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Case report

A case report of percutaneous endoscopic debridement for treating lumbar tuberculous spondylitis with large psoas abscess

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ABSTRACT

Introduction and importance: Spondylitis tuberculosis is a spinal infection characterized by bone destruction, fracture, abscess, and resulting in deformity (kyphosis and gibbus formation). Therefore, early diagnosis and management of spondylitis tuberculosis have special importance in preventing complications. Surgery is reserved for progressive deformity or where the neurological deficit is not improved by anti-tubercular treatment. The spine can be approached anteriorly or posteriorly in a minimally invasive way. We reviewed the evaluation of clinical outcome, laboratory findings, and radiological post-minimal invasive endoscopic debridement in spinal tuberculosis with psoas abscess.

Case presentation: We collected data from two patients, a 24 years-old female and 27 years-old male, who was diagnosed with spondylitis tuberculosis with psoas abscess based on the history, physical, and supportive examination. Patients were given chemotherapy antituberculosis agents and performed percutaneous endoscopic debridement. The outcome was measured by clinical signs, laboratory findings, and radiology evaluation.

Discussion: Patients had pre-operative symptoms of unremitting lower back and thigh pain, febrile sensation, signs of paravertebral muscle tenderness, and limitation of spine motion. Post percutaneous endoscopic debridement, patients showed good response with clinical improvement seen from significant reduction of pain, paravertebral muscle tenderness, increasing spinal motion, laboratory improvement with a decline of ESR and CRP value, and radiology findings improvement with resorption of psoas abscess. No complications were found.

Conclusion: Treatment of spondylitis tuberculosis remains controversial regarding optimal use of antituberculosis drugs and the approach used for surgical decompression. Patients had immediate pain relief and reduced disability in treating spinal tuberculosis after percutaneous endoscopic debridement.

1. Introduction and importance

Spinal tuberculosis is a spinal infection characterized by bone destruction, fracture, and resulting in deformity. The further destruction can be caused by granulation tissue, dural invasion, and abscess which can spread to the gluteal region leading to neurologic deficits [1]. The first evidence of tuberculous spondylitis was described by Sir Percival Pott in 1779 [1]. Although spinal involvement only occurs in 1% of tuberculosis cases, the increasing incidence of tuberculosis in both developed and developing countries make spinal tuberculosis a serious health problem [2,3]. It is the most common and one of the most dangerous forms of skeletal tuberculosis and accounts for 50% of all cases of pulmonary tuberculosis [2,3]. Although the thoracolumbar junction seems to be the most common site of the spinal column involvement in tuberculous spondylitis, any part of the spine can be affected. Only a few cases mentioned in the literature were clinically presented as low back pain and treated for a long time with analgesics and rest before an appropriate diagnosis could be made. In this case, we reported the radiological and clinical outcomes of patients with spondylitis tuberculosis treated with percutaneous endoscopic debridement

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[4].

Anti-tuberculosis chemotherapy treatment is usually sufficient for the treatment of uncomplicated spinal tuberculosis, and operative intervention is advised only for specific indications to prevent and treat complications [4]. The treatment goals are to eradicate the infection and prevent or treat neurologic deficits and spinal deformity. Mortality from spondylitis tuberculosis has decreased dramatically with the introduction of effective chemotherapeutic agents, which play an integral role in managing this disease [5]. Currently, operative treatment is performed to achieve debridement and drainage of large cold abscess, decompression of the spinal cord and neural structures, prevention of instability, and correction or prevention of deformity [3]. Several authors have described minimally invasive techniques that address spondylitis as the primary focus for treating this condition. Although the clinical results have been satisfactory in these studies, the number of patients was small. The techniques are technically demanding and sometimes time-consuming, which may present obstacles to these techniques becoming accepted as standard procedures. Simpler and easier treatment for this condition is still needed [6]. This case report has been written following the SCARE 2020 criteria [7].

2. Case presentation

2.1. Case 1

It was a 24 years-old Indonesian female with a complaint of pain in the thigh (VAS 7) since one month before arrival at the hospital. There are no lumps, and the patient cannot move normally. The pain developed progressively, especially followed by muscle tenderness in the lower back, and the patient began to look pale, having intermittent fever, weight loss, and decreased appetite. The patient had no comorbidities, drug history, and allergies.

In the physical examination, we found conjunctiva anemic, no deformity in the lower back. There are no changes of skin color on the lower back and loss of the normal lumbar lordotic. There was tenderness in the paravertebral muscle on palpation, the distal sensory impression was good, and limitation of motion of the spine.

We obtained an anemic level in laboratory investigations, increased ESR, increased C-reactive protein, and normal leukocytes. In the X-ray anteroposterior and lateral of the thoracolumbar, we obtained destruction of the 1st and 2nd lumbar spine (collapse of the anterior corpus), increasing local kyphotic (Fig. 1).

We obtained spondylitis tuberculosis at the 1st and 2nd lumbar spine with psoas abscess from the contrast MRI examination of the thoracolumbar. This result concluded there are massive psoas abscesses along the right psoas muscle region with the destruction of the corpus vertebra and increasing local kyphotic.

Clinical investigation confirmed the diagnosis of spondylitis tuberculosis of the 1st and 2nd lumbar spine without deficit neurologic. The attending senior and team performed the percutaneous endoscopic debridement began with aspiration and found a seropurulent liquid as much as 700 cc. Technique for the percutaneous endoscopic started with the patient being positioned prone on a radiolucent frame suitable for fluoroscopy. Under fluoroscopic guidance, the entry point was marked on the skin according to the targeted disease. After the skin was disinfected, a disposable 20-cm-long 22-gauge puncture needle (Create Medic Co., Yokohama, Japan) was inserted under local anesthesia and advanced to the center of the iliopsoas abscess, with monitoring of the needle tip by CT as needed. A guidewire was then passed through the outer sheath of the puncture needle into the abscess. The insertion point was adequately enlarged with a dilator, and the drainage catheter was inserted over the guidewire. After the complete evacuation of the abscess by aspiration, we performed drainage and irrigation; the drainage catheter was affixed to the skin (Fig. 2). The endoscope was placed directly in the infected intervertebral space (between the 1st and 2nd lumbar spine) and performed irrigation with 10 L saline solution.

With those examinations, the working diagnosis of this disease was established by spondylitis tuberculosis of the 1st and 2nd lumbar spine without deficit neurologic. Treatment in this patient is the administration of oral anti-tuberculosis chemotherapy WHO category 1 (Isoniazid, Rifampicin, Pyrazinamide, Ethambutol) for 9 months and percutaneous endoscopic debridement. And from clinical findings and re-examination of MRI thoracolumbar after one-year percutaneous endoscopic debridement therapy shows significant improvement (Fig. 3).

2.2. Case 2

Male 27 years old, came to the hospital with chronic back pain since one year ago, weight loss, and severe back pain since three months before admission. The pain causes the patient to sleep sitting upright. He still can move all of his extremities and can walk without aid. From the physical examination, we found a bulging mass on the right flank. The clinical investigation confirmed that the diagnosis is spondylitis tuberculosis intradiscal of the 4th and 5th lumbar spine without neurological deficits. From the contrast MRI of the thoracolumbar, we obtained spondylitis tuberculosis at the lumbar spine with massive psoas abscess, and there is no significant deformity of the lumbar region (Fig. 4).

This result concluded a massive psoas abscess alongside the right psoas muscle region with the destruction of the corpus vertebra. The attending senior and team performed percutaneous endoscopic

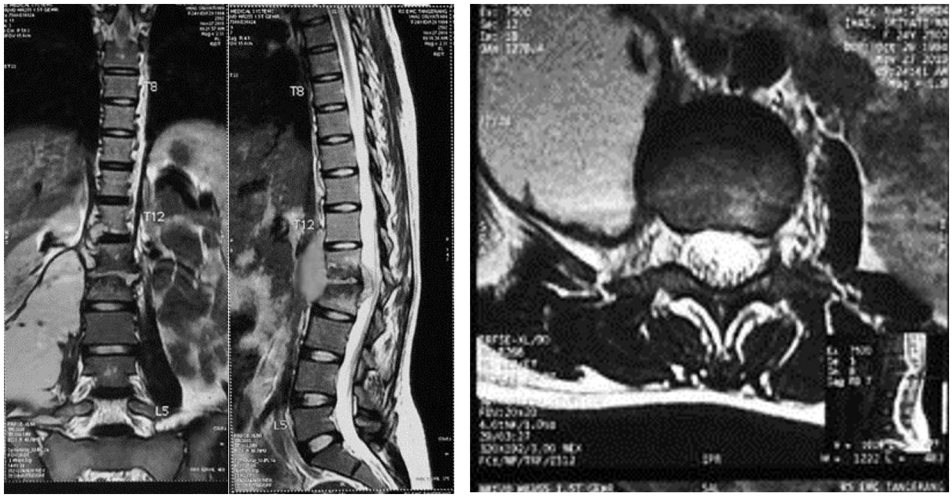

Fig. 1. MRI of the thoracolumbar. (a) Coronal projection, (b) sagittal projection, (c) axial projection.

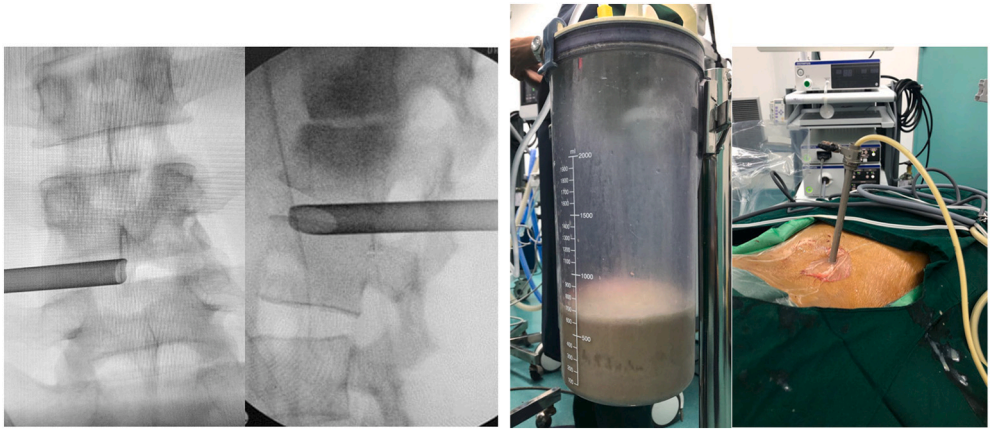

Fig. 2. (a) Under fluoroscopic guidance, (b) aspiration, (c) pus production.

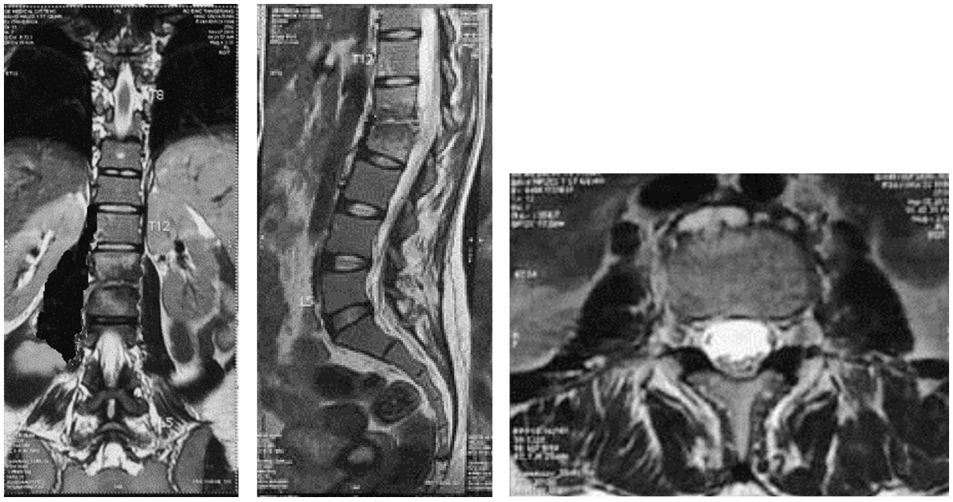

Fig. 3. Re-examination MRI of the lumbar after treatment with anti tuberculosis therapy, and percutaneous endoscopic debridement. (a) Coronal projection, (b) sagittal projection, (c) axial projection.

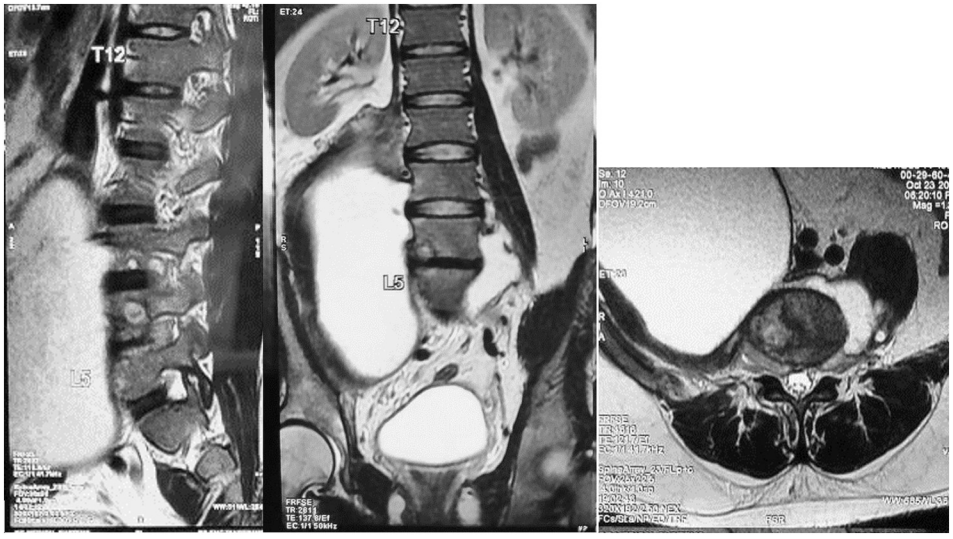

Fig. 4. MRI of the thoracolumbar. (a) Sagittal projection, (b) Coronal projection, (c) Axial projection.

debridement from the contralateral side (left transforaminal side) into the right transforaminal side to evacuate the abscess. Aspiration was done and we found 1500 cm^3 seropurulent liquid. Technique for the percutaneous endoscopic started with the patient being positioned prone on a radiolucent frame suitable for fluoroscopy. Under fluoroscopic guidance, the entry point was marked on the skin according to the targeted disease. After the skin was disinfected, a disposable 20-cm-long 22-gauge puncture needle was inserted under local anesthesia into the intradiscal 4th and 5th lumbar spine, then the scope was pushed until the contralateral psoas muscle to get the abscess region, and we also did a biopsy for the tissue and pus that we got from operation procedure (Fig. 5).

After those examinations, the working diagnosis of this disease was established by spondylitis tuberculosis of the 4th and 5th lumbar spine without deficit neurologic with psoas abscess. Treatment in this patient is the administration of oral anti-tuberculosis chemotherapy WHO category 1 (Isoniazid, Rifampicin, Pyrazinamide, Ethambutol) for 9 months and percutaneous endoscopic debridement. From clinical findings, the patient had immediate pain relief without any neurological deficit and laboratory improvement with a decline in ESR and CRP value. The re-examination of MRI thoracolumbar after percutaneous endoscopic debridement therapy shows significant improvement for this patient (Fig. 6).

3. Discussion

Spondylitis tuberculosis is a spinal infection characterized by bone destruction, fracture, abscess, and resulting in deformity (kyphosis and gibbus formation) [8]. It may be present in about 1% of TB cases. Those who present with spondylitis tuberculosis may have pulmonary TB in one-third to two-thirds of cases. The most important route of dissemination of TB to the spine is hematogenous [6]. Spondylitis tuberculosis usually develops insidiously, and there is thus a gap of several months between onset of symptoms and appropriate medical attention [16]. Therefore, early diagnosis and management of spondylitis tuberculosis are important in preventing these serious complications [9]. Surgery is reserved for select cases of progressive deformity or where the neurological deficit is not improved by anti-tubercular treatment. The infected spine can be approached anteriorly or posteriorly in a minimally invasive way. We review radiological and clinical outcomes after minimally invasive endoscopic debridement in spondylitis tuberculosis with psoas abscess [10].

The patients presented in this case report had a complaint of progressive pain in the lower back and thigh, paravertebral muscle tenderness, and limitation of spinal motion without any complaint of sensory and motoric function. The patients also felt other symptoms, such as night sweats and weight loss. The process of destruction of the lumbar spine and massive abscess on psoas muscle were found from radiographic X-ray and MRI examination; which gives more direction to the diagnosis. For a definitive diagnosis of tuberculous abscesses, tissue culture and histologic examination are always necessary [11]. The gold standard for diagnosis is positive *Mycobacterium tuberculosis* tissue culture. In addition, performing polymerase chain reactions in samples taken with biopsy, erythrocyte sedimentation rate (ESR), immunological hematological tests, and skin tests are helpful in diagnosis. The preferred imaging method for spinal cord TB is MRI [17].Typical findings include lesions in the vertebral endplates, anterior involvement in the vertebral body, subligamentous spreading, paraspinal cold (without signs of severe acute inflammation) abscesses and calcifications, vertebral bodies, vertebral body destruction, and collapse, but the disc is usually protected. MRI findings can also be used in treatment follow-up, but pain reduction and neurological recovery are more important in follow-up treatment [18].

These results show suspicions of spondylitis tuberculosis of the 1st and 2nd lumbar spine without deficit neurologic. Treatment of this patient was given anti-tuberculosis drugs WHO category 1 (Isoniazid, Rifampicin, Ethambutol, Pyrazinamide). After being given this conservative treatment for 1 year, significant improvements can be seen in the clinical, laboratory, and radiological findings. The pain symptoms are significantly reduced (VAS 2), tenderness in the paravertebral muscle disappears, no fever, bodyweight has increased, and there is resorption of psoas abscess from the immediate MRI (2 days after the percutaneous debridement). The patient can do their activities without any complaints and complications [19–21].

Spondylitis tuberculosis is usually secondary to hematogenous and spreads from a primary site of infection (most commonly the lungs). The paradiscal vessels typically supply the subchondral bone on either side of the disc space; therefore the most common pattern in the adult is the paradiscal lesion that begins in the vertebral metaphysis and erodes the cartilaginous endplate, resulting in disc space narrowing and discitis. The other patterns of involvement include central (with predominant vertebral body involvement), posterior (involving the posterior structures primarily), and non-osseous involvement (presenting with the abscess [23,24]). Abscess formation is seen more commonly in cases of tuberculous infection than in cases of pyogenic infection. Abscess formation has been reported in 71%–75% of cases of tuberculous spondylitis [12]. Progressive vertebral destruction leads to spinal kyphotic deformity and instability [20,24].

When vertebral lesions have no serious disturbance in vertebral stabilization and are located in one or two vertebrae, conservative management with percutaneous drainage of the abscesses along with antituberculosis treatment is recommended. The surgical treatment indications are neurologic deficit, spinal deformity with instability or pain, no response to medical therapy (continuing progression of kyphosis or instability), and large paraspinal abscess [13].

Open surgery is required in cases of spondylitis tuberculosis in which conservative treatment is ineffective or advanced bone destruction, or severe neurological deficits are present. There have been several reports

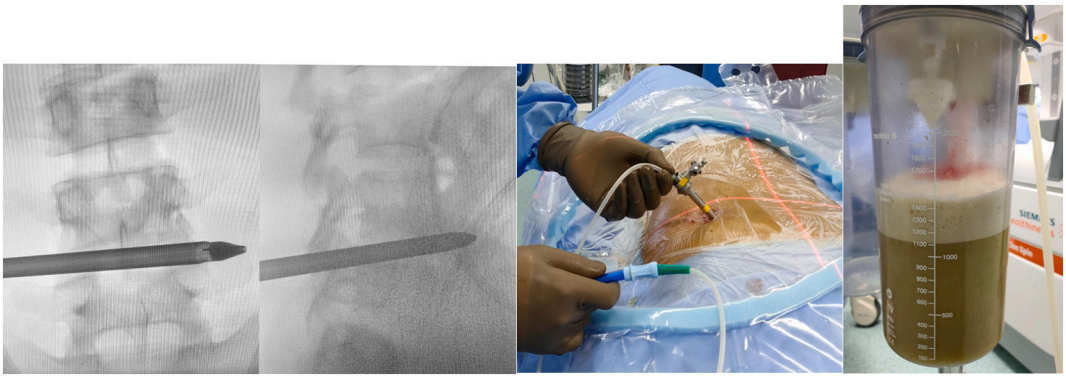

Fig. 5. (a) Under fluoroscopic guidance, (b) abscess evacuation with suction, (c) pus production.

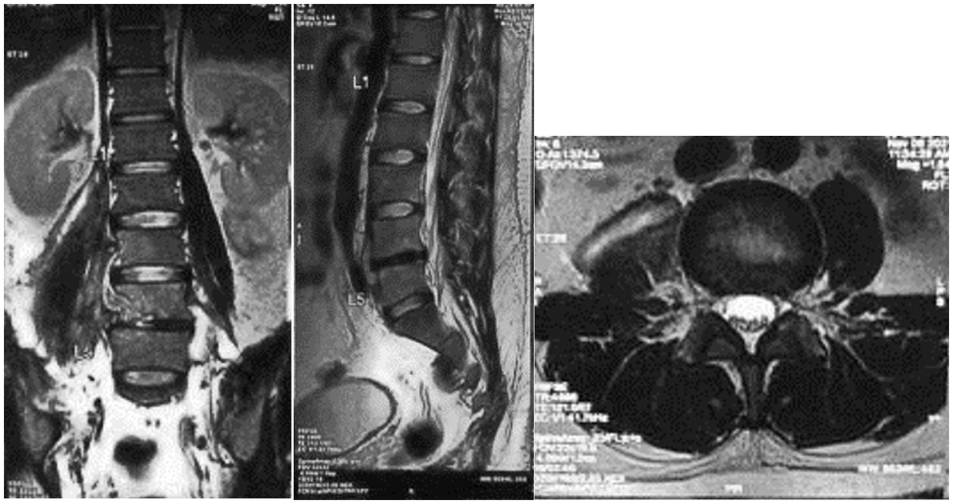

Fig. 6. Re-examination MRI of the lumbar after treatment with anti tuberculosis therapy, and percutaneous endoscopic debridement. (a) Coronal projection, (b) sagittal projection, (c) axial projection.

regarding surgical options for spondylitis tuberculosis. Some authors have suggested that favorable results are best achieved using anterior curettage and autologous bone grafting. Wisneski has also included increased paraspinal abscess formation among the indications for open surgery. In addition, Malawski and Lukawski have reported that although small paraspinal abscesses usually respond to conservative treatment, larger paraspinal abscesses can be treated surgically with successful results. In recent years, percutaneous endoscopic lumbar discectomy indications have been extended from simple lumbar disc herniation to spinal stenosis, pyogenic spondylitis, and lumbar intervertebral fusion. The therapeutic outcome is comparable with that of traditional open surgery. Ito et al. have reported the clinical results of percutaneous posterolateral endoscopic debridement and irrigation for pyogenic spondylitis. Previous studies performed either bilateral or unilateral percutaneous endoscopic debridement and lavage (PEDL) to treat infectious spondylitis [19].

Several studies have reported on the treatment of spondylitis tuberculosis accompanied by large iliopsoas abscesses using less invasive treatments directed at the spondylitis as the primary focus of infection. Hanaoka et al. performed percutaneous drainage and continuous irrigation of the infected disc space in 5 patients with severe pyogenic spondylitis with abscess formation or marked bone destruction and demonstrated successful results. Ito et al. reported good clinical results for posterolateral endoscopic debridement with irrigation in a study of 15 patients with pyogenic spondylodiscitis, including 6 patients with psoas abscess. We have previously reported that in 12 patients with pyogenic spondylitis accompanied by iliopsoas abscess, continuous irrigation using a saline infusion tube inserted in the infected disc, and a drainage tube in the secondary iliopsoas abscess communicating with the primary lesion was effective. Matsumoto et al. reported that CT-guided percutaneous drainage within the intervertebral space was effective for pyogenic spondylodiscitis with psoas abscess in a study of 8 patients. Although all the procedures mentioned above were effective and produced good clinical results, they may still be technically demanding, time-consuming, or complicated, making it difficult for them to become widely established in routine clinical practice [17].

Percutaneous endoscopic debridement has become established as the primary drainage and irrigation procedure for abscess so we can perform massive debridement and irrigation not only drainage the abscess, but this procedure can be performed by local anesthesia we can direct evaluation of the complication such as neurologic deficit and pain [9–12,15]. The objectives of surgical intervention include drainage of an abscess, debridement of infected tissues, stabilization of vertebrae, and deformity correction. Tubercle bacilli do not produce any biofilm, and therefore, tubercular infections are amenable to stabilization with implants. The surgical procedure typically involves debridement and fusion (instrumented or non-instrumented) through anterior, posterior, or combined approaches [25]. But there is still limited information in the literature on percutaneous endoscopic debridement of tuberculous psoas abscesses [9–12,13]. In the largest study to date (to our knowledge), Gupta et al. evaluated 27 patients with iliopsoas abscesses of tuberculous origin, three patients were treated with percutaneous aspiration, and the remaining 24 patients were treated with percutaneous endoscopic debridement. In that study, initial aspiration or percutaneous endoscopic debridement was successful in all 27 (100%) patients [14].

Indications for surgery in the active stage of the disease are failure of conservative therapy in terms of expanding paravertebral abscess or progressive bone destruction with significant angulation or vertebral collapse greater than 50% after a chemotherapeutic regime and rest for 6 to 8 weeks; epidural abscess causing compression of the dural sac or large paravertebral abscess; progressive complete or partial neurological dysfunction at any time during medical treatment; prevention of severe kyphosis in young children with the extensive dorsal lesion. Surgery is also performed in nondiagnostic biopsy cases and radicular or medullary compression cases due to granulation tissue, cold abscess, or sequestrated bone and disc fragments [20,21]. Indications for late surgery are recrudescence of the local disease, residual spinal deformity, development of a neural complication, and persistent severe pain due to mechanical instability [1]. Since surgery for spondylitis tuberculosis is demanding, it should be performed only after considering the risks and benefits for each patient. Various surgical procedures are recommended to treat spondylitis tuberculosis, but the common goals are to eradicate the infection and to prevent or to treat neurologic deficits or spinal deformity [22].

From the patient's history, we can conclude that administration of chemotherapy tuberculosis and percutaneous endoscopic debridement not only reduce the development of disease but improve the clinical, laboratory, and radiological findings. Pombo et al. reported results in six patients with seven tuberculous abscesses treated with percutaneous endoscopic debridement and chemotherapy [12]. They observed only one relapse, probably related to irregular or incomplete course of anti-tuberculosis medication. In a study conducted by Staatz et al., seven patients with tuberculous abscesses were successfully treated with percutaneous endoscopic debridement. This study is concerned that a combination of the administration of anti-tuberculous drugs and surgical treatment is the best choice for patients with spondylitis tuberculous with large psoas abscess [15].

This case report was far from perfect. The measured outcomes were only by clinical symptoms, laboratory and radiological findings. Furthermore, with more samples of patients, longer follow-up time, functional aspects, and daily activity consideration of patient believed will give more final goal of spondylitis tuberculosis treatment.

4. Conclusion

The present study's findings suggest that patients with spondylitis tuberculous accompanied by a psoas abscess can be cured without a prolonged period of therapy or recurrence by using this treatment that combined administration antituberculosis drug and the percutaneous endoscopic debridement. We believe that percutaneous endoscopic drainage and irrigation of psoas abscess are less invasive and can rapidly improve the clinical symptoms and laboratory and radiological findings.

Provenance and peer review

Not commissioned, externally peer-reviewed.

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Ethical approval

This case report did not intervene with patients' treatment plans and hence did not require ethical approval.

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

Harmantya Mahadipta: supervising, data collection, analysis.
Ajiantoro: data analysis, interpretation, writing the paper.
Reza Abidin: writing the paper, analysis, interpretation.
Riky Febriansyah Saleh: writing the paper, analysis, interpretation.
Jephtah Furano Lumban Tobing: writing the paper, analysis, interpretation.
Luthfi Gatam: reviewing, supervising, analysis.
Syafruddin Husin: reviewing, supervising, analysis.
Phedy: supervising, data analysis, interpretation.
Asrafi Rizki Gatam: data analysis, interpretation, writing the paper.

Registration of research studies

Not applicable.

Guarantor

Harmantya Mahadipta.

Declaration of competing interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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