

# Abdominal Tuberculosis in Children at Chu/Jra and SALFA Andohalo Laboratories, Antananarivo from 2017 to 2022

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## Abstract

Abdominal tuberculosis is one of the rare forms of extrapulmonary tuberculosis. Its diagnosis is difficult to establish in children. The aim of this study is to describe the epidemioclinical and anatomopathological characteristics of this form of tuberculosis at two Laboratories of Anatomical and Cytology Pathological of the Joseph Ravoahangy Andrianavalona University Hospital Center and Sampan'Asa Loterana momban'ny Fahasalamana (SALFA) Andohalo. In a retrospective study spanning 6 years from 2017 to 2022, 14 cases of abdominal tuberculosis were collected in children under 15 years of age, representing 5.09 % of extrapulmonary tuberculosis cases. The mean age of the patients was 11.78 years with extremes of 7 to 15 years and a sex ratio of 1. Peritoneal localization was the most frequent (33.3%). Symptomatology was dominated by abdominal pain (77.8%). The histological lesion was typically tuberculoid granuloma centered by caseous necrosis in 88.9%. In conclusion, abdominal tuberculosis in children is rare, difficult to diagnose, requiring multidisciplinary consultation.

## Keywords

Abdominal Tuberculosis, Child, Extrapulmonary Tuberculosis, Peritoneum

## 1. Introduction

Extra-pulmonary tuberculosis is the most common form of tuberculosis in children. However, its abdominal location is rather rare. Abdominal tuberculosis includes infection of the gastrointestinal tract, peritoneum, mesentery, abdominal

lymph nodes, liver, spleen and pancreas [1]. It ranks third after lymph node and meningeal involvement [2]. The interest of this subject lies in the rarity of this form, which requires special attention to improve diagnosis and management. The aim of this study is to determine the epidemiological, clinical and histopathological features of abdominal tuberculosis in children under 15 years of age.

## 2. Materials and Method

This is a retrospective, descriptive study of abdominal tuberculosis diagnosed in children under 15 years of age at the UPFR d'Anatomie et Cytologie Pathologiques du CHU/JRA and SALFA Andohalo, over a 6-year period (2017 to 2022). Data were collected from liaisons forms and anatomical pathology examination reports. The diagnosis of tuberculosis in this study was made by the presence of epithelioid and gigantocellular granuloma centered by caseous necrosis or sometimes by the existence of therapeutic evidence.

## 3. Results

Of the 275 cases of Extra-Pulmonary Tuberculosis (EPT) found in children, 14 cases of abdominal tuberculosis were histologically proven in 88.9% of cases. The mean age was 11.78 years, with a standard deviation of 0.69, and extremes of 7 and 15 years. The age group most affected was between 12 and 15 years with 9 cases or 64.28 %, followed by children aged 3 to 7 years with  $n = 3$  or 21.42 % and those aged 8 to 11 years with  $n = 2$  or 14.28 % (Figure 1). Concerning the gender, no predominance was observed, with a sex ratio of 1. The lesion was discovered during exploration of abdominal pain in  $n = 9$  cases (64.28%) and altered general condition in  $n = 3$  (21.42%), occlusive syndrome and pelviperitonitis in each of them in  $n = 1$  (7.14%) (Figure 2). The location was peritoneal in  $n = 7$  (50%), mesenteric and epiploic in  $n = 4$  (28.57%) and intestinal in  $n = 1$  (7.14%) (Figure 3). The morphological appearance was that of an epithelioid and gigantocellular granuloma centered by caseous necrosis in the majority of cases with  $n = 13$  or 92.85%. One case was a necrotizing adenitis in the peritoneal serosa, with therapeutic evidence.

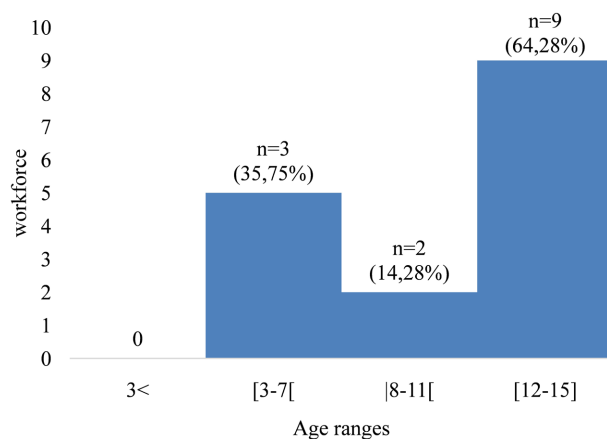
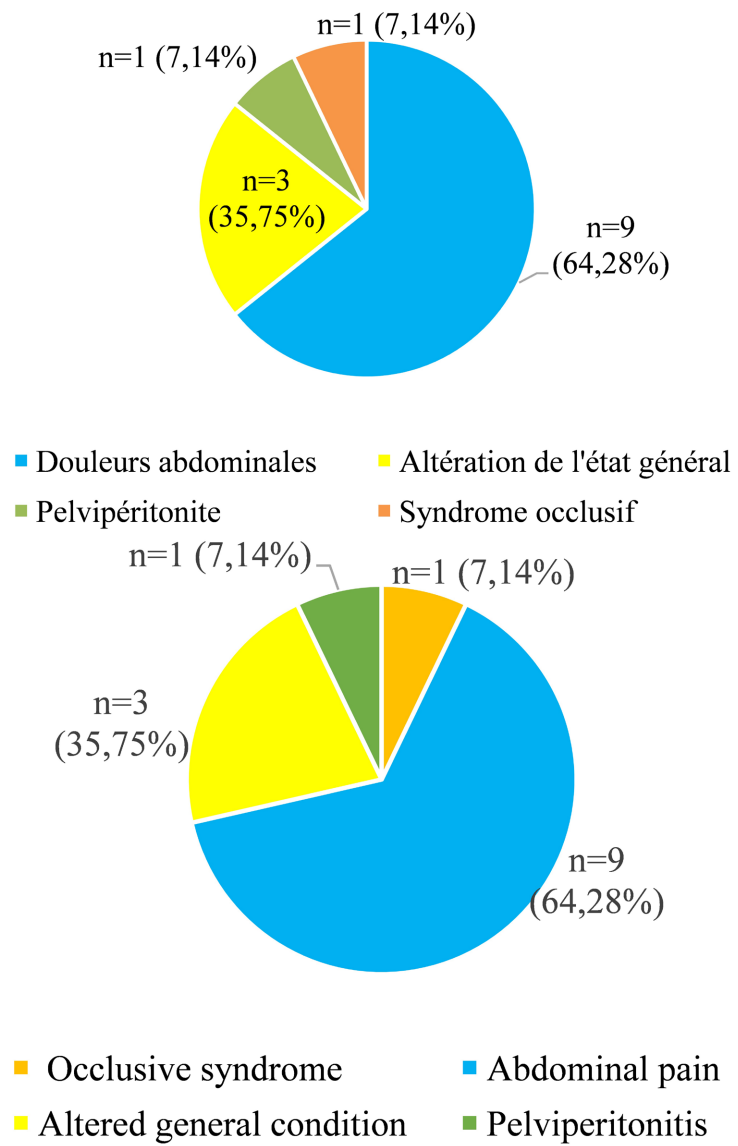
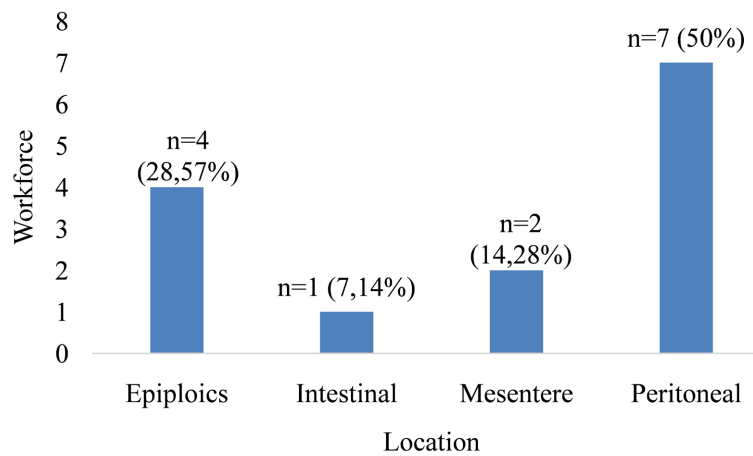


Figure 1. Distribution of cases by age group.



**Figure 2.** Distribution of cases by clinical information.



**Figure 3.** Distribution of cases location.

## 4. Discussion

Abdominal tuberculosis in children is rare among PET. It correspond to tuberculosis of the digestive tract and any other organ of the abdominal cavity [1]. According to Lin YS *et al.* in 2010 in Taiwan region, abdominal tuberculosis is a rare manifestation of childhood tuberculosis [3]. In this series, 14 cases out of 275 were collected, representing 5.09% of PET diagnosed during the study period and corresponding to the 2nd rank of PET after lymph node tuberculosis. These results concur with those reported by Rasamoelisoa JM *et al.* in 1999 in Madagascar, where abdominal tuberculosis ranked 2nd among forms of PET in children, accounting for 10% of cases [4].

The abdominal localization of tuberculosis may be explained by the dissemination of mycobacteria by hematogenous or lymphatic routes from an initial site of infection, usually the lungs. Tuberculosis bacilli can also reach the peritoneum by contiguity from other intra-abdominal organs. The abdominal cavity and digestive organs are surrounded by numerous lymph nodes. These form an important part of the immune system. Tuberculosis infection triggers a specific immune response, presenting histologically as epithelioid and gigantocellular granulomas centered on caseous necrosis. Abdominal localization of PET may also be linked to reactivation of an inactive primary gastrointestinal focus, due to malnutrition, HIV infection in children [5], ingestion of bacilli from an active pulmonary focus, or ingestion of infected milk in children accustomed to drinking unpasteurized milk [6].

In terms of age range, in this series, just over half (64.28%) of cases involved children aged between 12 and 15 years, which is different from the result found by Santiago-Garcia B *et al.* in 2016 in Spain, where children over 10 years of age accounted for only 3.7% [7]. The higher age range in this series could be explained by the fact that the pubertal hormones testosterone, estrogen and progesterone play an important role in the induction or activation of tuberculosis disease with a decline in immunity.

As regards the sex ratio, both in this study and in the various series in the literature [8] [9], no gender dominance was noted, with no particular explanation.

The most common form of abdominal tuberculosis in children is peritoneal tuberculosis [1]. This was observed in this study, with 50% of peritoneal location, a finding more important in number compared to the series in the literature, such as that of Malik R in India, where peritoneal tuberculosis accounted for 38% of cases [10]. For Soloviev AE *et al.* in 2022 in Russia, isolated involvement of an abdominal organ is rare, as several anatomical zones are usually involved simultaneously [11].

Diagnosis of abdominal tuberculosis in children is extremely difficult due to the similarity of clinical manifestations with other non-specific diseases, and the available diagnostic tools do not offer adequate sensitivity and specificity [11] [12]. According to the World Gastroenterology Organization in 2023, the symptoms and clinical signs of abdominal tuberculosis are non-specific and may suggest other gastrointestinal pathologies. According to the same report, the main

abdominal symptom in abdominal tuberculosis is abdominal pain [1]. According to Madeline B *et al.* in 2020 in Belgium, abdominal tuberculosis is difficult to diagnose because the symptoms are insidious and extremely varied. This often leads to misleading pictures responsible for delayed diagnosis [5]. In the present study, abdominal pain was the circumstance in which the lesion was discovered in the majority of cases (64.28%). This is consistent with data in the literature. For Eraksoy H *et al.* in 2021 in Turkey, the common symptoms were abdominal pain associated or not with fever, weight loss, nausea and vomiting [13]. For Valiente LR in 2015 in Peru, the most frequent clinical signs were abdominal pain, fever and ascites [6]. According to Lin YS *et al.* in 2010 in Taiwan region, the most frequent clinical signs were abdominal pain and fever [3].

The diagnosis of tuberculosis is most often suspected on clinical examination, but can only be confirmed by pathological examination, which reveals epithelioid granulomas and Langhans-type giant cells centered on caseous necrosis. This typical form was observed in 92.85% of cases.

In the remaining 7.14% of cases, the appearance was incomplete, i.e. there was no Langhans-type epithelioid and gigantocellular granuloma centered on caseous necrosis, but only necrotizing inflammation. This posed a problem of differential diagnosis with other necrotizing inflammations and other tuberculoid granulomas such as sarcoidosis, leprosy, other atypical mycobacteria, congenital syphilis and foreign-body reaction [14]. As Madagascar, a developing country, is in a tuberculosis-endemic zone, tuberculosis infection has been retained after cure by antituberculosis trial treatment, which is free in Madagascar.

Other diagnostic methods exist. Culture on Lowenstein or Löwenstein Jensen selective media has not been possible. The latter is based on Vancomycin, which reduces contamination of mycobacterial cultures by spore-forming bacteria [15].

The Expert Gene, a real-time PCR (Polymerase Chain Reaction) technique, a rapid tuberculosis diagnostic tool (results in 2 hours), was not available. This test increases the detection rate of *Mycobacterium Tuberculosis* (MT) and early detection of rifampicin resistance [16]. Its negativity does not exclude tuberculosis infection. This test is currently recommended by the OMS.

The purified protein derivative (PPD) tuberculin test represents an advanced version of the tuberculin skin test. It is based on the protein components of *Mycobacterium tuberculosis* culture filtrates and is used to diagnose latent tuberculosis infection [1]. This test could not be performed. A negative result does not rule out the disease.

In terms of differential diagnosis, sarcoidosis differs from tuberculosis in the absence of caseous necrosis. Leprosy can be differentiated from tuberculosis by a nodular peri-adnexal and especially peri-nervous infiltrate, and the Ziehl's test shows exceptional Hansen's or non-Hansen's bacilli.

Congenital syphilis may be recognized by polymorphous inflammatory infiltration rich in plasma cells, with fibrosis and vascular hyperplasia with vasculitis. Syphilitic serology and a history of syphilitic infections may guide the

diagnosis and rule out this differential diagnosis.

A foreign-body reaction may be distinguished by the presence of a foreign-body granuloma, i.e., a tuberculoid granuloma with multinucleated giant cells of the foreign-body or Müller type, without caseous necrosis. The foreign body may be visible under the light microscope.

## 5. Conclusions

Abdominal tuberculosis was the second most common type of PET. Anatomopathological examination remains essential for a reliable diagnosis. In this series, abdominal tuberculosis occurred mainly in older children, with no gender dominance. It manifested itself as abdominal pain, and the preferential location was the peritoneum. The morphological appearance was typical in the majority of cases.

Although these results are not representative of abdominal tuberculosis in children in Madagascar, they could provide additional relevant data for the Madagascar database. They could thus be of benefit to different levels and to those working in the fight against tuberculosis in Madagascar.

## Conflicts of Interest

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

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