling	20	83.33
Vaccination		
up to date vaccination	15	62.50
vaccination not up to date	9	37.50
Physical signs		
Alteration of general condition	12	50
Pallor	13	54.17
Dyspnea	20	83.33
Acute malnutrition	12	50
Hemoptysis	1	4.17
Duration of illness		
≤1 month	12	50
>1 month	12	50

Average progression of the disease 38.25±25 [14 -120 days]

Table III: additional assessment of cases of pulmonary tuberculosis in the Kamsar pediatric department.

Additional examinations	Number	Percentage
Positive VRS	4	16.67
Positive IDR	14	65 .22
Hb rate in (g/dl)		
≤5	3	12.50
6 -8	8	33.33
9 -12	13	54.17
White blood cells (X10 9/L)		
8-11	5	20.83
12-45.5	19	79.17
Positive CRP (mg/l)		
12-24	16	66.67
25 –48.33	8	33.33
Abnormal chest x-ray	21	95.4
positive AFB	8	33.33

CRP moyenne 27.55±13.68mg/l [5- 48.33] ; GB moyen 24.57±11.76 X 10^9 [12-45.3] ; Hb moyenne 8.64±25d/dl [5- 12]



Abnormal AP radiographs in children with pulmonary tuberculosis

Discussion

The hospital frequency in our study was 2%. Our results are lower than those of Soumare D et al. (6). in Mali 17.5% and those of Soumana A et al. in Niger (7) respectively 17.5% and 20.7%. Tuberculosis in children represents a good indicator of the circulation of BK in the population because it always corresponds to a recent infection from a close person(8).

Children (0-14 years) represent approximately 10-20% of all TB cases in endemic countries. In most cases, it is pulmonary tuberculosis (9). In France, tuberculosis in children under 15 years of age represents more than 5% of reported tuberculosis, with an incidence 11 times higher in children coming from tuberculosis endemic countries (8).

The age group of 6 -15 years old was the most represented in our series. Our results overlap with those of Miligo J C et al. (10) in Burkina Faso and those of Barry I K I(11) et al. in Guinea who reported a predominance among children aged 5-15 years, respectively 71.4% and 92.75%. After primary tuberculosis infection, the risk of developing tuberculosis disease decreases

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with age: 43% before the age of 1 year, 24% between 1 and 5 years, 16% in adolescents between 11 and 15 years (8).

The liberal profession dominated among fathers. Our results are similar to those of Miligo J C et al. (10) in Burkina Faso and those of Doumbia I et al.(12) in Mali who had documented the profession of farmer (60.7%) and commerce (10%) among the fathers of children with pulmonary tuberculosis. According to Mamy F et al. of Madagascar(13), the parents were unemployed in 44.68% of cases. Marie Talleux et al.(14) in France reported that precariousness among the parents of children with pulmonary TBC represented 35.8% of cases, among them 46% were immigrants.

The average time for progression of the disease was 38.2±25 days. Our results are similar to those of Abou Coulibaly et al.(15) in Mali where the course of the disease was between 1 - 3 months in children. In most children, the disease appears within a year of infection. This is why it is important to establish a contact history, and this also explains why the burden of tuberculosis in children reflects persistent transmission within a population (16). Latent tuberculosis can develop into pulmonary tuberculosis, particularly when immune defenses decline (18).

Fever, chronic cough, difficulty breathing and weight loss characterized the reasons for consultation. Our results are similar to certain African authors from Mali and Madagascar (7; 15; 18).

The most common clinical picture of pulmonary tuberculosis combines persistent respiratory symptoms and low weight gain (9).

Half of the children were in a state of malnutrition and 16.67% of children had positive VRS. Our results overlap with those of Barry IK et al. (11) in Guinea and those of Mamy F et al. in Madagascar (18) who reported the respective frequencies of 13.4% and 30% of cases.

According to the literature, HIV and malnutrition are factors that increase the risk of developing tuberculosis disease (17).

Vaccination was not up to date in the majority of children (50%). Miligo J C et al. in Burkina Faso (10) who reported in their study that 92% of tuberculosis patients did not have their vaccination up to date.

The BCG vaccine effectively prevents serious forms of tuberculosis disease (meningitis, miliary), but only prevents at best half of the classic forms of tuberculosis disease in children (1).

The notion of telling was observed in the majority of children (83.33%), The same remarks were documented by Barry IK et al. in Guinea (11) where the notion of contagion represented 100%. The search for a contaminator is a major argument for the diagnosis, even if the absence of a known contaminator does not exclude it (1).

The intensity of exposure depends on proximity and repetition of contacts, particularly sharing the same home (19).

Chest x-ray was abnormal in 83.33% of our children. According to Marie Talleux (14) in France, radiology was pathological in 83% of children with tuberculosis.

Chest x-rays can identify lesions highly suggestive of tuberculosis in children (1).

Chest radiography is the primary examination for pulmonary tuberculosis (it makes it possible to suspect 90% of cases of pulmonary tuberculosis) in association with clinical evaluation looking for symptoms of tuberculosis (18).

AFB and IDR were only positive in 33% and 65.22% of children with pulmonary tuberculosis respectively. Our results are similar to those of Barry IK K et al. in Guinea (11)(66.24% and 18.75%) and those of Marie Talleux et al.(14) in France (55% and 66%).

However, bacteriological evidence of tuberculosis is rare in children. Direct microscopic examination is positive in less than 20% of cases and culture finds BK in less than 50% of cases (8). In addition, culture can differentiate M. Tuberculosis from non-tuberculous mycobacteria and test drug sensitivity (20). Therefore, the IDR should be interpreted based on BCG vaccination. A negative IDR never rules out tuberculosis (19). A positive reaction to the tuberculin skin reaction test means that the patient is or has been infected with M. tuberculosis but does not necessarily mean that they have tuberculosis. This is a test that measures the immune response and not the presence/absence of bacteria (20). The intradermal reaction with tuberculin IDR, a purified protein derivative, is the reference test (3).

During hospitalization, 21 (87.49%) were released improved; the death rate was 8.34% and one case (4.17%) lost to follow-up was observed. According to Segbedji et al. (21), recovery represented 76% of cases, those lost to follow-up accounted for 18% and the death rate concerned 4% of cases in their study.

Thanks to the implementation of the national policy to combat tuberculosis, care is free; which reduces the rate of deaths due to easy treatment. However, unfavorable socio-economic conditions of parents, high belief of the population in traditional medicine. Serious illnesses are considered the fate of devils and people prefer to seek treatment from traditional healers.

Conclusion

Pulmonary tuberculosis is a reality in the pediatric department; children over 5 years old were the most common; they were contaminated by the direct environment. Chronic cough, fever and difficulty breathing were the most common reasons for consultation. Prevention of pulmonary tuberculosis involves protecting children from adults with tuberculosis through awareness-raising measures in the media and public places.

Key words: pulmonary tuberculosis, child, pediatrics, kamsar.

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