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Original Research Article

THORACIC TUBERCULOUS SPONDYLITIS WITH DECOMPRESSION AND POSTERIOR STABILIZATION TREATMENT: A CASE REPORT

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ABSTRACT

Introduction. Tuberculosis (TB) spondylitis is one of the most common spinal infections. The management of spinal tuberculosis is difficult due to non-specific and variable clinical manifestation that leading to delayed identification and increases the risk of disease. The early identification and treatment are very important to avoid permanent damage in the future. **Method.** In this research, the researcher reports a case of a patient with tuberculous spondylitis involving the thoracic vertebral body which treated by decompression and posterior stabilization treatment. **Results and Analysis.** The physical examination revealed a mass appears in the midline of the back. Chest CT examination without contrast revealed a mass that caused destruction and compression of the right side of the Thoracal 7 (Th 7) vertebral body, partial destruction of the right Th7 lamina, and spinal intracanal pushing to the left of the Th7 level of the spinal cord which caused the destruction of 7th and 8th posteromedial right ribs nearby. During the two months of treatment, the patient was treated with a first-line oral regimen as standard treatment for extrapulmonary TB followed by seven-month follow-up phase. At follow-up after more than 2 months of initial TB drug administration, the back pain was persisted. The patient underwent level 7 thoracic decompression by means of laminectomy and *flavectomy*. Histopathological examination from biopsy showed fibrous connective tissue containing *epitheloid* tubercles with *datia langhans* which suggests the presence of tuberculous spondylitis. The diagnosis was confirmed by AFB staining. **Discussion.** This case is important to provide recognition of the risks and phenomena of the continuing incidence of spinal TB, despite the progress made in early diagnosis and effective management.

Keywords: Posterior stabilization, Spondylitis, Tuberculosis

INTRODUCTION

One of the most common spinal infections, particularly in underdeveloped countries, is tuberculous (TB) spondylitis. Every year, 1.3 million people die because of the disease, affecting 1 to 2 percent of the world's population and accounts for up to half of all TB in the bones and joints (Dunn and Ben Husien, 2018). The majority of spinal tuberculosis infections occur in the lumbar area, second in the thoracic and cervical regions as the third most common site of infection. In the last two decades, the prevalence of bone and joint TB has grown, owing primarily to the emergence of immunocompromised conditions (Anshori, Priyamurti and Rahyussalim, 2020).

Spine tuberculosis is a common cause of non-traumatic causes of spinal deformities, especially in endemic countries (Sharma *et al.*, 2017). The incidence of neural complications among

patients in rich and poor countries with spondylitis TB ranges from 10 to 20% and 20 to 41%, respectively. Paraplegia most often occurs in second lumbar tuberculosis (L2), narrowing of the spinal canal due to bone structure and physiological thoracic kyphosis, which causes necrotic tissue to enter the canal. An abscess forms in a segment of the spinal column that tends to stay under the anterior longitudinal ligament and enters the spinal canal through the intervertebral foramina, compressing the umbilical cord. The abscess, on the other hand, drains into the psoas muscle in the lumbar spine segment (Jain and Kumar, 2013).

The management of spinal tuberculosis is difficult because of the non-specific and variable clinical manifestations that lead to delays in identification and an increased risk of disease and death in the patient population due to multiple sequelae. Early identification and treatment is very important to avoid permanent damage in the long term. What is to be achieved in the treatment of spinal tuberculosis is to establish a correct diagnosis, prescribe definite bacteriological drugs, reduce pressure on the spine, and correct spinal deformities and their complications. In cases of active tuberculosis, paraplegia should be treated with active anti-tuberculosis drugs, with surgical decompression or without surgical compression. Directly observed treatment (DOT) is a common method of ensuring proper treatment. In individuals who have neurological problems affected by spinal cord compression, surgery is often performed (Ferrer *et al.*, 2012).

Here, the researcher offers a patient's case report with tuberculous spondylitis involving the thoracic vertebral body and treated and improved by decompression and posterior stabilization treatment.

METHODS AND ANALYSIS

A 29-years-old Indonesian male patient who worked at a marketing office arrived to the pulmonary clinic of our hospital with backache for 2 months prior to admission and bilateral lower extremity weakness. There had been no historical trauma, fever, night sweat, and decrease in body weight. There were no other families who experienced the patient's condition. Physical examination revealed a mass appears in the midline of the back (Figure 1A). The initial results of laboratory examination were hemoglobin of 15,6 g/dL, leukocyte of 3,720, ESR 54 mm/hour, platelet of 223,000 cells/ µl, AST of 39 U/L, ALT of 44 U/L, blood glucose 150 mg/dL, *ureum* of 25 mg/dL. A chest x-ray examination was performed, and the impression showed no radiological abnormalities in the heart and lungs. Chest CT examination without contrast revealed a mass that caused destruction and compression of the right side of the Thoracal 7 (Th 7) vertebral body, partial destruction of the right Th7 lamina, and spinal intracanal pushing to the left of the Th7 level of the spinal cord. The mass reached the right paravertebral height Th6 to Th 8 measuring 2.31 x 5.15 x 3.43 cm, infiltrated the right Th7 and Th 8 neural foramen to the right Th 6-Th 7 neural foramen and caused the destruction of the 7th and 8th posteromedial right ribs nearby (Figure 1B-D). The impression of MRI results was compression of Th7 corpus with paravertebral complex lobulated mass predominantly on the right side, extension to the posterior column along Th6 to Th8, right-side pedicle, right posterior Th7 ribs, extension to the central intracanal, spinal cord compression, spinal cord level Th7 edema. Multifocal enhancing lobulated solid mass in the superior mediastinal along the right upper and lower paratracheal and on the left costovertebral - Th4 posterior costal and foci enhancing on *os sternum*, corpus Th3, Th4, Th10, right posterior 8,9 ribs also revealed from

MRI scanning. Multiple lymphadenopathy levels 1R, 2R, and especially 4R were also found. There were no bilateral lung abnormalities or other intrathoracic organ abnormalities. (Figure 1E-G). The patient was subsequently diagnosed with spondylitis TB.

Figure 1A Mass is seen in the midline of the back.

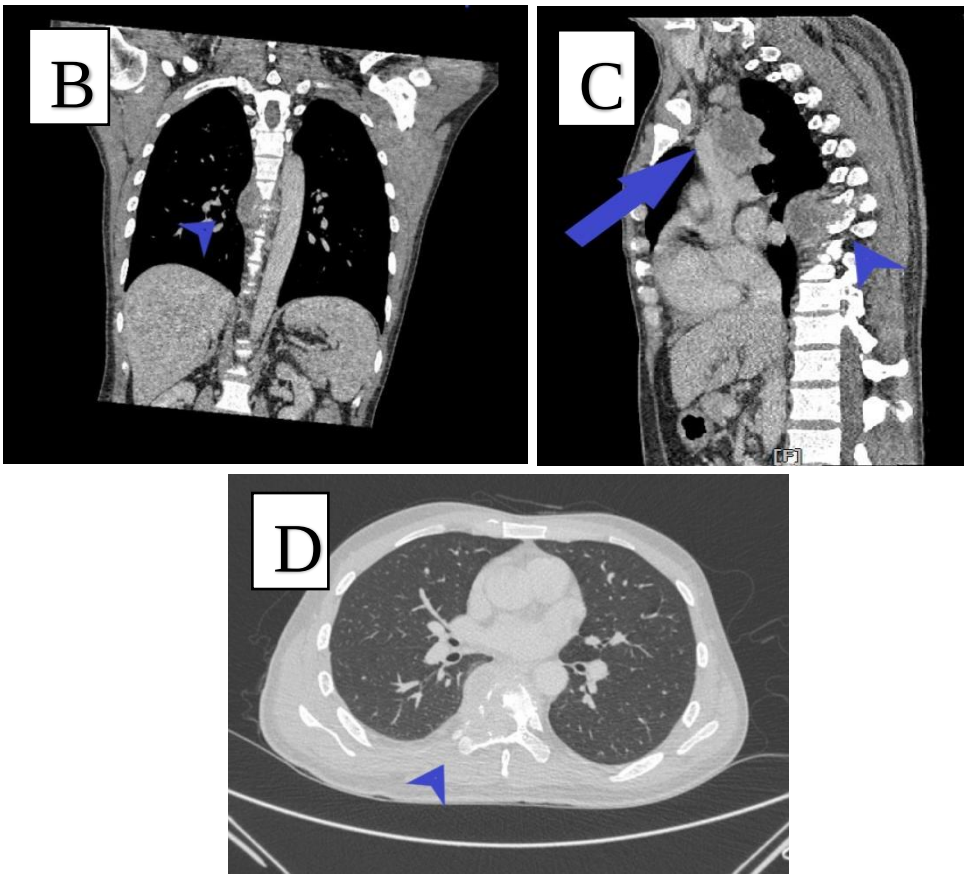

Figure 1B-1D. A mass that caused destruction and compression of the right side of the Thoracal 7 (Th) vertebral body, partial destruction of the right Th7 lamina and spinal intracanal pushing to the left of the Th7 level of the spinal cord. The mass reached the right paravertebral height Th6 to Th 8 measuring 2.31 x 5.15 x 3.43 cm and infiltrated the right Th7-Th 8 neural foramen to the right Th 6-Th 7 neural foramen and caused destruction of the 7th and 8th posterome,dial right ribs nearby.

During the two months of treatment the patient was treated with a first-line oral regimen as standard treatment for extrapulmonary TB in the intensive phase with rifampin 450 mg once daily, isoniazid 300 mg once daily, pyrazinamide 1000 mg once daily, ethambutol 1000 mg once daily and a seven-month follow-up phase. At follow-up after more than 2 months of initial TB drug administration, back pain persisted. The patient was advised to consult an orthopedist in preparation for surgery because his back pain was getting worse, but the patient refused. One month later, he came to the hospital and finally underwent surgery, because he felt very severe pain and couldn't walk. The patient was undergoing level 7 thoracic decompression by means of laminectomy and *flavectomy*. Posterior stabilization was carried out with the installation of 5,6,8,9 level pedicle screws and rods. An intra pedicular biopsy abscess evacuation was performed (Figure 1H).

RESULTS

The histopathological examination results of the spine came out after 6 days with a microscopic explanation found fibrous connective tissue containing *epitheloid* tubercles with *datia langhans* cells, these findings suggest the presence of tuberculous spondylitis (Figure 1I-J).

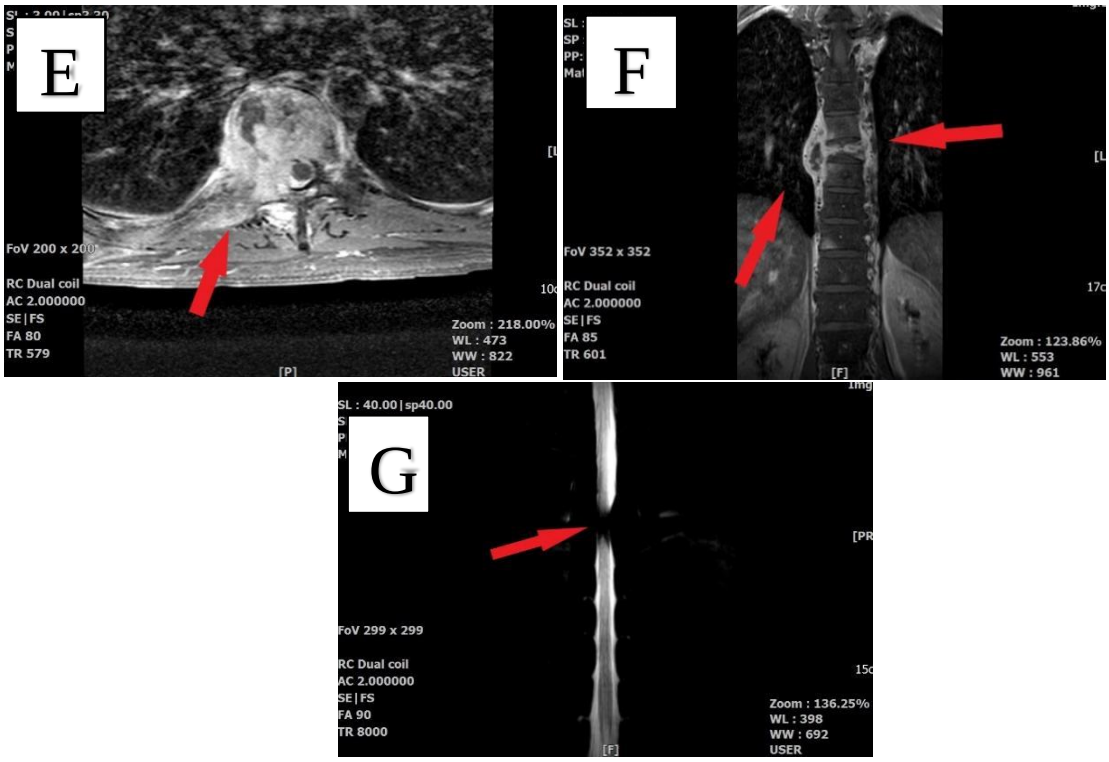

Figure 1E-1G. Compression of Th7 corpus with paravertebral complex lobulated mass predominantly on right side, extension to the posterior column along Th6-Th8, right-side pedicle, right posterior Th7 ribs, extension to the central intracanal, spinal cord compression, spinal cord level Th7 edema.

After 4 days of surgery, Anteroposterior and Lateral thorax x-ray showed a fracture of the vertebral body of Th7, and post posterior stabilization with internal fixation was in a good position. The patient reported clinical improvements and the pain decreased

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Figure 1H. Level 7 thoracic decompression by means of laminectomy and flavectomy. Posterior stabilization was carried out with the installation of 5,6,8,9 level pedicle screws and rods.

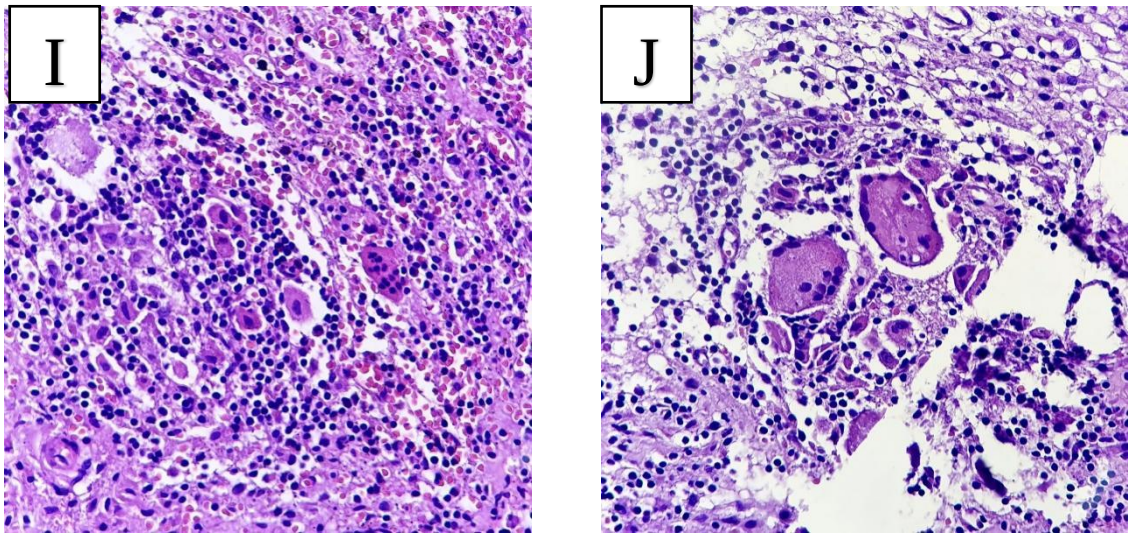

Figure 1I-J. Granulomatous inflammation, swollen connective tissues containing *epitheloid* tubercle nests with necrotization, and *datia langhans* cells.

DISCUSSION

Spinal TB infection is always secondary, resulted from the hematogenous spread of the bacillus from a primary focus (Schirmer, Renault and Holodniy, 2010). The clinical picture of spinal TB varies. Commonly, spine TB is subtle at the start and grows at a slow rate. Since the onset of symptoms, the diagnosis period may be ranging from two weeks to many years. The severity and length of spinal TB, as well as the development of complications such as abscess, sinusitis, deformity, and neurological deficiency,

these influence the manifestation of spinal TB. Backache is the most prevalent symptoms. The nature of resting pain at the pathognomonic level and its appearance is comparable to that of the degree of bone destruction and instability (Su *et al.*, 2010). In this report, the patient complained of back pain for 2 months before admission and bilateral lower extremity weakness. In this report, the patient complained back pain for 2 months prior to admission and bilateral lower extremity weakness.

Anatomically, the discussion of the intervertebral discs involves avascular structures, with the paradisical arteries dividing on either side of the disc and reaching the subchondral regions of each disc's upper and lower end plates. With progressive destruction of the vertebral body, deformation of spine will cause kyphosis (Rajasekaran, Kanna and Shetty, 2014).

The loss of vertebrae in the cervical spine and spinal column can be adjusted, the inherent lordosis causes the thoracic and thoracolumbar spine to differ. Nonetheless, progressive cervical kyphosis may require surgical procedure in rare cases of active continuing infection. Neurological complications might emerge during the active stage of the disease or in the late stages of recovery. Usually, the causes of neurological compromise in the active stage are direct compression as the consequence of the inflammatory tissue, abscess, or instability and sequestrum (Shetty, Kanna and Rajasekaran, 2016). As TB heals, mechanical tension of the umbilical cord in the internal gibbus persists and causes neurological problems. Radiographic observations show that 60-70% of spinal TB can present with active lung lesions, this makes chest radiography very important. Computed tomography (CT) can demonstrate vertebral degradation much better than plain radiography and is very useful in identifying the extent of bone destruction, posterior column involvement, junctional pathology, joint involvement, and regional stability (Sinan *et al.*, 2004). MRI is becoming the imaging modality of choice because of its ability to detect changes at the earliest. MRI gives the best visualization for the extent of soft tissue involvement, abscess spread, and neural compression, as well as assessing therapy response (Souza *et al.*, 2013). In this patient, MRI revealed a mass that caused destruction and compression of the right side of the Thoracal 7 (Th) vertebral body, partial destruction of the right Th7 lamina and spinal intracanal pushing to the left of the Th7 level of the spinal cord. The mass reached the right paravertebral height Th6 to Th 8.

One of sensitive marker for monitoring therapeutic response is erythrocyte sedimentation rate (ESR), but its low specificity is a drawback. ESR value in TB patients typically more than 20 mm/h and decreases as healing progresses (Guo *et al.*, 2010). This is consistent with the laboratory findings in this report.

The diagnosis of the patient was confirmed by AFB and histopathology examination. Mycobacterium diagnosis in culture specimens from the infected tissue is the single most confirmatory diagnostic test for spinal TB. However, because of its very poor sensitivity, histopathological studies demonstrating classical granulomas and identification of acid-fast bacilli (AFB) by staining the smears are considered to be gold standards for the diagnostic. Apart from histopathological evaluation, tissue samples should be subjected to AFB staining, AFB culture, and aerobic culture,

as well as polymerase chain reaction (PCR), line probe assays, or other molecular diagnostic techniques for antibiotic sensitivity assay (Rajasekaran, Kanna and Shetty, 2016).

Despite its association with high morbidities, the anterior debridement and radical excision of the disease foci along with Anti TT therapy was chosen for initial treatment. Lack of response to chemotherapy or relapse, extreme weakness at presentation, and nerve deficits static or worsening even after starting chemotherapy, instability, disabling discomfort, and deformities are among circumstances that require surgical intervention (Benli, Kaya and Acaroğlu, 2007). Surgical treatment has advantage which are adequate sampling for histological assay for the diagnosis, removal the disease focus allowing early and better healing, correction and prevention of the spinal deformity, reduced recurrence rates, and promoting early neurological recovery. The principles of surgical management include sufficient decompression and debridement, stability maintenance and reinforcement, and correcting or halting deformity progression (Rezai *et al.*, 1995).

Because of their ease, familiarity, and less learning curve, posterior procedures are now the most performed. The ability to achieve adequate exposure for all-around spinal cord decompression, improving the control of deformity through pedicle screws, the possibility of extension of instrumentation when needed, moreover avoiding complications related to thoracotomy through a posterior approach are all encouraging. Transpedicular decompression and posterior instrumentation help patients recover more quickly and minimize development of deformities and neurological complications in onset condition (Lee, Sung and Park, 2006).

CONCLUSION

This case is important to provide recognition of the risks and phenomena of the continuing incidence of spinal TB, despite the progress made in early diagnosis and effective management. In early diagnosis and effective treatment, the goals of treatment for spinal TB are to eliminate the disease and prevent and/or correct spinal deformities and eliminate the resulting neurologic effects. Decompression and debridement to stabilize and stop progression so as to correct deformities in the disease when declared cured. This is the goal of surgery in spinal TB.

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