

## Case Report

# A Case of Tuberculous Spondylitis in Child with Undernourish

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## Abstract

*Tuberculous spondylitis accounts for around 2% of all cases of Tuberculosis (TB) and around 15% of extrapulmonary TB cases. It has been reported that a 17 years old boy with a complaint of a bump on the lumbar region and felt low back pain since two years before admission with a history of back trauma. There was a decrease of body weight. There was no paraesthesia nor paralysis. Defecation and micturition were normal. Basic immunization was incomplete. On physical examination found palpable lymph nodes 0,5x0,5x0,5 cm, multiple et regio colli. There was no BCG scar. Impression nutritional status was undernourished. There was fixed palpable mass at back size about 5x4x5 cm, hard, no fluctuations, no rebound tenderness. Lung examination was normal. Tuberculin test showed induration sized 20 mm. Gene Xpert result Micobacterium Tuberculosis (MTB) not detected. On chest X-ray examination found L1-2 corpus destruction. MRI Spine was suggestive of compressive fractures and suggestive of a bilateral psoas abscess. Decompression and lumbar stabilization surgery were performed. The histopathology examination results were consistent to spondylitis TB characteristics. The patient was discharged on 6<sup>th</sup> hospitalization and given anti-tuberculous drug.*

**Keywords:** bump, extrapulmonary, fracture, spondylitis, tuberculosis

## Abstrak

Spondilitis tuberkulosis menyumbang sekitar 2% dari semua kasus tuberkulosis (TB) dan sekitar 15% kasus TB luar paru. Dilaporkan kasus spondilitis tuberkulosa pada seorang anak laki-laki berusia 17 tahun dengan keluhan benjolan di daerah pinggang dan nyeri pinggang bawah sejak 2 tahun sebelum masuk rumah sakit dengan riwayat trauma punggung. Terdapat penurunan berat badan. Tidak ada parestesia dan paralisis. Defekasi dan misturiksi tidak ada keluhan. Imunisasi dasar tidak lengkap. Pada pemeriksaan fisik teraba kelenjar limfa regio colli ukuran 0,5x0,5x0,5 cm, multipel. Tidak ada BCG skar. status nutrisi gizi kurang. Massa di punggung berukuran 5x4x5 cm, terfiksasi, tidak ada fluktuasi dan tidak nyeri saat ditekan. Pemeriksaan paru-paru tidak ditemukan kelainan. Uji tuberkulin menunjukkan indurasi 20 mm. Hasil gen Xpert menunjukkan MTB tidak terdeteksi. Pada pemeriksaan rontgen dada ditemukan kerusakan korpus L1-2. MRI Spine menunjukkan fraktur kompresi dan abses psoas bilateral. Operasi dekompresi dan stabilisasi lumbal telah dilakukan. Hasil pemeriksaan histopatologi sesuai dengan karakteristik spondilitis TB. Pasien pulang setelah 6 hari rawatan dan diberikan obat anti tuberkulosis.

**Kata kunci :** benjolan, ekstrapulmoner, fraktur, spondilitis, tuberkulosis

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## BACKGROUND

Tuberculosis (TB) is an ancient disease but remains a major global public health problem. There

were an estimated 10.0-10.4 million new cases of TB (range, 9.0–11.1 million), equivalent to 133 cases (range, 120–148) per 100,000 population.<sup>1,2</sup> TB affects all countries and all age groups, but overall the best estimates for 2017 were that 90% of cases were adults (aged ≥ 15 years), 64% were male, 9% were people living with HIV (72% of them in Africa) and two-thirds were in eight countries: India (27%), China (9%), Indonesia (8%), the Philippines (6%), Pakistan (5%),

Nigeria (4%), Bangladesh (4%) and South Africa (3%).<sup>3</sup>

Pulmonary TB (PTB) is the most common form of TB, extrapulmonary TB (ETB), such as spinal TB (STB) known as tuberculous spondylitis, is one of the oldest reported diseases in humans.<sup>4</sup> Extrapulmonary disease accounts for between 10% - 42% of TB cases, with the proportion being greater among children and those with immunodeficiency due to HIV co-infection. The exact incidence and prevalence of spinal tuberculosis in most parts of the world are not known.<sup>5</sup> Tuberculous spondylitis estimated accounts for around 2% of all cases of TB and around 15% of extrapulmonary TB cases.<sup>6,7,8</sup>

TB is caused by the *Mycobacterium tuberculosis* complex, which has around 60 species. It is a slow-growing fastidious, aerobic bacillus.<sup>9,10-12</sup> The risk factors for tuberculosis as well the predisposing factors for tuberculous spondylitis include poverty, overcrowding, illiteracy, malnutrition, diabetes mellitus, immunosuppressive treatment, HIV infection, alcoholism, and also drug abuse.<sup>3,13</sup>

Spinal involvement in tuberculous spondylitis is usually a result of the hematogenous spread of *M. tuberculosis* from a primary source into the dense vasculature of cancellous bone of the vertebral bodies.<sup>14</sup> The primary infection site is either a pulmonary lesion in the lungs, lymph nodes of the mediastinum, mesentery, gastrointestinal tract, genitourinary system, or any other viscera.<sup>15,16</sup>

The clinical picture of tuberculous spondylitis is extremely variegated. Its progression is insidious in onset and the disease develops at a slow pace.<sup>17,18</sup>

The main characteristic clinical features of tuberculous spondylitis include local pain, local tenderness, stiffness and spasm of the muscles, a cold abscess, gibbous, and a prominent spinal deformity.<sup>19,20</sup>

The additional examination can be used to evaluate and diagnose tuberculous spondylitis, such as tuberculin test, blood test, tissue analysis, and radiology. Polymerase Chain Reaction (PCR) analysis of tissue samples is considered to be very sensitive and specific for the diagnosis of spinal tuberculosis.<sup>21</sup> Gene Xpert MTB/RIF test is a fully automated

diagnostic test that has a sensitivity of 95.6% and specificity of 96.2%.<sup>22</sup>

Tuberculous spondylitis is a rare clinical condition, but it can cause severe vertebral and neurological sequelae that can be prevented with a correct early diagnosis. Early diagnosis and appropriate empirical anti-TB agents combined with surgery are associated with an excellent prognosis.

## CASE

A 17 years old boy came to the respiratory outpatient clinic pediatric RSUP. Dr. M. Djamil was consulted by the division of orthopedic surgical with lumbar compression et causa suspected tuberculosis spondylitis. The patient came with a chief complaint of low back pain in the last two years.

The patient had a history of back trauma three years ago. The patient fell from a tree as high as 2,5 meters, the child fell down, but the child can still walk. A bump appeared on the back two years ago, initially small, increasingly enlarged, painful, brought by parents to massage. He felt more pain during sitting than standing position. There was no paraesthesia nor paralysis. A history of suffering from a long cough is denied. There are neither fever, seizure, nausea, vomiting, coughing, nor breathlessness. Decrease of body weight in the past one month ago, highest body weight 43 kg, current body weight is 39 kg. Both defecation and micturition were within normal limits. The parents took the patient to the Mukomuko Regional Hospital 4th months ago and were referred to the department of surgical outpatient clinic Dr M. Djamil Hospital. Lumbosacral magnetic resonance imaging (MRI) examinations were done. He was get natrium diclofenac 2x1 tablet, vitamin B kompleks 1x1 tablet. The patient was counseled from orthopedic surgery to the general pediatric outpatient clinic with diagnosed suspect tuberculosis spondylitis.

The patient has no history suffered from the same disease nor history of contact with tuberculosis patient. History of family members suffered chronic cough, coughing with blood with weight loss was denied. There is no family history who suffered from the same disease.

The patient is a first child from 5 siblings, he had a spontaneous delivery assisted by a midwife, a term

with a birth weight of 3.500 gram and birth length 48 cm, vigorous. Basic immunization was incomplete, bacille calmette-guerin (BCG) and measles vaccine has not been carried out. No booster immunization. The history of nutrition concluded as less than enough in both quantity and quality. Growth and developmental history were normal. Hygiene and sanitation were less good.

Patient with the moderately ill presentation, alert, blood pressure 110/70mmHg, heart rate 81 times per minute, respiratory rate 19 times per minute, body temperature 36,9 oC, body weight 39 kg, body height 162 cm, weight for age was 60%, height for age was 92%, weight for height was 79%, genetic height potential was 159 – 176 cm, with impression nutritional status was undernourished. The skin was warm. The Head was round and symmetric. Conjunctival wasn't anemic, sclera wasn't icteric, pupil isochor with diameter two mm/2 mm, light reflex was positive normal. Ears and nose were normal. Tonsil was T1-T1, not hyperemic and pharynx was not hyperemic. Mouths mucous was wet. Palpable lymph nodes 0.5x0.5x0.5 cm, multiple, et regio colli dextra et sinistra. Examination on heart ictus wasn't seen, ictus palpated at left midclavicularis line, intercostal space V, on auscultation there is regular rhythm, no murmur. On examination of lung normochest, no retraction, no lagging breath, vesicular breath sounds, no rales, no wheezing. There was no abdominal distension, Liver and spleen were not palpable, the peristaltic sound was normal. There was a fixed palpable mass at the back on second until third lumbar region size about 5x4x5cm, hard, no fluctuations, tenderness at low back pain, no rebound tenderness.

No abnormality found in genitalia, puberty state A3P4G4. Extremities were warm with good perfusion, and physiological reflexes were positive normal, pathological reflexes were negative. Motor strength was  $\frac{555/555}{555/555}$  Sensory was normal. The tuberculin test was positive. It showed induration sized 20 mm.

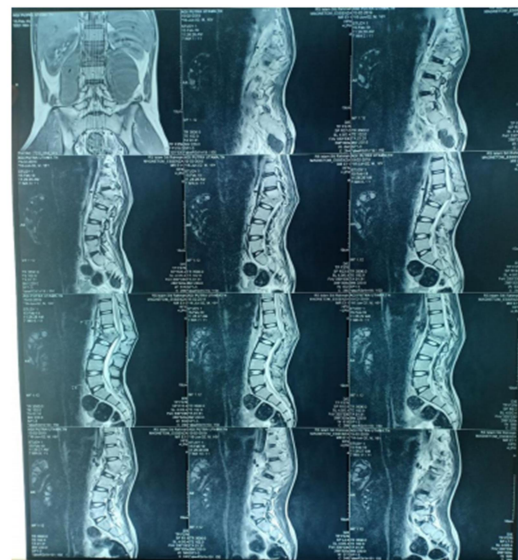
On laboratory finding, Hemoglobin was 13,2gr/dL, white blood cells 9.940/mm<sup>3</sup>, hematocryte 37%, platelet 453.000/mm<sup>3</sup>, differential count 0/2/2/67/24/5, PT 11 second, APPT 42.8 second. Interpretation: APTT more than normal range. SGOT 13 U/L, SGPT 7 U/L, BUN 18 mg/dL, SC 0,6 mg/dL,

random blood glucose 109 mg/dL, natrium 141 mmol/L, kalium 4 mmol/L, calcium 9,4 mg/dL and chloride 102 mmol/L. Hs-CRP that was 30.6 mg/L (normal value: 0,4-7,9 mg/L). Erythrocyte sedimentation rate (ESR) examined was 48 mm (normal value 0-10 mm). Interpretation: electrolyte was in normal range, ESR and hs-CRP increased than normal range.

On Vertebrae thoracolumbal X ray with PA and lateral view, we found compression and destruction of the L1-L2 vertebral body. We also found narrowing between disc L1-L2 and L2-L3. These findings were suggestive as spondylitis.



**Figure 1.** Vertebrae thoracolumbar X-Ray on PA/ Lateral view



**Figure 2.** Lumbosacral MRI

Lumbosacral MRI examination with axial and sagittal pieces without contrast, the expert found deformity in the lumbar 1-2 vertebrae corpus, which causes narrowing of thoracic 12-lumbar 1, lumbar 1-2 and lumbar 2-3 and causes 'protruded discs' to appear

on the intervertebral thoracic 12-lumbar 1, lumbar 1-2, lumbar 2-3 accompanied by herniation of the nucleus pulposus toward the posterior diffuse and causes suppression of the spinal canal and bilateral spinal radix accompanied by changes in the intensity of the lumbar signal 1-2 which gives a hypointense signal at T1W1 and hyperintense on T2W1. Regular border boundary lesions on the left m psoas and the right m psoas which at T1W1 give inhomogeneous hypointense signals and at T2W1 give inhomogeneous hyperintense signals. The conclusion was suggestive of compressive fractures et cause spondylitis and also suggestive of a bilateral psoas abscess

On Chest Xray with PA and lateral view, the heart was not enlarged (CTR < 50%). Left sinus and diaphragm were normal, there were no infiltrates. Trachea in the middle. Aorta and superior mediastinum were normal. Both hilum were not widening. Bronchovascular appearance within normal limits. No visible infiltrates or nodules in both lung fields. Both costophrenic sinuses were acute. Both were slippery diaphragms. L1-2 corpus destruction appeared. The conclusions were heart and lung within normal limits, and suggestive spondylitis.

We diagnosed the patient with tuberculosis spondylitis L1-L2, and undernutrition. Decompression and lumbar stabilization surgery was performed. The patient has hospitalized in the surgical ward Dr. M. Djamil Hospital for six days. He get therapy IVFD RL 22 drop per minute macro, Ceftriaxone 2x1 gr iv, Ranitidine 2x50 mg iv, Ketorolac 3x1 ampoule iv, Kalnex 3x1 gr iv, Vit K 3x10 mg iv, Vitamin B6 1x20 mg po and anti-tuberculosis drug FDC 1x3 tablet (Rifampicin 150 mg / Isoniazid 75 mg / Pirazinamid 400 mg and Etambutol 275 mg) po. The condition when the patient went to home was the child could sit, still had low back pain, no fever, no urinary or defecation disorders. Physical examination showed a blood pressure of 100/70 mmHg, a pulse rate of 90 times per minute, a breath rate of 20 times per minute and a temperature of 37<sup>0</sup> C. The conjunctiva was not anemic, and the sclera was not jaundice. Heart and lung disorders were not found. Stomach not distended, bowel sounds normal (+), on the back 16 cm long surgical wound covered by gauze, painful. Warm extremities, good perfusion, normal physiological

reflexes, muscle strength with normal sensory. From gene Xpert result MTB not detected. We continued the intensive (initial) phase anti-tuberculosis drug. The patient was discharged on the six<sup>th</sup> hospitalization.

## DISCUSSION

A 17 years old boy was hospitalized with a diagnosis of tuberculous spondylitis with undernourishment. The working diagnosis was established based on detailed history of prolonged back pain for 2 years, with the slow-growing mass on the back region since 2 years ago, and a decrease of body weight for last a month ago. The history of basic immunization was incomplete and BCG scar was negative. He lives on poor hygiene and sanitation environment. His parents were low educated. Based on the literature, the clinical pictures of tuberculous spondylitis are extremely variegated. Its progression is insidious in onset and the disease develops at a slow pace. The diagnostic period, since onset of symptoms, may vary from 2 weeks to several years with average disease duration ranging from 4 to 11 months.<sup>17,18</sup> The main characteristic of clinical features for tuberculous spondylitis include local pain, local tenderness, stiffness and spasm of the muscles, a cold abscess, gibbus, and a prominent spinal deformity. Patients usually seek for medical advice only when they felt severe pain, there were marked deformity, either neurological symptoms develop.<sup>19,20</sup> The epidemiology shows that 90% of cases were aged ≥ 15 years and 64% were male. The risk factors for tuberculosis as well the predisposing factors for tuberculous spondylitis include poverty, overcrowding, illiteracy, malnutrition, poor history of vaccination, immunosuppressive treatment, HIV infection, alcoholism, and also drug abuse.<sup>3,13</sup> Low-educated parents also seemly indirectly involve in increasing the risk of this disease.

On physical examination, there was a fixed palpable mass at the back on second until third lumbar region sized about 5x4x5cm, tenderness at low back pain with pain scale 4/10, no rebound tenderness. Back pain is the most frequent symptom of tuberculous spondylitis. The intensity of pain varies from constant mild, dull aching to severe disabling. Pain is typically localized to the site of involvement.

The pain may be aggravated by touching, spinal motion, coughing, and weight-bearing, because of advanced disk disruption and spinal instability, nerve root compression, or pathological fracture. Chronic back pain as the only symptom was observed in 61% of cases of tuberculous spondylitis.<sup>5</sup> Spinal deformity is a hallmark feature of spinal tuberculosis. The type of spinal deformity depends on the location of the tuberculous vertebral lesion. Kyphosis, the most common spinal deformity, occurs with lesions involving thoracic vertebrae. The clinical appearance depends on the number of vertebrae involved causing “knuckle” (1 vertebra), “gibbus” (2 vertebrae), and “rounded kyphosis” (>3 vertebral collapses).<sup>5,24</sup> There’s no other constitutional sign of TB infection was found from general physical examination in this patient, such as fever, lymph node enlargement, nor abnormality on lungs examination. The constitutional sign and symptoms are more frequently associated with PTB than spinal TB. Those symptoms present in approximately 20–30% of cases of osteoarticular tuberculosis. The classical constitutional features of tuberculosis indicating the presence of active disease are malaise, loss of weight and appetite, night sweats, evening rise in temperature, generalized body aches, fatigue, and lymph node enlargement.<sup>22</sup>

Tuberculin test was positive in this patient, and it showed induration sized 20 mm. The tuberculin skin test is recommended by the WHO for use in low-income countries. It shows positive results for 62%–90% of patients with tuberculosis.<sup>25</sup> This test has no diagnostic value in endemic areas and may also be falsely negative in immunodeficient individuals and hence is of some use only in latent TB. Positive tuberculin testing results support the diagnosis in areas with low prevalence (or no vaccination). Negative tuberculin test results may be founded in nearly 30% of cases. In addition, if the patient is markedly immunosuppressed with HIV infection or is severely malnourished, the skin test is nearly always negative.<sup>26</sup>

On hematology examination, it was founded that this patient had the level of C-reactive protein (CRP) was increase significantly. One of the standard blood tests that are used for the evaluation of tuberculosis was the C-reactive protein (CRP) level. CRP is more

specific for acute infection rather than TB. It has been reported that the CRP level was increased in 69% of cases but noted that an elevated CRP level is more specific for acute infectious lesions. Total and differential leukocyte (lymphocyte) counts can be elevated but lack a defined role in the diagnosis of spinal tuberculosis.<sup>27</sup>

Chest X-Ray examination (PA and lateral projection) showed normal lungs and heart, with the abnormality of vertebrae bone which was L2-3 corpus destruction. Those images are suggestive of spondylitis presentation. MRI showed spinal tuberculosis at L2–L3. Spinal tuberculosis caused the destruction, collapse of vertebrae, and angulation of the vertebral column. Plain radiography is usually performed initially in patients suspected to have STB. Sixty percent to 70% of spinal TB may have an active pulmonary lesion, and thus chest radiography is essential.<sup>4,22</sup> Disc space narrowing and rarefaction of vertebral endplates can be identified as the disease progresses and further destruction leading to kyphosis and instability can be made out only in late stages. Magnetic resonance imaging (MRI) has been the imaging modality of choice as it has been able to detect the earliest changes. The extent of soft tissue involvement, the spread of abscess, and neural compression are best visualized in MRI. Whole spine screening aids in identifying skip lesions. MRI is also of immense value in assessing the response to treatment.<sup>22</sup>

The classification of tuberculous spondylitis based on Gulhane Askeri Tip Akademisi (GATA) system was based on seven clinical and radiological criteria (abscess formation, disc degeneration, vertebral collapse, kyphosis, sagittal index, instability and neurological problems). This patient’s category is in type III (severe vertebral collapse, severe kyphosis, instability deformity with or without neurological deficit), so the treatment administered to this patient were debridement, decompression and correction of deformity & internal fixation through a surgical procedure. Potential benefits of surgery were adequate sampling for histological confirmation of the diagnosis, early and better healing by removal of the disease focus, correction and prevention of the spinal

deformity, reducing the rates of recurrence, and promoting early neurological recovery.<sup>22,25</sup>

The diagnosis was confirmed by conducted histologic examination. The histologic features that are the most commonly observed are epithelioid cell granulomas (90%), granular necrotic background (83%), and lymphocytic infiltration (76%). Scattered multinucleated and Langhans' giant cells may be seen in up to 56% of cases.<sup>5</sup> The histopathology examination results on this patient were consistent with tuberculous spondylitis characteristics, which's found on tissue specimen as: a connective tissue stroma with some histiocytes, epithelioid, plasma cells, and Langerhans cells. It also showed regions with caseosa necrotic and bone sequester.

The patient had pharmacological treatment anti-tuberculosis drug with FDC regimen, and supportive therapy for pain management along with surgical management. Almost all anti-tuberculous drugs penetrate well into tuberculous vertebral lesions. Spinal tuberculosis falls under category-1 of the WHO treatment category. The category-1 anti-tuberculosis treatment regimen is divided into two phases: an intensive (initial) phase and a continuation phase. In the 2-month intensive phase, anti-tuberculous therapy includes a combination of four first-line drugs: isoniazid, rifampicin, pyrazinamide and ethambutol. In the continuation phase, two drugs (isoniazid and rifampicin) are given for 10 months.<sup>25,27</sup>

Prognosis and recovery are associated with the initiation of treatment and stage of disease development. Based on literature, prognosis of this patient was possibly good because there's no neurological deficit and deformity.

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