CASE REPORT

Salmonella spondylodiscitis of the thoracic vertebrae mimicking spine tuberculosis

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SUMMARY

Extraintestinal *Salmonella* infection involving the thoracic spine is very rare. It commonly presents with non-specific chronic back pain and can occur with no gastrointestinal manifestation. Blood test results and imaging findings are often indistinguishable from more common chronic spine infections such as spine tuberculosis. Culture studies remain the key to establishing a definitive diagnosis and subsequently successful treatment. We report a case in which a patient presented with symptoms and signs suggestive of spine tuberculosis, yet the culture examination revealed otherwise.

BACKGROUND

Spondylodiscitis secondary to *Salmonella* infection is very rare. Owing to its rarity, it is usually missed or misdiagnosed as other more common causes of spine infection such as tuberculosis of the spine. It is paramount to establish a definitive diagnosis as this leads to different pathways of management and prognosis.

CASE PRESENTATION

We report a case of a 64-year-old woman with no known medical illness who presented with intermittent low back pain of 3 months' duration. The pain was throbbing in nature, worsening with activity and becoming more intense at night. The pain was localised to the lower back, with no accompanying weakness or numbness of the lower limbs. There were no changes in urinary and bowel habits. The patient was forced to limit her daily activities due to the pain and claimed her appetite was not as good as before the onset of the pain, although she did not notice any significant weight loss. These symptoms were not preceded by trauma and there was no history of chronic cough or haemoptysis prior to her presentation. She was not sure of her immunisation status, however, she denied any contact with persons afflicted with tuberculosis.

She was afebrile and her vital signs were stable during examination. Respiratory system examination did not reveal abnormalities and other systemic review was unremarkable. There was a localised tenderness at the thoracolumbar junction, with associated paravertebral muscle spasm. However, there was no coronal or sagittal plane deformity, no palpable mass and no step deformity of the spine. Straight leg raising test was negative and there was no neurological deficit of the lower limbs.

INVESTIGATIONS

The inflammatory markers, namely erythrocyte sedimentation rate (ESR) and C reactive protein

(CRP) were elevated. There was no leucocytosis and the tumour markers were within normal range. Mantoux test was negative, however, sputum acid-fast bacilli was not performed due to inability to obtain a sputum sample. Thoracolumbar radiographs revealed T9 and T10 destruction, with narrowing of the T9/T10 disc space. Further imaging with MRI showed end plate destruction and post-contrast enhancement extending posteriorly with signs of cord oedema (figure 1). The patient successfully underwent CT-guided biopsy of the T9/T10 soft tissue lesion. Histopathological examination revealed chronic granulomatous inflammation.

DIFFERENTIAL DIAGNOSIS

Based on the preliminary results, a working diagnosis of spinal tuberculosis of the T9/T10 vertebrae was made and the patient started on treatment for spinal tuberculosis. Three days after initiation of treatment, tissue culture from the CT-guided biopsy revealed growth of *Salmonella* spp, sensitive to ceftriaxone and chloramphenicol.

TREATMENT

Subsequently, the patient was treated with ceftriaxone for 2 months and showed clinical improvement in terms of pain reduction and functional ability, and reduced level of inflammatory markers.

OUTCOME AND FOLLOW-UP

Follow-up in outpatient clinic at 6 months showed the patient free of back pain and retaining good function. ESR and CRP level had normalised. Review at 1-year follow-up revealed no neurological symptoms and no hyperkyphotic deformity of the thoracic vertebra on plain radiograph (figure 2).

DISCUSSION

Salmonella osteomyelitis is a rare extraintestinal manifestation of *Salmonella* infection. In a review of more than 7000 cases, only 0.76% of patients with *Salmonella* infection had osteomyelitis,¹ most commonly involving the diaphyseal part of long bones such as the humerus and the femur.² Vertebral involvement has been reported in only 0.45% of all *Salmonella* osteomyelitis,³ with the lumbar vertebra being the most common site of involvement.⁴ The exact pathogenesis is not well established, although theoretically, bowel microinfarcts causing haematogenous spread of *Salmonella* bacteria are likely to be the cause. Cases due to direct contiguous spread from an adjacent mycotic aneurysm have also been reported.⁵

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Figure 1 MRI sagittal view showing postcontrast enhancement indicating inflammatory process surrounding thoracic 9 and 10 vertebrae.

Salmonella and *Mycobacterium* infections occur within similar endemic areas. Both infections are characterised by invasion of the bony spine, paravertebral tissue, spondylodiscitis and psoas muscle abscesses.⁶ The main presenting symptom is low back pain and fever, the former being more common. Although the *Salmonella* spp mainly affect the gastrointestinal system, interestingly, less than a quarter of patients in a report by Santos and Sapico⁴ presented with gastrointestinal symptoms. This was also evident in our patient, as she did not have preceding gastrointestinal symptoms and, during retrospective questioning, stated that she did not have any close contact with persons with gastrointestinal symptoms. Blood investigations did not reveal leucocytosis, however, our patient had an increased level of ESR and CRP, in keeping with findings of *Salmonella* spondylodiscitis in previous series.^{7 8} Although not performed in our patient, Widal test has been shown to have high specificity and should be used as a diagnostic tool if *Salmonella* infection is suspected.

In our patient, the initial MRI findings were suggestive of tuberculosis. This was further supported by histopathological examination performed on the sample obtained via CT-guided biopsy. In our place of practice, it is not uncommon to start tuberculosis treatment based on preliminary clinical, imaging

Figure 2 Lateral view radiograph of the thoracic vertebra at 1-year follow-up showed no hyperkyphotic deformity.

and pathological investigation. However, studies have shown that imaging such as radiograph and MRI, and histopathological examination, could not reliably differentiate *Salmonella* and tuberculous infections.^{9 10} Ultimately, the key to diagnosis in *Salmonella* spondylodiscitis is the identification of the organism, from bone, pus or blood cultures, as reported by previous authors.^{8 10} Culture of tissue sample from CT-guided biopsy from our patient grew *Salmonella* spp.

Once the organism is identified and its sensitivity determined, *Salmonella* infection usually responds to antibiotic treatment.⁷ Our patient was treated with ceftriaxone for a total of 2 months, as suggested by a previous study.⁹ Other commonly used antibiotics are chloramphenicol, ciprofloxacin and ampicillin. No specific laboratory parameters were found to be helpful in monitoring the response to treatment.⁸ We monitored response to treatment by clinical resolution of pain, serial ESR measurement and radiological evidence of fusion. Surgical interventions such as drainage, anterior drainage and anterior lumbar interbody fusion have been described in the literature for cases with osseous instability and neurological deficit, and to establish the diagnosis in ambiguous cases.⁷

In conclusion, *Salmonella* spondylodiscitis must be considered in cases of suspected infective spondylodiscitis, especially of tuberculous origin. Tissue culture is the most important step in differentiating *Salmonella* from other causes of infective spondylodiscitis. Culture-based antibiotic treatment, combined with surgical interventions to address osseous instability, pain and neurological deficit, are the mainstay of treatment of this condition.

Learning points

- ▶ *Salmonella* spondylodiscitis must be considered as a differential in suspected spine tuberculosis.
- ▶ Tissue culture is an important reliable feature to differentiate *Salmonella* spondylodiscitis from other causes of infective spondylodiscitis.
- ▶ A combination of culture sensitive antibiotics and surgical intervention to support or decompress the spine are the mainstay of management.

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Competing interests None declared.

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