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Case Report in an Adolescent Patient with Diagnosis and Management of Abdominal Tuberculosis

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KEYWORDS
Abdominal tuberculosis, adolescents, diagnosis, management.

ABSTRACT
This case report describes a 14-year-old boy with *abdominal tuberculosis* presenting with persistent vomiting. He was referred from *Genteng Jember Hospital* to the emergency department at *Dr. Soetomo Surabaya Hospital* after being initially suspected of having an intra-abdominal mass. Clinical assessment included physical examination, *head-neck* evaluation, laboratory hematology, plain abdominal radiograph (*foto BOF*), and abdominal CT scan. The *foto BOF* showed a normal distribution of intestinal gas in the pelvic cavity, with no signs of obstructive ileus or pneumoperitoneum. Based on clinical and radiological findings, a diagnosis of *abdominal tuberculosis* was established. Treatment consisted of anti-tuberculosis therapy: RHZE (*Rifampicin*, *Isoniazid*, *Pirazinamid*, *Etambutol*) for two months, followed by RH for six to nine months, with doses adjusted to the patient's 40 kg body weight using the adult fixed-dose combination *OAT* (*KDT*), three tablets daily. The patient was closely monitored for therapeutic response and potential drug side effects. Clinical and microscopic improvement was used to assess healing. This case highlights the need for heightened suspicion of *abdominal tuberculosis* in children with nonspecific symptoms and imaging suggestive of intra-abdominal masses. Early diagnosis and appropriate, closely monitored therapy can lead to favorable outcomes and prevent complications. Vigilance is crucial when encountering pediatric patients with atypical abdominal presentations, as *abdominal tuberculosis* can mimic other intra-abdominal pathologies.

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INTRODUCTION

Tuberculosis (*TB*) remains a major global health challenge, particularly in developing countries like Indonesia (Allwood et al., 2021; Dutta & Karakousis, 2014; Khabibullina et al., 2022; Pradipta et al., 2022). Caused by the bacterium *Mycobacterium tuberculosis*, TB is a chronic infectious disease characterized by its long-term persistence in the body (Chakaya et al., 2021; Saktiawati & Probandari, 2025; Wedari et al., 2021). Indonesia ranks as the country with the second highest number of TB cases worldwide, with an estimated 969,000 cases reported (Cheistwera et al., 2024; Al-Zanbagi & Shariff, 2021). According to the Ministry of Health of the Republic of Indonesia (*Kemenkes RI*), in 2022 there were approximately 110,881 TB cases among children under 15 years old, accounting for about 15.3% of the national TB burden. Among these, 143 cases were identified as Drug-Resistant TB (*RO*).

Several factors contribute to the high incidence of TB, including low socioeconomic status, inadequate health services, homelessness, the spread of HIV, weakened immune systems, and the virulence and quantity of TB bacilli (Chakinala & Khatri, 2020; Henen et al., 2021).

TB is primarily transmitted via airborne droplets, inhaled from individuals with active infection. In pediatric cases, the source of infection is typically an adult with active TB (Al-Zanbagi & Shariff, 2021). Once inhaled, *Mycobacterium tuberculosis* colonizes the lungs,

especially in individuals with low immunity, and can disseminate hematogenously (via the bloodstream) or lymphogenously (via the lymphatic system). TB can affect nearly all organs, including the lungs, brain, kidneys, digestive tract, bones, and lymph nodes, with the lungs being the most commonly involved site (Lal et al., 2020).

While pulmonary TB is most prevalent, extrapulmonary TB can occur, affecting organs outside the lungs. One significant but less common form is *abdominal tuberculosis* (Gopalaswamy et al., 2021). This form involves infection of the gastrointestinal tract, peritoneum, mesenteric lymph nodes, or other intra-abdominal organs. Abdominal TB constitutes 6–38% of all extrapulmonary TB cases. Diagnosis is challenging due to non-specific symptoms such as abdominal pain, vomiting, weight loss, and presentations that may mimic abdominal tumors. Such non-specificity often leads to diagnostic delays and worsened patient outcomes (Ionescu et al., 2021; Das et al., 2023).

Previous studies have highlighted the global burden and clinical challenges of diagnosing extrapulmonary and abdominal TB, especially in children and adolescents. Al-Zanbagi & Shariff (2021) emphasize the diagnostic difficulties posed by non-specific symptoms, while Ionescu et al. (2021) note significant delays in treatment due to symptom overlap with other abdominal conditions. However, these studies generally focus on broad aspects of TB and do not specifically address adolescent abdominal TB cases.

This report presents a case of abdominal tuberculosis in an adolescent male, detailing the diagnostic process, management strategies, and the patient's response to anti-tuberculosis therapy. The aim is to provide additional insights for healthcare professionals, particularly general practitioners and pediatricians, to enhance recognition and management of abdominal TB in adolescents—a demographic in which this condition is often overlooked. Furthermore, the report offers a practical overview of clinical management for abdominal TB, serving as a reference for decision-making in both primary and referral healthcare settings.

RESEARCH METHOD

This study employed a case study method to analyze a case of abdominal tuberculosis in a male adolescent, focusing on the diagnostic process, management strategies, and the patient's response to the prescribed antituberculosis therapy. The case study was conducted at XYZ Hospital, covering the period from January 2023 to April 2023. Data were collected from the patient’s medical records, including clinical symptoms, physical examination findings, diagnostic test results (such as X-rays, CT scans, and PCR tests), and medical history. Additional data were gathered through interviews with the treating physicians and the patient’s family. The case was analyzed by examining the progression of symptoms, the impact of medical intervention, and the effectiveness of the antituberculosis therapy provided. The analysis included comparing the case with existing literature on abdominal tuberculosis in adolescents, exploring challenges in early diagnosis, and assessing the management strategies used. The study also evaluated the clinical outcomes, including changes in the patient's condition and their response to treatment. This case study method was intended to provide deeper insights into abdominal tuberculosis in adolescents and offer clinical recommendations for improving diagnosis and management in similar cases.

Case Report

A 14-year-old boy referred from Genteng Jember Hospital came to the emergency room of Dr. Soetomo Hospital on December 2, 2024 with the main complaint of vomiting. Patients have been vomiting since the last 10 days. The patient's mother said that the child has not been able to defecate since the last 8 days but can still fart with a small intake. The patient did not get complaints of tightness, no cough complaints, no fever complaints.

The history of the disease showed that the patient had previously been treated at Genteng Hospital with a diagnosis of intra-abdominal tumor About three years ago the patient often experienced severe abdominal pain, then a CT scan of the abdomen and a colonoscopy were carried out with the results of the intra-abdominal tumor However, the results of the examination were not brought by the patient's mother After that the patient was referred to Jember but the family chose not to continue medical treatment and preferred alternative treatment Over the past three years, abdominal pain has still often appeared with a frequency of about once every three to six months.

The patient is the first child of two siblings, born at full term with normal delivery, with a BBL of 3500 grams and PBL does not remember but is normal, immediately crying and not blue/yellow. The patient's father is an active smoker, smoking 1 pack per day since 20 years ago until now. The patient's immunization history is complete. History of growth and development according to age, the current sufferer is a student of an Islamic boarding school in Pasuruan. history of drinking breast milk from the age of 0 – 1.5 years, drinking formula milk from the age of 4 months – 5 years, complementary foods from the age of 6 months and family food from the age of 12 months. The patient and both parents live in a house measuring 5.5 m x 15 m with windows and good lighting. The victim's father works as a trader in the Jember area and the mother works as a housewife.

On physical examination, it was found that the boy weighed 34 kg and was 147 cm tall. The general condition is sufficient with blood pressure of 110/60 mmHg, heart rate of 82 times per minute, breathing rate of 20 times per minute, and body temperature of 36.70o C. Peripheral saturation of the patient is 99% with room oxygen.

Examination of the head and neck in patients found that there was no anemia, no cyanosis, no jaundice, and no *dysnea.* There was no enlarged lymph nodes. On the pulmonary examination, the chest inspection was found to look symmetrical. On chest palpation examination, normal palpative phremitus was found. On chest percussion examination, sonor was found in both hemitochocs of the dextra. On auscultation examination, vesicular examinations were found in both hemitoracs, without rhonki and wheezing. On the heart examination, a single S1-S2 sound was obtained, without murmurs and gallops. The abdomen appears distended, there is pressure pain in the epigastrium. Turgor of the normal skin, liver and lien are not palpable. Normal intestinal noise. There was no edema and *clubbing finger* on the extremities of the sufferer, warm, dry, red acral with CRT<2 seconds. Neurological status with GCS 456.

A complete hematology laboratory examination was carried out and hemoglobin 15.8; leukocytes 9,100; neutrophils 65.7%; lymphocytes 23.3%; monocytes 10.1%; eosinophils 0.5%, platelets 452,000; SGOT 40; SGPT 35; hypoalbuminemia 4.36; BUN 82; creatinine 1,2; potassium 3,2; hyponatremia 125 ; chloride 78; LDH 225; AFP 0.80; Quantitative Beta HCG 0.3.

The therapy given was rehydration 1500 cc ringer lactate infusion in 3 hours, followed by Dextrose 5 1/2 NS 1000cc infusion in 24 hours, Ondansetron injection 4 mg (k/w). A BOF photo examination was carried out and the following results were obtained: Normal intestinal gas shadow in the abdominal cavity with distribution to the pelvic cavum; There is no picture of coiled spring, herring bone appearance, or pathological step ladder; Preperitoneal fat looks good; The shadow of the liver and lien does not appear to be enlarged; The contour of the right and left kidney is not clearly visible; There is no visible radioopaque shadow along the urinary tract; The left right shadow psoas is not clearly visible; Corpus pedicle and spatium intervertebralis appear to be well LLD : Intestinal gas shadow appears to be distributed in the right and left abdominal area; There is no pathological step ladder; There was no shadow of free air in the abdominal cavity. The conclusion was obtained that a normal intestinal gas

shadow was obtained in the abdominal cavum with a distribution to the pelvic cavum; There was no picture of obstructive ileus or pneumoperitoneum.

On December 3, 2024, an abdominal CT examination was carried out with contrast and the following readings were obtained: Loculated fluid collection (8-16 HU) appears in the right hypochondrium, right lumbar, umbilical region and hypogastric region that push small and large bowels to the left lateral side Multiple mesenterial lymphnodes of 0.8-1.5 cm in the left lumbar region No images of mass in the abdominal cavity or pelvic cavity which when contrasted do not appear abnormal contrast enhancement hepar: normal size, normal density, invisible dilation IHBD/EHBD, v.porta/hepatica normal, invisible mass/nodule GB: normal size, normal density, invisible mass/stones/pancreatic cyst: normal size, normal parenchymal density, invisible mass/cyst Lien: normal size, normal parenchymal density, invisible mass/cyst Right ren: normal size, normal parenchymal density, invisible ecstasy pelviocalyceal system, no visible mass/stones/cysts Left Ren: normal size, normal parenchymal density, invisible ecstasy of the pelviocalyceal system, no visible mass/stones/cysts Buli: filled with enough fluid, no visible thickening of the walls/stones/mass of the prostate: normal size, normal parenchymal density, no visible mass/calcification No visible osteolytic/osteoblastic process. The conclusion obtained from the above findings can be an overview of abdominal tuberculosis; There is no picture of masses in the abdominal cavity or pelvic cavity, ileus, or pneumoperitoneum.

On December 5, 2024, the results of Genexpert mycobacterium tuberculosis from fecal samples were obtained as MTB Not detected.

On December 6, 2024, it will begin the administration of anti-tuberculosis therapy with the intensive phase adult FDC regimen with a dose of 1x3 tablets.

On December 10, 2024, the patient came to the Children's Polyclinic for the MRS control post and asked to be referred back to the Genteng-Jember Health Center to continue anti-tuberculosis drug therapy.

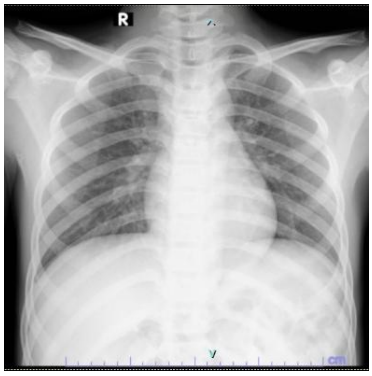

Figure 1. Thoracic photo on December 2, 2024

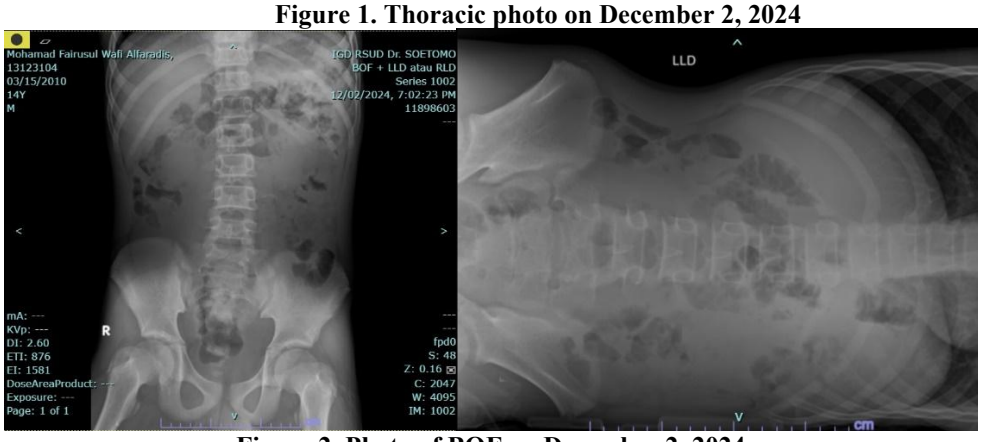

Figure 2. Photo of BOF on December 2, 2024

The results of BOF and LLD were concluded that the shadow of normal intestinal gas in the abdominal cavity with distribution to the pelvic cavity; There was no picture of obstructive ileus or pneumoperitoneum.

RESULT AND DISCUSSION

The case report reported a 14-year-old boy with the main complaint of vomiting. Patients have been vomiting since the last 10 days. The patient's mother said that the child has not been able to defecate since the last 8 days but can still fart with a small intake. The patient did not get complaints of tightness, no cough complaints, no fever complaints.

A previous patient from Genteng Hospital with a diagnosis of S. intra-abdominal tumor. Three years ago, patients often complained of very severe abdominal pain. An abdominal CT scan and colonoscopy at that time showed the presence of an intraabdominal tumor, but the results of the examination were not brought by the patient's mother. The patient was then referred to a hospital in Jember, but the family refused and opted for alternative treatment by giving herbal medicine. Over the next three years, patients still experienced recurrent abdominal pain, with a frequency of pain about once every 3 to 6 months.

In the patient's physical examination, such as the examination of the head and neck, no signs of anemia, cyanosis, jaundice, or difficulty breathing were found. In addition, no enlarged lymph nodes were detected. On the pulmonary examination, the chest inspection was found to look symmetrical. On chest palpation examination, normal palpative phremitus was found. On chest percussion examination, sonor was found in both hemitochocs of the dextra. On auscultation examination, vesicles were found in both hemitoracs, without ronki and wheezing. On the heart examination, a single S1-S2 sound was obtained, without murmurs and gallops. The abdomen appears distended, with pressure pain in the epigastrium. Turgor of the normal skin, liver and lien are not palpable. Intestinal noise has a normal effect. There was no edema and *clubbing finger* on the extremities of the sufferer, warm, dry, red acral with CRT<2 seconds. Neurological status with GCS 456.

Abdominal tuberculosis includes the gastrointestinal tract, peritoneum, mesentery, lymph nodes, liver, spleen, and pancreas (Al-Zanbagi & Shariff, 2021). Abdominal TB is the sixth most common form of extrapulmonary TB after lymph nodes, genitourinaria, bones, and joints, milier TB and meningeal TB. Abdominal TB is a rare type of extrapulmonary TB, only found as much as 0.3% of all TB in children. The most infected locations are the ileocaecal region ranging from 44-48% (Chakinala & Khatri, 2020; Al-Zanbagi & Shariff, 2021).

Some of the mechanisms of occurrence of abdominal TB are hematogenal spread from distant foci, lymphatic which causes the involvement of abdominal lymph nodes, swallowing sputum of patients with active pulmonary TB, through the consumption of milk and dairy products that have not been pasteurized contaminated by *Mycobacterium tuberculosis,* can be through the spread of infected organs adjacent to the peritoneum such as tuberculosis spondylitis, congenital infections that occur during antenatal through intrauterine transplacental spread or ingestion of infected amniotic tissue, and finally through the consumption of breast milk from mothers with TB infection who do not receive treatment. *Acid-fasst bacilli* or acid-resistant bacilli can survive in the stomach and reach the gastrointestinal tract by penetrating the mucosa to diphagorostosis by cells presenting antigens in the intestinal lymphoid follicles and then form the focus of the intestinal lymphoid follicle and then form the primary foci and caseosa granulomas, after 2-4 weeks becoming caseose necrosis and causing ulceration of the mucosa above it and spreading to the deeper layers and to the lymph nodes adjacent as well as peritoneum. Sometimes, these bacilli can enter the portal

circulation or arteries of the hepatica and hit solid organs such as the liver, pancreas, and spleen (Chakinala & Khatri, 2020; Al-Zanbagi & Shariff, 2021).

Abdominal tuberculosis is a disease with a chronic course, where the development process lasts from several weeks to months. The clinical symptoms that appear are very diverse and are influenced by the location of the organs involved. Manifestations can range from mild complaints that are not typical to severe conditions that resemble other disorders of the digestive system (Malikowski et al., 2018). The most common symptoms are fever, weight loss and abdominal symptoms such as abdominal pain, diarrhea, vomiting and loss of appetite (Henen et al., 2021). The symptoms of abdominal pain, fever and weight loss are referred to as triage TB abdominal because they are a triad of symptoms that most often occur in all developing and developed countries. Other symptoms and signs from the data collected in several studies are abdominal distension, abdominal pressure pain, palpable abdominal mass, ascites, peritonis and peritoneal disease in the form of fistula or abscess (Lal et al., 2020). The most common complications are intestinal obstruction due to intestinal narrowing and adhesions, perforations, intestinal fistulas, and gastrointestinal bleeding (Al-Zanbagi & Shariff, 2021).

Clinical manifestations and non-specific symptoms, diagnosing abdominal TB in children becomes a challenge, as in this case, the microbiological confirmation of the disease is often difficult, for the diagnosis must depend on clinical suspicion, imaging, histopathological findings and even in some cases, when the diagnostic test is inadequate, but the clinical suspicion is high, the patient begins anti-tuberculosis treatment (Al-Zanbagi & Shariff, 2021). Response to therapy is proposed as a criterion for the diagnosis of abdominal TB. Response to therapy occurs quickly, usually within two weeks (Chakinala & Khatri, 2020).

Laboratory findings are often non-diagnostic. Laboratory results can show non-specific chronic inflammatory conditions such as normochromic normochromic anemia, increased erythrocyte sedimentation rate and increased CRP. Serum albumin levels can be low due to malnutrition or liver damage in general. Transaminases may also be increased and dense organ involvement may arise with hepatosplenomegaly (Sartoris et al., 2020).

In the patient, a BOF photo examination was carried out and the results showed that the distribution of intestinal gas shadows appeared normal in the abdominal cavity until it reached the pelvic cavity, then no signs of obstructive ileus or the presence of free air in the peritoneal cavity were found.

On December 3, 2024, an abdominal CT examination was carried out with contrast and a loculated fluid collection (8-16 HU) was obtained in the right hypochondrium, right lumbar, umbilical region and hypogastric region which pushed the small and large bowel to the left lateral; Multiple mesenterial lymphnodes of 0.8-1.5 cm in the left lumbar region are visible; There is no picture of the mass in the abdominal cavity or pelvic cavity, which in contrast is not abnormal contrast enhancement. The conclusion obtained from the above findings can be an overview of abdominal tuberculosis; There is no picture of masses in the abdominal cavity or the pelvic cavum, ileus, or pneumoperitoneum

Radiological examinations such as ultrasonography (ultrasound), CT scans barium examinations and MRIs can help detect abdominal lymphadenopathy, ascites, thickening of the intestinal wall and omentum, as well as complications such as perforation or narrowing of the lumen (Wong et al., 2020).

Bacteriological examination is a confirmation of TB diagnosis, but negative results do not rule out the possibility of TB diagnosis in children. Based on the literature, histological findings of granuloma caseosa necrosis are bacteriological confirmation in children often negative, especially in patients under five, this is because TB in children is pausibasilar (small number of germs) and taking test preparations is not easy.

Some bacteriological examinations for TB are Molecular Rapid Test (TCM), antigen detection using lateral flow lipoarabinomannan (LF-LAM) urine, microscopic examination of acid-resistant bacteria (BTA) and culture examination (culture) which is the gold standard for TB diagnosis, namely by finding *Mycobacterium tuberculosis germs* in culture examinations. Meanwhile, the examination for evidence of M. TBC infection is in the form of tuberculin and (Interferon Gamma Release Assay) (IGRA) skin tests. The two examinations are to detect TB infection through the detection of the presence or absence of a specific cellular immune response to M. TBC, either *in vivo* (tuberculin skin test) or *in vitro* (IGRA) (Ministry of Health of the Republic of Indonesia, 2023).In GenExpert patients from the results of the feces, *MTB Not Detected* results were obtained, but from clinical symptoms and radiological examination it has led to a high suspicion of abdominal TB, so it was decided to provide anti-tuberculosis therapy to the patient.

Antituberculosis therapy was given in the form of a combination of RHZE (Rifampicin, Isoniazid, Pirazinamid, Etambutol) for 2 months and RH for 6-9 months. During treatment close monitoring is needed because antituberculosis drugs have some side effects. Response to therapy is an approach often used to demonstrate macroscopic and microscopic healing in abdominal TB cases. In patients, it was decided to administer antituberculosis oabt with a dose according to the patient's body weight (40kg) so that it was given adult OAT KDT intensive phase 3 tablets per day (Henen et al., 2021).

The prognosis of abdominal tuberculosis (TB) in children is highly dependent on various interrelated factors. One important factor is the age at which the child is infected. The younger the child, their immune system tends to be not fully mature, making it more susceptible to severe infections and complications. In addition, the existence of HIV infection also worsens the condition because it decreases the child's immune system, making it difficult to fight tuberculosis infection. The presence of comorbidities or comorbidities can also worsen the prognosis. Children with nutritional disorders, other chronic diseases, or congenital disorders will face greater challenges in the healing process. No less important, the existence of resistance to anti-tuberculosis drugs is also a major challenge in treatment. If the tuberculosis germ is resistant to one or more first-line drugs, then the therapy becomes more complex, the duration is longer, and the end result is not always satisfactory.

Another factor that also determines the success of therapy is adherence to treatment. Children who receive family support in undergoing treatment regularly have higher recovery rates. Conversely, irregularities in drug consumption can lead to therapy failure and increase the risk of serious complications, even death (Vlad et al., 2022). Therefore, a comprehensive approach and strong support from families and health systems are essential in improving the prognosis of children with abdominal tuberculosis.

CONCLUSION

In this case, diagnosis of abdominal tuberculosis was supported by *BOF* photo examination and contrast-enhanced abdominal CT scan, which revealed characteristic findings such as localized fluid collection and mesenteric lymphadenopathy without evidence of masses or ileus. Despite a negative GenExpert result from stool samples, antituberculosis therapy was initiated based on clinical and radiological assessment. The patient received a combination of RHZE (*Rifampicin*, *Isoniazid*, *Pirazinamid*, *Etambutol*) for two months, followed by RH for six to nine months, with dosing adjusted to body weight (40 kg) using the adult fixed-dose combination *OAT* (*KDT*), three tablets daily. Close monitoring was conducted to evaluate therapeutic response and manage potential drug side effects, as clinical and microscopic improvement are key indicators of recovery. Early diagnosis and appropriate, well-monitored therapy led to favorable clinical outcomes and prevented further complications. Future research

should focus on developing more sensitive diagnostic methods for abdominal tuberculosis in adolescents, particularly for cases with negative molecular test results, to further improve early detection and treatment outcomes.

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