BRITISH JOURNAL OF NEUROSURGERY
https://doi.org/10.1080/02688697.2021.1950632

Taylor & Francis
Taylor & Francis Group

SHORT REPORT

Resolving solitary osteolytic lumbar tuberculosis in young adult

Anan Shtaya[a], Matthew Thomas[b], Madeline M Sampson[b], Kyriakos Giannoulis[a] and Ali Nader-Sepahi[a]

[a]Wessex Spinal Unit, University Hospital Southampton NHS Foundation Trust, Southampton, UK; [b]Department of Radiology, University Hospital Southampton NHS Foundation Trust, Southampton, UK

ABSTRACT

Lumbar vertebral tuberculosis presenting with a focal solitary osteolytic lesion is rare in spinal tuberculosis (TB) and the English literature describing this entity is scant. The differential diagnosis includes primary and secondary malignancies. In this report, we describe a case of 35-year-old woman who presented with low back pain and was found to have a focal L4 vertebral lytic lesion on MRI and CT. Whole body CT was carried out as a potential malignancy staging procedure and demonstrated lung lesions suggestive of TB. Her neurological and general examination were entirely normal. Her blood test was positive for QuantiFERON Gold. She was managed conservatively with anti-TB medications and serial imaging which showed evidence of resolution of the osteolytic lesion. Although it is unusual for TB to present as an isolated osteolytic vertebral body lesion, the possibility should always be considered in the differential diagnosis, along with neoplastic processes. Conservative medical management, in the absence of neurological deficits and deformity, is the main stay of management with a very good outlook.

ARTICLE HISTORY
Received 8 April 2021
Revised 8 June 2021
Accepted 28 June 2021

KEYWORDS
Spine tuberculosis; lumbar; osteolytic; conservative

Introduction

Skeletal tuberculosis (TB) is a destructive extra-pulmonary disease manifestation of Mycobacterium tuberculosis infection. It occurs in up to 10% of active pulmonary disease,[1] also in 1–3% of all the cases of tuberculosis with the spine being the most commonly affected site in approximately 50% of skeletal TB.[2,3] Two-vertebral disease with destruction of the intervening intervertebral disc and a paravertebral or psoas abscess is the typical radiological appearance of tuberculous spondylitis.[1–3] However, the atypical isolated involvement of a single vertebral body occurs rarely and often misdiagnosed. Solitary vertebra tuberculosis presenting with a focal osteolytic lesion in a normal architecture of the vertebral body is uncommon in spinal TB.[4,5] The aim of this report is to present an atypical TB pattern of solitary osteolytic lesion in lumbar vertebral body as the presenting involvement in a young adult.

Case report

A thirty-five-year-old Caucasian woman presented with low back pain that had increased over the previous 5 months with occasional night sweats. She denied weakness, gait disturbance, fever, or chills. She was initially managed in the community for back pain. She underwent an MRI scan to evaluate her low back pain following normal plain radiography. The MRI study revealed a low signal lesion surrounded by a low-intensity change in the surrounding marrow on T1-weighted images with high signal on T2- weighted images plus high signal on a fat suppressed water sensitive sequences within the lesion and surrounding vertebral marrow. This involved the L4 vertebral body only, abutting the endplate (Figure 1(A–D)). She had a CT chest-abdomen and pelvis staging scan for investigation of possible malignancy which revealed clusters of centrilobular nodularity in the periphery of both lungs and more confluent soft tissue opacities in the upper lobes, largest being in the left apex. In addition, there was a solitary circumscribed osteolytic lesion with well-defined margins in L4 vertebra (Figure 2). There was no residual fragment within the lesion and no paravertebral soft tissue extension around the affected vertebral body.

Physical examination revealed a well-nourished woman. The findings of the examination were unremarkable and there were no motor deficits or sensory changes. Laboratory studies showed an erythrocyte sedimentation rate (ESR) of 16 mm/h and C-reactive protein (CRP) of 15 mg/L. The possibility of an inflammatory or local infectious process was considered. Her blood QuantiFERON TB Gold test was positive. She underwent fibreoptic bronchoscopy with no abnormality noted. Bronchoscopy washings were sent for TB testing. She had a CT guided biopsy of the L4 lesion which was negative for mycobacterium, Acid Fast bacilli and malignancy. She was managed by the TB respiratory physician and was placed on anti-TB medications. She was initially commenced on quadruple therapy (Rifater, Ethambutol, and Pyridoxine). She developed abnormal liver function tests. Therefore, her anti-TB medications were introduced individually in a phased pattern with close monitoring of her liver function. She has been followed up by the spinal team with serial imaging and a review of scans at the spinal multidisciplinary team meetings. Her latest MRI scan (16 months following diagnosis) demonstrated that the osteolytic lesion had reduced in size and showed marked improvement in the surrounding bone marrow oedema and a developing surrounding

CONTACT Anan Shtaya anan.shtaya@uhs.nhs.uk Wessex Spinal Unit, University Hospital Southampton NHS Foundation Trust, Southampton, UK

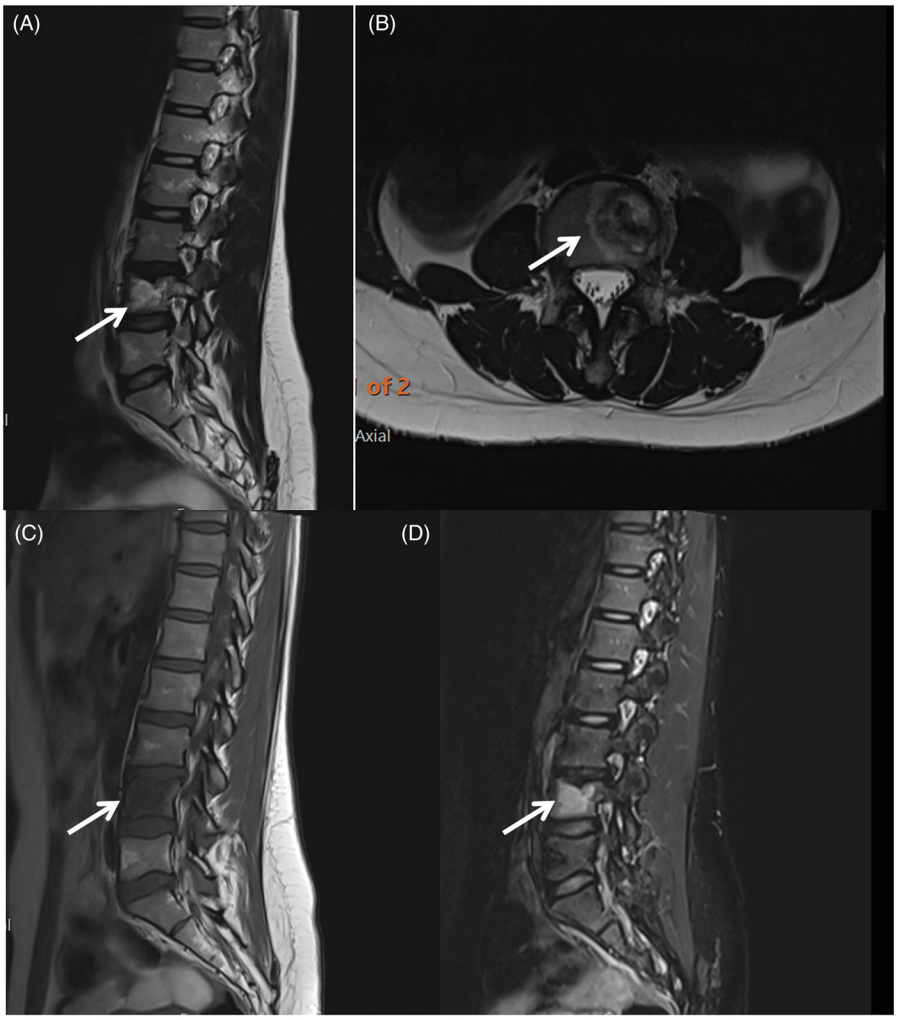

Figure 1. MRI at diagnosis. (A) This is a sagittal T2W MRI image showing the L4 hyperintense lesion (arrow). (B) This is an axial T2W MRI image at the level of L4 demonstrating the lesion and the surrounding bone oedema (arrow). (C) This is a sagittal T1W MRI image showing the L4 lesion with intermediate intensity (arrow). (D) This is a sagittal STIR MRI image showing the L4 hyperintense lesion (arrow).

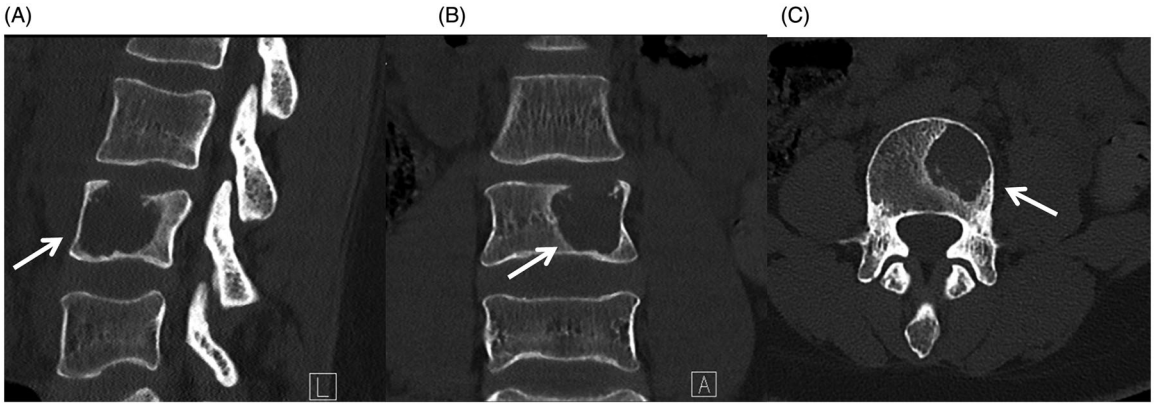

Figure 2. CT lumbar spine at diagnosis. (A) This is a sagittal CT image showing the L4 osteolytic lesion (arrow). (B) This is a coronal CT image showing the lesion (arrow). (B) This is an axial CT image at the level of L4 demonstrating the osteolytic lesion (arrow).

rim of bony remodelling (Figure 3). Clinically she has improved but still complains of mild back pain that is manageable with simple analgesia. She will have a consultation after 6 months and can contact the team earlier if new symptoms arise. She remains under the respiratory team for surveillance just in case her latent TB reactivates.

Discussion

Spinal TB accounts for 1–3% of all TB case and is the most common form of skeletal TB.[2,6] Thoracic and lumbar spine is the most common site of involvement and is one of the primary causes of spinal deformity and paralysis.[7] Classical radiological

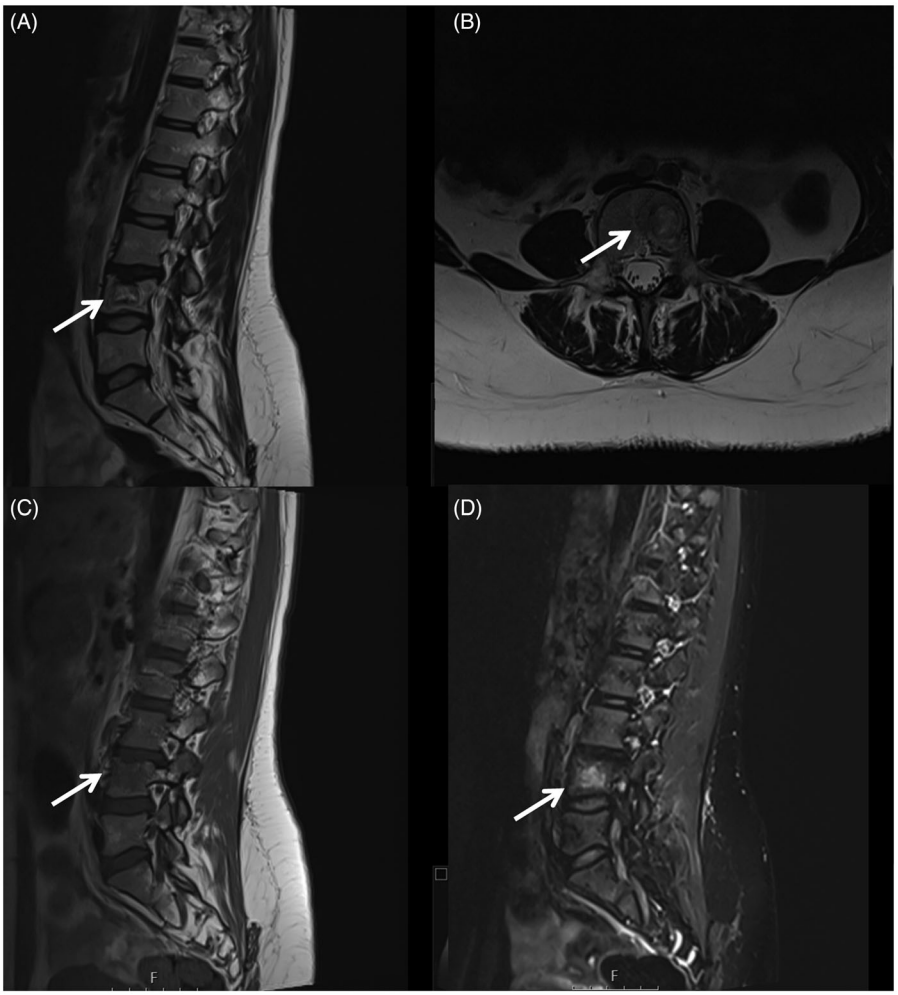

Figure 3. MRI at follow up- 16 months after the diagnosis. (A) This is a sagittal T2W MRI image showing the L4 hyperintense lesion (arrow), the size is smaller when compared to Figure 1(A). (B) This is an axial T2W MRI image at the level of L4 demonstrating the lesion that had reduced in size and no surrounding bone oedema (arrow). (C) This is a sagittal T1W MRI image showing a smaller L4 lesion with intermediate intensity (arrow). (D) This is a sagittal STIR MRI image showing the L4 hyperintense lesion that had reduced in size (arrow).

findings include involvement of more than one vertebra with destruction of the intervening intervertebral disc and soft tissue abnormalities.[1,3] Solitary vertebral body TB is rare and reported to be less than 2% of spinal TB.[5] In a previous report, Loge et al described 7 cases of single vertebra TB without characteristic osteolytic lesions.[5] Single vertebra osteolytic lesion due to TB is exceedingly rare. Searching PubMed showed 6 cases of young adults diagnosed with lumbar vertebra osteolytic TB reported from a large centre in China.[4] There is a wide range of differential diagnosis of a single vertebral body osteolytic lesion that includes metastatic deposits in the vertebral body, lymphoma, eosinophilic granuloma, plasmacytoma, myeloma, leukaemia, focal infection or primary neoplasms affecting a solitary vertebral body.[4,5] Primary vertebral body tumours (osteosarcoma, chordomas, chondrosarcoma, and giant cell tumour) may have a rounded mass-like appearance and excessive signal heterogeneity at times, thus difficult to differentiate from tuberculosis. Clinical presentation may provide a clue to the diagnosis. However, confirmation is possible only by imaging-guided biopsy or a response to anti-tuberculous therapy.

Zhen et al described 6 cases of osteolytic TB lesions that affected young adults (age range 22–38 years). These occurred in the lumbar spine (L1–L5), and in the vertebral body without soft tissue involvement.[4] Two of these patients had CT guided biopsy and the rest had surgical curettage and iliac graft bony fusion with/without pedicle screws fixation. None of these patients had neurological deficits or developed deformities. Our patient, in common with Zhen et al, presented with back pain and no neurological deficits. Her blood QuantiFERON test was positive; CT thorax suggested TB. ESR and CRP are the most commonly used parameters to monitor disease activity and follow up the therapeutic response of spinal TB.[8] Our patient at diagnosis had an ESR of 16 mm/h and CRP of 15 mg/L. This may suggest that she had very low activity or in fact an inactive disease. In the absence of neurological deficits and/or significant deformity, conservative treatment with chemotherapy is the main stay of TB treatment. This was the management plan in our patient with a follow up by serial images. Her most recent MRI after 16 months following the diagnosis revealed significant resolution of the osteolytic lesion. Our case did not require surgical intervention and the CT guided biopsy was performed to rule out malignancy.

In conclusion, we add tuberculosis to the differential diagnosis of solitary osteolytic lumbar vertebrae lesions. This rare disease,

in the absence of neurological deficits or deformity, can be managed conservatively with very good outcome.

Consent to participate

Patient consent was obtained. No identifiable data is presented.

Disclosure statement

The authors declare that they have no conflict of interest.

Funding

This study was completed with no dedicated funds.

ORCID

Anan Shtaya http://orcid.org/0000-0001-7459-8437

References

1. Khanna K, Sabharwal S. Spinal tuberculosis: a comprehensive review for the modern spine surgeon. *Spine J* 2019;19:1858–70.
2. Weng CY, Chi CY, Shih PJ, Ho CM, *et al.* Spinal tuberculosis in non-HIV-infected patients: 10 year experience of a medical center in central Taiwan. *J Microbiol Immunol Infect* 2010;43: 464–9.
3. Wang P, Liao W, Cao G, Jiang Y, Rao J, Yang Y. Characteristics and Management of Spinal Tuberculosis in Tuberculosis Endemic Area of Guizhou Province: A Retrospective Study of 597 Patients in a Teaching Hospital. *Biomed Res Int* 2020;2020:1468457.
4. Zhen P, Li XS, Lu H. Single vertebra tuberculosis presenting with solitary localized osteolytic lesion in young adult lumbar spines. *Orthop Surg* 2013;5:105–11.
5. Lolge S, Maheshwari M, Shah J, Patkar D, Chawla A. Isolated solitary vertebral body tuberculosis-study of seven cases. *Clin Radiol* 2003;58: 545–50.
6. Trecarichi EM, Di Meco E, Mazzotta V, Fantoni M. Tuberculous spondylodiscitis: epidemiology, clinical features, treatment, and outcome. *Eur Rev Med Pharmacol Sci* 2012;16: 58–72.
7. Cheung WY, Luk KD. Clinical and radiological outcomes after conservative treatment of TB spondylitis: is the 15 years' follow-up in the MRC study long enough? *Eur Spine J* 2013;22(Suppl 4):594–602.
8. Fritz J, Tzaribatchev N, Claussen CD, Carrino JA, Horger MS. Chronic recurrent multifocal osteomyelitis: comparison of whole-body MR imaging with radiography and correlation with clinical and laboratory data. *Radiology* 2009;252:842–51.