Erhan Emel
Feyza Karagöz Güzey
Deniz Güzey
N. Serdar. Bas
Baris Sel
Ibrahim Alatas

Non-contiguous multifocal spinal tuberculosis involving cervical, thoracic, lumbar and sacral segments: a case report

Received: 14 August 2004
Revised: 8 April 2005
Accepted: 12 June 2005
Published online: 7 April 2006
© Springer-Verlag 2006

E. Emel · F. K. Güzey (✉)
N. S. Bas · B. Sel · I. Alatas
Department of Neurosurgery,
SSK Vakif Gureba Training Hospital,
Fatma Sultan M Kahal Bagi S 31/6 Fatih,
34096, Istanbul, Turkey
E-mail: fkarag@yaho.com
Tel.: +90-212-5346900
Fax: +90-212-6217580

D. Güzey
Department of General Surgery,
SSK Vakif Gureba Training Hospital,
Fatma Sultan M Kahal Bagi S 31/6, Fatih,
34096, Istanbul, Turkey

Abstract *Main problem:* There are only a few cases reported with non-contiguous spinal tuberculosis in the literature. Most of these patients have only two non-contiguous lesions, and in almost all of these cases, surgical treatment is required. *Methods:* A 17-year-old girl with non-contiguous multifocal spinal tuberculosis involving cervical, thoracic, thoracolumbar, lumbar and sacral segments is reported. The patient presented with systemic tuberculosis symptoms and signs, and progressive paraparesis. *Results:* The patient was treated with antituberculous drug therapy and was operated twice for thoracolumbar and cervical spinal lesions. She made an excellent neurological recovery.

Conclusions: In the patients with non-contiguous spinal involvement, there is a high percentage of requirement of surgical treatment. This may be due to “fulminant” behaviour of the disease in these patients. Early surgical treatment of the cases with large abscesses and systemic tuberculosis may provide early improvement, and must probably be the first treatment modality after general support to the patient.

Keywords Spinal tuberculosis · Pott’s disease · Spinal instrumentation

Introduction

Tuberculosis is not an uncommon disease in developing and underdeveloped countries. Its incidence is also increasing in developed countries because of immigration from underdeveloped and developing countries, and increased incidence of human immune deficiency virus (HIV) [4]. Tuberculous spondylitis occurs in 1% of the patients with pulmonary tuberculosis [9]. In the vast majority of the cases, lesions are at the thoracic and lumbar spine, and that at the cervical spine is present at about 5% of all tuberculous spondylitis cases [1].

Usually, two or more contiguous vertebrae are involved in spinal tuberculosis owing to haematogenous spread through one intervertebral artery feeding two

adjacent vertebrae [3]. Non-contiguous multiple tuberculous spondylitis is rare, and most of the reported cases have lesions only in two levels [2, 3, 5, 8, 9]. There is only one case with extensive spinal involvement in literature [10].

A case with multifocal spinal tuberculosis involving almost all spinal levels is reported.

Case report

A 17-year-old girl was admitted with complaints of neck, back and low back pain, dysphagia, and swelling on left preauricular region. She had those complaints for 8 months and had been treated with the diagnosis of cold in another hospital. On physical examination, she

was cachectic and her body weight was 37 kg. There were bilateral large lymphadenopathies on her cervical and preauricular regions, and also a fluctuating mass under right breast, and a left paravertebral mass at the thoracolumbar junction. There was paraparesis with a 4/5 muscle strength, and a bilateral hypoesthesia below L1 level.

Erythrocyte sedimentation rate (ESR) was 140 mm/h, C reactive protein (CRP) was 11.5, haemoglobin level was 8.3 g/dl, and haematocrit level was 24%. *Serological tests for HIV were negative.* Chest radiographs showed a suspicious active tuberculosis focus. On spinal radiographs, hypodens lesions on C3 and C4 bodies, collapse of C4 body and anterior angulation at the C3–C4 level, collapse of T12 body, paravertebral soft tissue mass at that level, untidiness and height loss at T11–T12 disc level, and a 30° kyphosis at that level were seen. Cervical magnetic resonance imaging (MRI) revealed destruction of C2–C4 bodies, a prevertebral retropharyngeal large abscess, spondylodiscitis at the C3–C4 disc level, intensity changes on all the cervical vertebral bodies, and epidural granulation tissue compressing the dural sac (Fig. 1a, b). On thoracic and lumbosacral spinal MRI examinations, there were intensity changes on T1, T2, T12 and L3 bodies, small abscesses in the T7, T8, T9, L1, L2, L5, S1 and S2 bodies, collapse of the T12 body, paravertebral abscess at that level, large paravertebral abscesses along whole lumbar levels, and an abscess in right ala of the sacrum (Figs. 2a, b, 3a, b).

A Philadelphia-type cervical corset was used for cervical immobilisation, and a thoracolumbosacral orthosis for thoracolumbar immobilisation. A biopsy was undertaken from her preauricular lymphadenopathy. On pathologic examination, a necrotizing granulomatosis was seen. But acid-resistant bacteria had not been identified. A quartet antituberculous therapy (isoniasid 300 mg/day, rifampisin 600 mg/day, ethambutol 1.5 g/day, and pyrazinamid 1.5 g/day) was started with a possible diagnosis of tuberculosis. However, she was operated on the fifth day of her antituberculous therapy because of a rapid progression of her paraparesis to 2/5 muscle strength. Her hypoesthesia level did not change. First, T11 and T12 corpectomies, abscess drainage, radical debridement, anterior strut grafting and T10–L1 anterior instrumentation were performed by an anterolateral approach, and then T8–T9–L2–L3 posterior instrumentation with a pedicle screw-rod system was performed in the same session (Fig. 4a, b).

Muscle strength of her legs was increased in a few days after the operation. Drug therapy was continued with following the ESR and CRP levels. Because her dysphagia continued, and ESR and CRP levels did not decrease, abscess drainage, C3–C4 discectomy, C4 subtotal corpectomy and iliac autografting were performed by a cervical anterior approach 6 weeks after thoracolumbar operation (Fig. 5). The CRP and ESR levels started to

Fig. 1 Cervical sagittal (a) and axial (b) MRI sections. The axial section was at C4 level

decrease gradually and the patient was discharged after 2 weeks. When she was discharged, ESR was 90 mm/h, and CRP was 7. The ESR was 40 mm/h and CRP was at normal level 6 weeks after second operation, and ESR was at normal level 4.5 months after second operation.

Fig. 2 Thoracic sagittal (a) and axial (b) MRI sections. Note that collapse of the T12 body and paravertebral abscess at that level

Antituberculous therapy was discontinued 12 months after cervical operation. On follow-up, there were no complaints, symptoms or signs after 32 months. There were no new kyphosis on cervical and thoracolumbar radiographies, or epidural compression on cervical MRI (Fig. 6a–c).

Fig. 3 Lumbarosacral sagittal (a) and sacral axial (b) MRI sections. Note the abscess in the right ala of the sacrum

Discussion

Usually, two or more contiguous vertebrae are involved in spinal tuberculosis owing to haematogenous spread through one intervertebral artery feeding two adjacent

Fig. 4 AP (a) and lateral (b) thoracolumbar radiographs of the patient after two-staged operation for T12 lesion

vertebrae [3]. Non-contiguous multifocal tuberculous spondylitis is rare. Turgut [9] reported only one patient with non-contiguous thoracic and lumbar involvement in 694 patients. Rezai et al. [8] reported one patient with

Fig. 5 Early postoperative cervical lateral radiograph of the patient after cervical operation

thoracic and thoracolumbar involvement in 20 patients. Nussbaum et al. [5] reported one case with cervical and thoracic involvement in 29 cases. This case was operated by laminectomy, grafting and posterior instrumentation for both lesions because of neurological deficits. Janssens and De Haller [2] reported one case with thoracic and lumbar involvement in 26 cases. This case was operated by curettage and spongiosa grafting because of the progression of the abscess in spite of the appropriate treatment. Kulali et al. [3] reported one case with two non-contiguous circumferential thoracic involvement. They treated the patient by posterior decompression, fusion and instrumentation. In all of those reported cases, there are two non-contiguous lesions.

There is only one reported case with extensive involvement in whole spinal regions in the literature. Turgut [10] reported a case with cervical, thoracic and lumbar spondylitis. In this case, there was progressive quadriparesis, and she was treated by an anterior approach to cervical spine and lateral retroperitoneal approach to lumbar spine.

Our patient had the tuberculous involvement in almost all spinal levels. There were multiple lesions in cervical, thoracic, thoracolumbar, lumbar and sacral vertebrae with huge paravertebral abscesses. This is the second reported case with extensive spinal involvement in literature.

Fig. 6 Control cervical lateral (a) and thoracolumbar lateral (b) radiographs and sagittal cervical MRI section (c) after 32 months. Note that there were no new kyphosis on radiographs and no epidural compression on cervical MRI

In this patient, the source of infection was probably the lungs. Turgut put forward pelvic infection as a source of spinal tuberculosis in his patient [10], and Kulali et al. [3] reported that they could not find any source in their patient. Other multifocal non-contiguous spinal tuberculosis cases in the literature are the cases in small series, and we could not reach any information about their infection sources.

Our patient was treated by operations for two lesions. The T11–T12 lesion caused kyphosis and paraparesis. First, C3–C4 lesion was not operated and conservative treatment was tried. But the symptoms and signs were not affected, and the ESR and CRP did not drop in spite of the quartet chemotherapy, and the lesion was operated because of huge prevertebral abscess causing dysphagia. It is reported that ESR is a useful guide in evaluating response to therapy during the course of the disease in vertebral osteomyelitis [7]. However, in most patients, the ESR drops to less than half of the original value at the completion of antibiotic therapy. Although it has not often been described in literature, Rath et al. [7] reported that elevation of the CRP is a more accurate finding in vertebral osteomyelitis. The CRP is also a more constant laboratory finding than ESR and it starts to drop earlier after antibiotherapy according to our experience. In the presented patient, CRP was normal

6 weeks after second operation, and ESR was normal after 4.5 months.

All of the reported cases in the literature were with multiple spinal tuberculous involvement except one who required surgical treatment. In the last case, it was not clear if the patient was operated or not [8]. However, in the papers including those cases with multilevel involvement, 34–86% of the patients (totally 64%) required an operation [2, 5, 8, 9]. The higher operation percentage of the multilevel spinal tuberculosis is possibly due to “fulminant” behaviour of the disease in those patients. The presence of symptoms and signs of systemic tuberculosis and huge abscesses as in our case and the other case in the literature [10] supports this idea.

In the patients with extensive spinal involvement, drainage of large abscesses may provide dramatic response as in the cases presented by Turgut [10] and presented here. Therefore, early surgical treatment of the cases with multilevel spinal tuberculosis causing large abscesses and with systemic tuberculosis must probably be the first treatment modality after general support to the patient.

The use of spinal instrumentation in the presence of spinal infection is controversial. Scar tissue, which forms around the instruments, is believed to act as a refuge for bacteria, because the vascular supply in these areas is poor. But Oga et al. [6] demonstrated that adhesive properties of *Mycobacterium tuberculosis* on stainless steel was less than that of other bacteria. Although there were no studies on titanium, there were no

recurrences of infection due to instrumentation in reported series using anterior approach [7, 11]. Primary stabilisation of the infected spine by instrumentation may facilitate nursing care, may allow early mobilisation of the patients, and therefore, reduces the risks of the complications of long-term bed rest [7].

References

1. Hsu LCS, Leong JCY (1984) Tuberculosis of the lower cervical spine (C2-7). *J Bone Joint Surg (Br)* 66:1–5
2. Janssens JP, De Haller R (1990) Spinal tuberculosis in a developed country. A review of 26 cases with special emphasis on abscesses and neurologic complications *Clin Orthop* 257:67–75
3. Kulali A, Cobanoglu S, Özyılmaz F (1994) Spinal tuberculosis with circumferential involvement of two noncontiguous isolated vertebral levels: case report. *Neurosurgery* 35:1154–1158
4. Lee TC, Lu K, Yang LC, Huang HY, Liang CL (1999) Transpedicular instrumentation as an adjunct in the treatment of thoracolumbar and lumbar spine tuberculosis with early stage bone destruction. *J Neurosurg Spine* 2:163–169
5. Nussbaum ES, Rockwold GL, Bergman TA, Erickson DL, Seljeskog EL (1995) Spinal tuberculosis: a diagnostic and management challenge. *J Neurosurg* 83:243–247
6. Oga M, Arizono T, Takasita M, Sugiyoka Y (1993) Evaluation of the risk of instrumentation as a foreign body in spinal tuberculosis. Clinical and biological study. *Spine* 18:1890–1894
7. Rath SA, Neff U, Schneider O, Richter HP (1996) Neurosurgical management of thoracic and lumbar vertebral osteomyelitis and discitis in adults: a review of 43 consecutive surgically treated patients. *Neurosurgery* 38:926–933
8. Rezai AR, Lee M, Cooper PR, Errico TJ, Koslow M (1995) Modern management of spinal tuberculosis. *Neurosurgery* 36:87–96
9. Turgut M (2001) Spinal tuberculosis (Pott's disease): its clinical presentation, surgical management, and outcome. A survey study on 694 patients. *Neurosurg Rev* 24:8–13
10. Turgut M (2001) Multifocal extensive spinal tuberculosis (Pott's disease) involving cervical, thoracic and lumbar vertebrae. *Br J Neurosurg* 15:142–146
11. Yilmaz C, Selek HY, Gurkan I, Erdemli B, Korkusuz Z (1999) Anterior instrumentation for the treatment of spinal tuberculosis. *J Bone Joint Surg (Am)* 81:1261–1267