



Case report

Upper thoracic spondylitis tuberculosis treated by posterior approach only:
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ARTICLE INFO

Keywords:

Posterior approach
Skeletal TB
Spondylitis
Tuberculosis

ABSTRACT

Introduction and importance: *Mycobacterium tuberculosis* (MTB) causes an infectious disease called tuberculosis which affects lung and other site of body. Spinal tuberculosis accounts for about half of all occurrences of skeletal tuberculosis. Patients with upper thoracic spinal TB are at an increased risk of severe spinal cord injury and kyphotic deformity, which may require surgery. Several treatment modalities include debridement, chemotherapy treatment, and decompression of the spinal twine and nerves.

Case presentation: A female patient, 45 year old, came with inability to walk for 2 months. Pain had started for 1 year and it was getting worse until motor strength of both leg diminished. The patient was diagnosed spondylitis tuberculosis of thoracal 2nd ASIA B with myelopathy. We performed posterior instrumentation of Th1-Th3 continuous with decompression by laminectomy and transpedicular debridement. There was no neurological injury, wound infections, and other complications after the surgery. Outcome of the surgery was evaluated on 1 months after surgery.

Clinical discussion: The patient has good motor function one month following the operation. Without assistance, the patient could rise and take a few steps. Furthermore, the patient felt better overall and no longer had back discomfort, indicating that the surgery also had good results.

Conclusion: Posterior approach is feasible for internal fixation, debridement, and fusion in this case. It is minimal traumatic, good correction rate and prevents the progression of kyphosis. The spinal cord also can be decompressed with satisfactory result.

1. Introduction

Tuberculosis is an infectious disease caused by *Mycobacterium tuberculosis* (MTB), mainly prevalent in developing and underdeveloped countries. Its incidence is also increasing in developed country because of an increased incidence of human immunodeficiency virus. According to Global Tuberculosis Report 2021, an estimated 9.9 million people suffered TB in 2020, equivalent to 127 cases per 100,000 population. TB was the 13th leading cause of death worldwide. The global number of deaths officially classified as caused by TB in 2020 is 1.3 million [1].

Tuberculosis primarily affects the lungs (pulmonary TB) but can also affect other sites. If the lesion in the lung is not well managed, other organs can be affected. Spinal TB is one of the most common extrapulmonary TB. The exact incidence and prevalence of spinal tuberculosis usually unknown. In high-burden countries, the incidence is expected to be proportionately high. Estimated 10 % of patients with

extrapulmonary tuberculosis have skeletal involvement, with spine as the most common site affected. Spinal tuberculosis accounts for almost 50 % cases of skeletal tuberculosis [2].

It is well known that the purpose of the surgical intervention of spinal tuberculosis is complete debridement, shortened chemotherapy treatment, decompression of the spinal twine and nerves, improved neurologic function, corrected kyphosis deformity, and reconstructed stability of the spine [3].

Patients with upper thoracic spinal tuberculosis have high risk of suffering from severe spinal cord damage and kyphotic deformity requiring surgical intervention. However, selecting the surgical approach for thoracic TB is still controversial [3,4].

We present a 45-year-old female with Spondylitis Tuberculosis of thoracal 2nd treated in our institution. Informed consent has been given by the patient to be reported in a case report. This case report has been in line with SCARE criteria [5].

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Received 4 March 2022; Received in revised form 13 June 2022; Accepted 15 June 2022

Available online 18 June 2022

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2. Methods

A 45-year-old female was presented to our institution with inability to walk since 2 months prior to admission. The complaint began with pain in the back since 1 year ago. The pain also radiates to the chest area and feels like a being tied. Complaints are getting worse, and the patient lost motor strength in both legs. The patient had no history of previous TB and medications.

From physical examination, she felt tenderness at the upper back region with visual analogue scale (VAS) of 4. Slight kyphotic deformity was detected. The range of motion of the neck was restricted due to pain. We also found the loss of motor function with muscle power grade 1. Clonus is also found in the physical examination in both legs. The complete blood count was found normal but ESR examination was found increased as much as two-folds from upper limit. The plain radiograph of the thoracic spine is displayed in Fig. 1. The image showed that decreased in vertebral body of thoracic 2nd in AP view, but unfortunately the lateral view is not completely can be evaluated.

We also performed MRI (Fig. 2) to evaluate the thoracic spine and found that there is a destruction of the thoracic 2nd with kyphotic deformity and suspected pus collecting in the anterior part of the upper thoracic spine.

The patient was diagnosed with spondylitis tuberculosis of thoracic 2nd ASIA B with myelopathy. She was then planned to perform surgery for her condition. The procedure was performed by our senior orthopedic consultant surgeon. Before the surgery, ceftriaxone was given, as prophylactic antibiotics, an hour before the surgery began. At the operating theatre, the patient was in prone position and general anesthesia was administered. Aseptic and antiseptic procedure was performed before incision. Incision was made posteriorly. Intraoperatively, the condition of thoracic 2nd was evaluated. The vertebral body was destruct and kyphotic deformity was clearly seen. We decide to perform posterior instrumentation of Th1-Th3 continuous with decompression by laminectomy and transpedicular debridement.

The plain radiograph after the procedure is presented in Fig. 3 below. There was no neurological injury, wound infections, and other

complications after the surgery.

After discharged, the patient was advised to do rehabilitation and routine control to outpatient clinic. The patient was suggested to wear cervical support. Post-operative compliance of the patient was good. The patient reported satisfied with his current condition.

3. Results

Outcome of the surgery was evaluated on 1 month after surgery in our outpatient clinic. Postoperative subjective and objective functional outcome and general quality of life of the patient were evaluated based on patient perspective.

Physical examination shows the motoric function is increase. The patient could stand and start to walk a few step without the aid, compared to the condition before surgery the patient was bed-ridden for two months because loss of motor function. The patient was suggested to use walker to support her while mobilization due to imbalance (Fig. 4).

The patient felt better overall and no longer felt pain on back. One month after the procedure, the patient reported satisfactory results from the procedure, where the pain resides, and the wound recovered appropriately with good functional outcome.

4. Discussion

Spinal involvement is usually a result of hematogenous spread of MTB into the dense vasculature of cancellous bone of the vertebral bodies. The primary infection site is either a pulmonary lesion or an infection of the genitourinary system [6]. Spinal TB can cause serious sequelae, if not treated adequately. It can damage the vertebral body, discs, and paravertebral soft tissue, resulting in caseous necrotic tissue, pus, and dead bone. This necrotic tissue could enter the spinal canal and cause compression which leads to paraparesis and even paraplegia [3].

Initially, spinal tuberculosis appears in the anterior inferior portion of the vertebral body which later spread into central part of the disk or body. Paradiscal, anterior, and central lesions are the most common type of vertebral involvement. The disk is primarily involved in younger

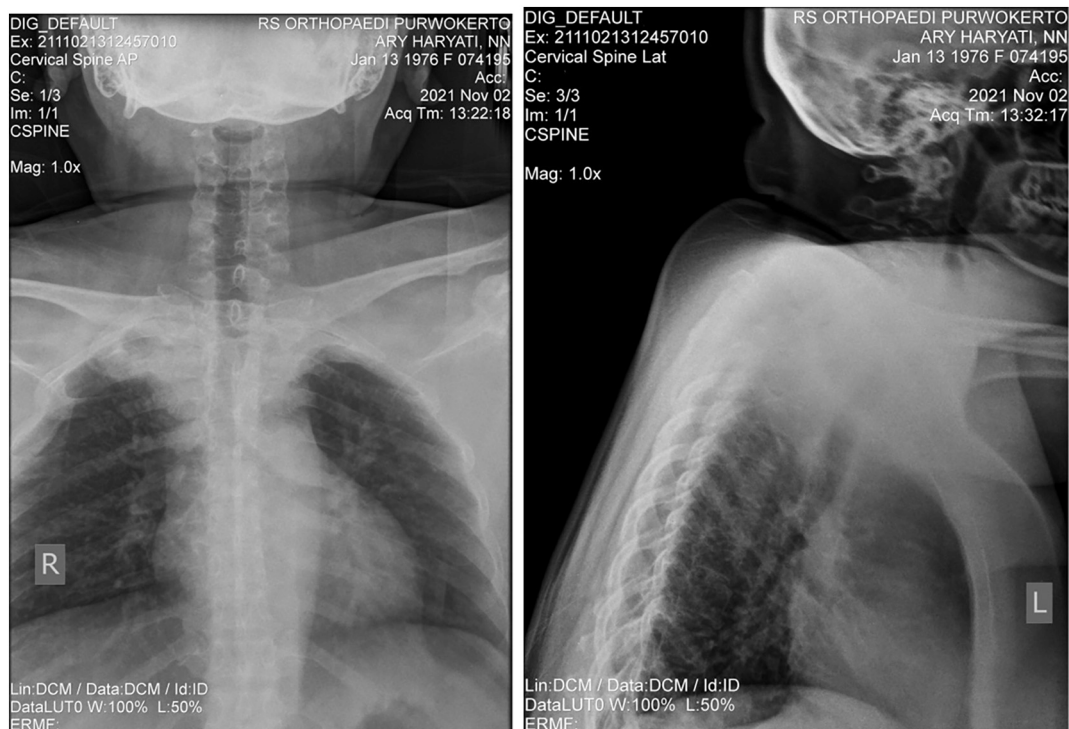


Fig. 1. Plain radiograph of the thoracic spine.

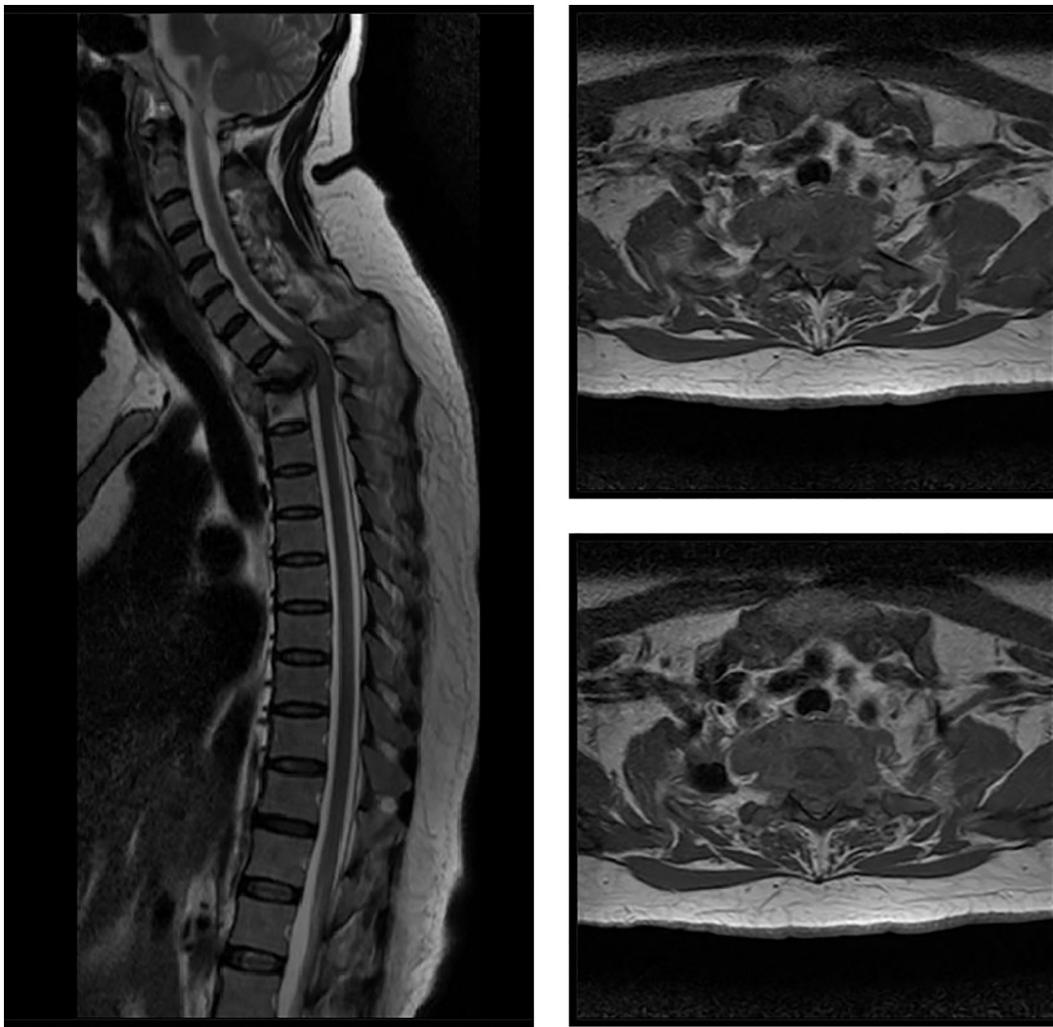


Fig. 2. MRI of the thoracic spine.

patient because the disk is more vascularized. In older patient, the disk is not primarily affected because of its avascularity related to age. Generally, there are more than one vertebra affected because segmental arteries bifurcate to supply two adjacent vertebrae. The lack of proteolytic enzymes in MTB is suggested to be the cause of the of subligamentous spread of infection. (in comparison with pyogenic infections) [2,7–9].

Spinal tuberculosis caused destruction of the intervertebral disk space and the adjacent vertebral bodies. It also causes collapse of the spinal elements and anterior wedging which leads to the formation of characteristic angulation and gibbus. The most frequently involved sites are the upper lumbar and lower thoracic spine. Typically, more than one vertebra is involved, and the vertebral body frequently affected than the posterior arch [2,7].

Spinal TB can occur in any part of the spine. In children and adolescent patients, thoracic spine is the most frequently affected. On the other hand, lumbar spine usually affected in adult patients. Because of the narrow spinal canal and inadequate blood supply in the spinal cord, paralysis can rapidly occur in patient with thoracic spinal TB if the treatment is not administered promptly and correctly [3,8].

Compression fracture without the intervertebral disk involvement (Concertina collapse) can occur because of the extensive tuberculous destruction. Concertina collapse bulges into the parenchyma of the spinal cord. Intrinsic factors cause meningomyelitis by direct involvement of spinal cord, surrounding meninges and roots or by involvement of blood vessels supplying the spinal cord. Late-onset paraplegia is a

neurological complication that develops after a variable period in a patient with healed tuberculosis. Late-onset paraplegia may develop two to three decades after active infection. It is often associated with marked spinal deformities [2,10].

The objective of surgical intervention of spondylitis TB is to effectively and safely relieve neural pressure, maximizing the decrease of the infectious burden, and reconstructing spinal stability, while minimizing physical damage [4]. Until now, the timing suitable for surgical intervention for paraparesis and paraplegia of spinal TB has been disputed. Some experts have been concerned that early surgical intervention may lead to the dissemination of systemic TB. However, study by Li et al. showed no cases of disseminated TB were observed during the hospitalization period and subsequent follow-up [3].

The anterior approach is commonly used for spinal TB and has some merit for debridement and interbody fusion. Previous scholars believed that a one-stage anterior approach surgery could achieve complete debridement, decompression, restoration of anterior column destruction, and bone graft fusion and could prevent posterior column destruction, shorten operative times, and facilitate wound healing [3]. However, some articles have reported that anterior internal fixation is not effective for the correction of kyphosis, especially for aggravating kyphosis during the disease course [11]. Therefore, anterior debridement combined with posterior instrumentation is recommended by scholars.

In recent years, many researchers have reported successful results from single posterior surgery for spinal TB. For patients with spinal TB

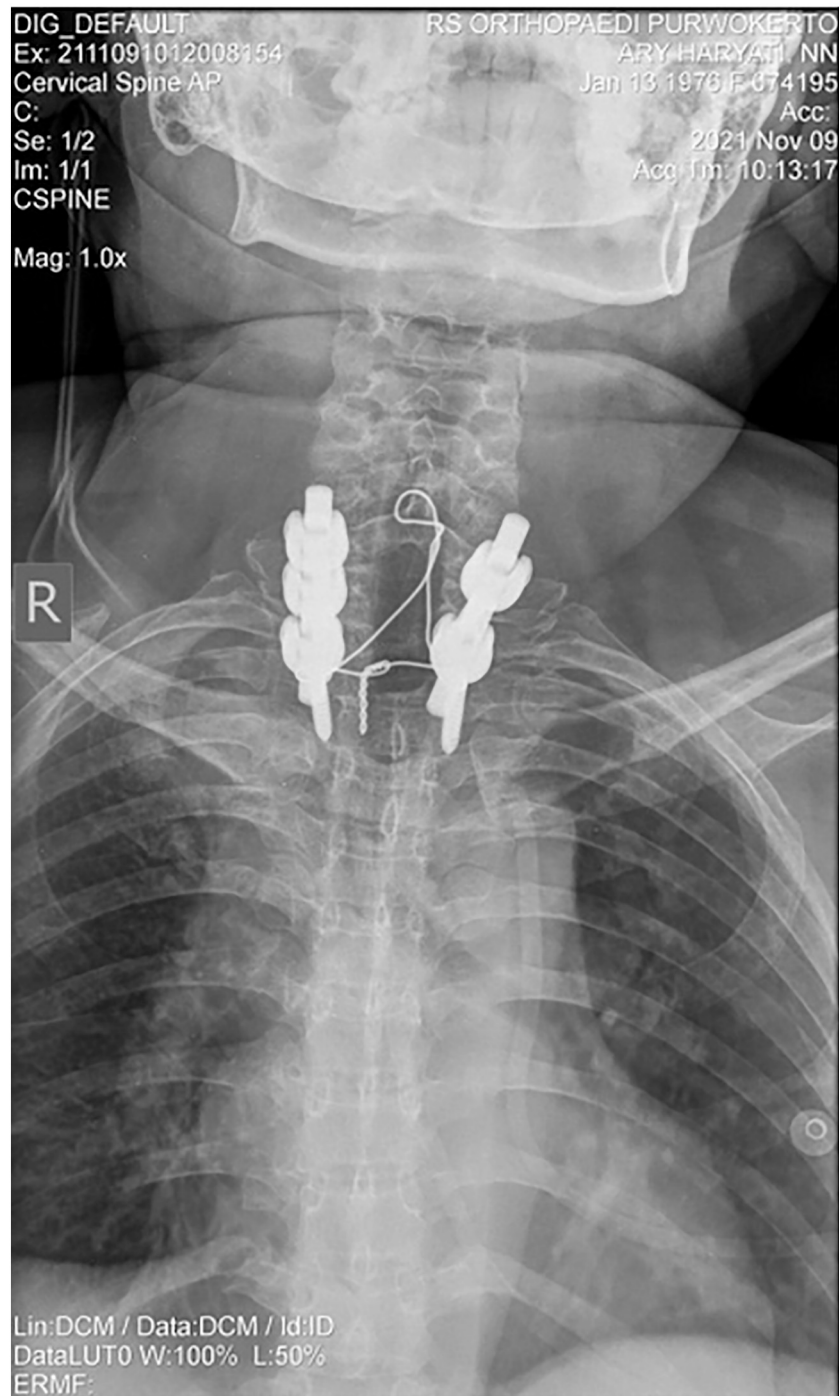


Fig. 3. Post-operative X ray.

with paraparesis or paraplegia, spinal cord decompression is more accessible through a posterior approach. Therefore, the single posterior approach is a suitable choice for spinal TB cases with paraparesis or paraplegia with small prevertebral abscesses [3].

The posterior surgical approach is simple, less traumatic, and involves complete debridement, interbody fusion, and spinal stability reconstruction in a single incision, without changing position and with fewer complications. At the same time, there are minimal lung function requirements in this approach, meaning that lung ventilation is not required and is not affected in cases of severe pleural adhesion [11]. In our patient, short-term follow-up was used to evaluate immediate response and patient postoperative condition.

Patient that was treated with posterior approach are more suitable to drainage of residual component postoperatively in the supine position due to the gravity effect.

Zhang et al. revealed the unique advantages of posterior-only approach in surgical treatment for upper thoracic spondylitis tuberculosis, including 1) the aim of surgery to performed debridement, spinal cord decompression, correction of deformities, bone grafting, and internal fixation can be completed in one incision and surgical position, 2) the complication to the lung can be minimize and no need to one-lung ventilation during surgery, and 3) under direct vision, the decompression from posterior lateral and also anterior aspect (decompression 270°) can be performed by this approach [4].



Fig. 4. Post-operative hip range of motion of the patient.

5. Conclusion

According to our findings, posterior approach is a feasible approach to perform internal fixation, debridement, and fusion in this case. There was minimal risk of trauma, good correction rate, and it was able to prevent the progression of kyphosis. The spinal cord can be decompressed, and our patient had satisfactory result.

Sources of funding

The authors report no external source of funding during the writing of this article.

Ethical approval

Ethical approval was not required in the treatment of the patient in this report.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

Iman Solichin contributes in the study concept or design, data collection, analysis and interpretation, oversight and leadership

responsibility for the research activity planning and execution, including mentorship external to the core team.

Muhammad Dedy Alkarni contributes to the study concept or design, data collection and writing the paper.

Registration of research studies

Does not need any registration

Guarantor

Iman Solichin is the sole guarantor of this submitted article.

Declaration of competing interest

The authors declare no conflicts of interest.

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