

Case Report

Surgical treatment of noncontiguous spinal tuberculosis with gibbus deformity: A case report



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ARTICLE INFO

Article history:

Received 20 March 2012

Received in revised form

25 May 2012

Accepted 22 June 2012

Keywords:

Cervicothoracic

Gibbus

Noncontiguous

Spinal

Tuberculosis

ABSTRACT

Noncontiguous tuberculous spondylitis, especially with involvement of the cervicothoracic junction, is uncommon. The disease is usually accompanied by severe neurologic deficits. The surgical approach to this junction is quite difficult. We present here a 21-year-old woman who had had paraplegia and ascending numbness for over 1 month. Magnetic resonance imaging revealed noncontiguous spinal tuberculosis at the cervical, thoracic, and lumbar levels complicated by cervicothoracic gibbus deformity. She underwent staged operations including anterior decompression, halo ring traction, posterior decompression, and posterolateral fusion with internal fixation. After surgery, the muscle power in her lower limbs improved gradually, she could walk without aids after 8 months, and she was disease-free 2 years and 4 months after surgery. For a patient with noncontiguous tuberculous spondylitis with cervicothoracic junction involvement, staged surgeries at the critical levels combined with adequate medication can result in a good neurologic recovery.

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1. Introduction

Tuberculosis (TB) remains the leading cause of death among infectious diseases. It is estimated to cause over 3 million deaths worldwide annually [1]. Spinal TB, which occurs in about 1–2% of all TB patients, has a great impact on life quality [2]. Most spinal TB is contiguous, and only about 1–16% of cases are noncontiguous [3]. However, in one retrospective study of patients investigated using whole-spine magnetic resonance imaging (MRI), the incidence of multiple-level noncontiguous vertebral TB was 71.4% (10/14 cases) [4]. Cervicothoracic junction involvement is not common, and the surgical approach to this area is difficult in spinal TB. Here, we describe a 21-year-old woman with noncontiguous spinal TB at the cervico-thoracic-lumbar junction who was bed-ridden at admission. She underwent staged operations different from those that have been reported previously.

2. Case report

A 21-year-old woman presented with paraplegia, ascending numbness, and fecal and urinary incontinence that had lasted for over 1 month. Whole-spine MRI revealed multiple enhanced lesions in the whole spine with circumferential, paravertebral, and epidural abscesses; there was also a compression fracture and gibbus deformity at the second thoracic spine with thecal sac compression (Fig. 1).

The patient underwent staged operations. First, she received anterior cervicothoracic decompression to release the pressure of the cold abscess, and a specimen of pus was sent for examination. Halo ring traction was applied to regain alignment and the maximal traction force was 17 kg. Then the halo vest was fixed, and she received posterior fixation from the C5 to T6 levels using lateral mass screws at the fifth and sixth cervical vertebrae, with transpedicle screws at the fifth and sixth thoracic vertebrae. Posterolateral fusion was performed with artificial and autogenous bone grafts. A laminoplasty from the first to the fifth thoracic vertebra was also performed for posterior decompression.

The paravertebral abscess at the T9/T10 level was managed by drainage only. The pathologic examination revealed granulomatous

Conflict of interest: none.

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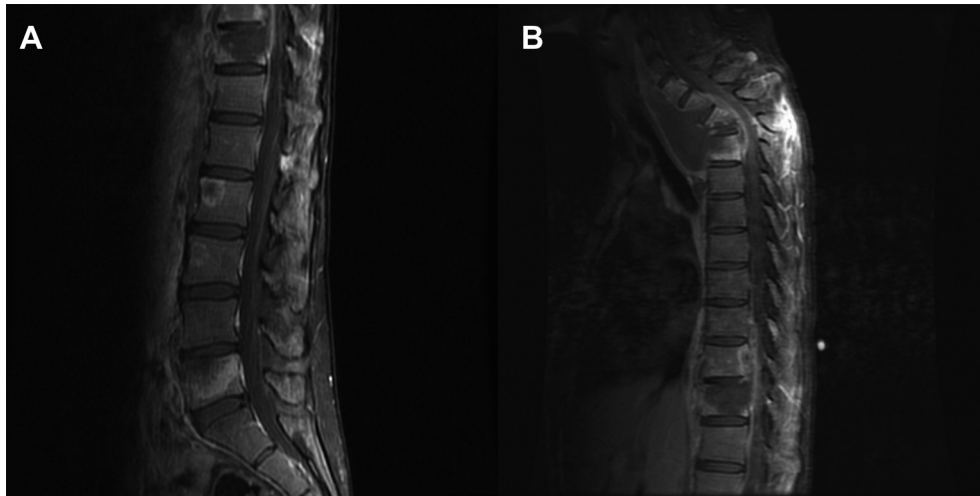


Fig. 1. Preoperative sagittal T1-weighted magnetic resonance imaging with gadolinium demonstrating (A) enhanced noncontiguous lesions in the lumbar vertebral column. (B) Enhanced noncontiguous lesions are seen in the cervical and thoracic vertebral column, and are more severe at the C6–T3 levels, with prevertebral and epidural abscesses. The intervertebral discs are relatively spared. A compression fracture and gibbus deformity are noted at the second thoracic vertebra.

inflammation with caseous necrosis, and culture of the pus yielded *Mycobacterium tuberculosis*. The anti-HIV antibody test was negative.

Spinal computed tomography showed great reduction of the kyphotic angle, as measured by the Harrison posterior tangent method [5] from 61 degrees before halo ring traction to 36.5 degrees 28 months postoperatively (Fig. 2). Bony fusion also occurred (Fig. 3). The patient wore a halo vest for 3 months and a sternal-occipital-mandibular immobilizer for another 3 months. She received anti-TB agents for 17 months and underwent rehabilitation. There was no fecal or urinary incontinence and her muscle power recovered gradually. The patient could walk with crutches 3 months after operation and was free of aids 8 months after surgery. She was disease-free 28 months postoperatively.

3. Discussion

Tuberculous spondylitis is usually derived from hematogenous spread of *Mycobacterium tuberculosis*. The subsequent bony destruction and spinal nerve or cord compression can result in severe neurologic deficits, such as paraplegia or fecal incontinence. Noncontiguous tuberculous spondylitis affects multiple levels of spinal vertebrae and thus can cause more neurologic symptoms.

With whole-spine MRI, the identified incidence of noncontiguous tuberculous spondylitis can reach 71.4%, as recently reported [4].

Our patient had noncontiguous tuberculous spondylitis involving the cervical, thoracic and lumbar spinal vertebrae. The most striking pathologic lesion was at the cervicothoracic junction, which is very difficult to access surgically. Thus we first performed halo ring traction to reduce the degree of cervicothoracic kyphosis, and then cervicothoracic internal fixation and fusion with a posterior approach.

The anterior approach with a sternotomy for the cervicothoracic junction is associated with high mortality, but a posterior thoracotomy provides only minimal access in lower cervical lesions [6]. Govender et al described 16 cases with an extended lower cervical approach with satisfactory outcomes [7]. However, cervicothoracic kyphosis can reduce the surgical space if an anterior approach is used, and contamination may occur with paraspinous abscesses. Lenoir and his colleagues reported 27 satisfactory reductions and complete or partial neurologic recovery in 10 of 14 patients after a posterior approach for unstable cervicothoracic junction injury in 30 patients [8]. The efficacy and feasibility of one-stage posterior debridement, bone grafting, and instrumentation for cervicothoracic spinal TB with kyphosis in children have also been reported [9]. Only one case of posterior decompression which



Fig. 2. Sagittal reconstruction on spinal computed tomography demonstrating a kyphotic angle of (A) 61 degrees before halo ring traction, (B) 38.5 degrees after traction, and (C) 36.5 degrees 28 months postoperatively.

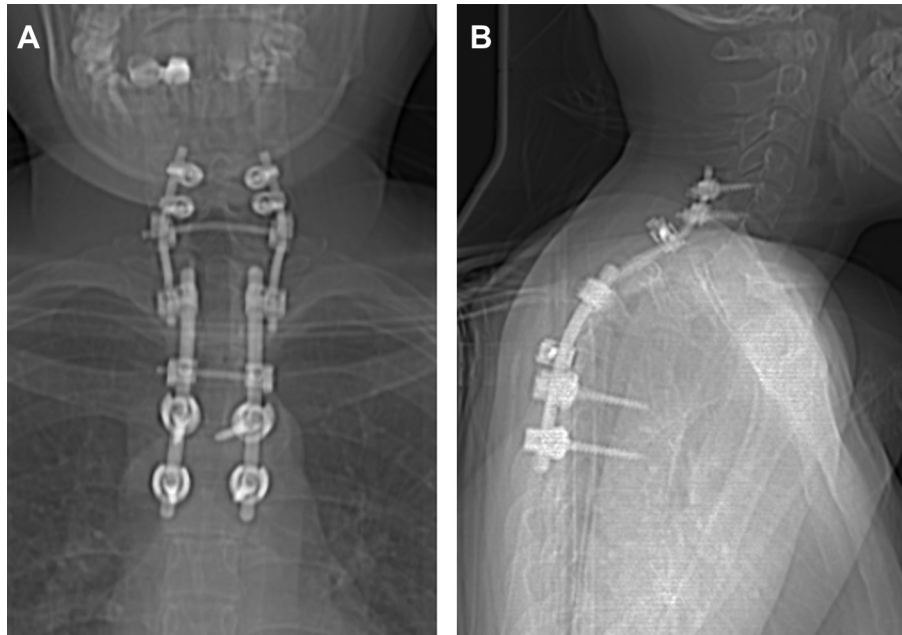


Fig. 3. Computed tomography 20 months postoperatively showing good spinal alignment in the (A) anteroposterior and (B) lateral views.

included a suboccipital craniectomy and laminectomy for circumferential craniocervical extradural tuberculous granulations with 18 months of anti-TB medication has been reported [10]. Anterior debridement and drainage combining posterior instrumentation can be a surgical option for such a gibbus deformity at the cervicothoracic junction.

There was no compression of the thecal sac or spinal instability at the other sites of spinal TB at the lumbar levels in our patient. Therefore the lumbar paravertebral abscess was managed by drainage only, and it was brought under control with anti-TB agents. It is important to choose surgical sites and the extent of the surgery carefully, so the patient can receive the most surgical benefits with the least invasive procedure.

Our surgical approach began with anterior debridement and drainage, reduction of the spinal vertebrae by traction, and then posterior stabilization and decompression. The rationale is that reduction by traction can provide better spinal alignment and bony structure, and further surgery is then easier to perform. The patient showed a complete recovery of neurologic deficits. In conclusion, combining anti-TB medications, meticulous surgical planning and technique, and adequate postoperative immobilization is essential.

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