Paratyphi Spondylitis: Report of a Case and Review of the Literature

Abolfazl Rahimizadeh, Touraj Yazdi, Ava Rahimizadeh, Housain Soufiani
Pars Hospital, Neurospinesociety of Iran, Tehran, Islamic Republic of Iran

ABSTRACT
A case of Salmonella paratyphi spondylitis in a 60-year-old male is presented in whom initial presumptive diagnosis of tuberculous infection was made on clinical and radiological features. Ultimate diagnosis was eventually made upon culture of the material obtained in surgery once the patient developed paraparesis despite antituberculous treatment. The patient recovered completely with transthoracic debridement and application of an autogenous bone graft followed by appropriate antibiotic therapy. A review of the literature showed that Salmonella paratyphi is a rare cause of spondylitis in immunocompetent subjects and only eight cases have been reported in the past. Diagnostic pitfalls and therapeutic options that spine surgeons may encounter when treating Salmonella vertebral osteomyelitis will be discussed.

KEY WORDS: Paratyphi, Salmonella, Spondylitis

INTRODUCTION
Salmonella spondylodiscitis is a rare but well-established entity. It is particularly seen in immunocompromised patients and those with sickle cell anemia (2,10,15,16,31,32,46,47). Reports on immunocompetent healthy subjects are very rare (1,3,6-9,12,14,17,19,23,25,27,28,33,35,36,42,43). More than sixty serotypes of salmonella have been recognized throughout the world, where only 30% of these serotypes affect the vertebral column (1,3,28,36,37).

Salmonellas of the more aggressive group C (Chloreasuis & Virchow) and S. paratyphi are the most common causes of vertebral osteomyelitis in immunocompetent subjects (9,22,34).

Spondylitis caused by S. paratyphi was first reported by Rozenski in 1948 and only seven additional cases had been reported so far, all affecting previously healthy individuals (6,27,3542). Clinically, all kinds of Salmonella spondylitis may appear without clear history of typhoid fever or gastroenteritis. Salmonella spondylitis can present either in an acute form with fever, sweating, chills, local pain and paravertebral spasm or in a chronic form with progressive back pain of insidious course (8,11,14,27,28,31,33,34,36,47). Corresponding neurological symptoms might appear sooner or later in both types (3,32,33). The radiological and clinical picture of chronic forms of salmonella spondylitis are indistinguishable from tuberculous and Brucella spondylitis, particularly in the countries where all these pathogens are endemic (8,27,37).

Herein, a 60-year-old male with Salmonella paratyphi A spondylitis in whom presumptive diagnosis of tuberculous spondylitis was made initially is presented. Later, with appearance of progressive paraparesis, surgical intervention was decided. This was achieved via transthoracic approach through which debridement and fusion with autogenous bone graft was carried out. Culture of the materials obtained from the debridement and epidural abscess disclosed Salmonella paratyphi A as the responsible pathogen. The patient recovered fully after additional appropriate medical treatment. The present case is the first example of Salmonella spondylitis bacteriologically confirmed in Iran. Further, a thorough
review of the literature disclosed that the current case is the ninth bacteriologically proven spondylodiscitis secondary to Salmonella paratyphi.

CASE REPORT

A 60-year-old male with a 3–month history of back pain radiating to the chest on the right side was admitted to an institution. He was diagnosed as suffering from tuberculous spondylitis with an MRI that had shown mild destruction of two vertebra and paraspinal collection. His neurology was normal at that time. Report of C.T guided biopsy was not conclusive. Considering the imaging features and elevated ESR of 61 mm/h and positive CRP, anti-TB medication was started. Despite the medical therapy, his medical condition was aggravated. On admission, his back pain had become disabling to the extent that he could walk only a few steps. This was associated with feeling of numbness and weakness in his lower extremities. Therefore he was referred to our institution. On arrival, he was found to have a profound pain at mid-thoracic region associated with paraspinal spasm. He had localized tenderness at the spinal process of the low thoracic region. Neurological examination revealed spastic paraparesis with upgoing plantar reflexes. Vague sensory level up to T10 could be detected. The blood test showed Hg to be 10, WBC 8600 and ESR 87 with positive CRP. Regarding the issue that only the reports of previous imaging were available, the imaging was repeated. Plain radiographs showed narrowed T9-T10 vertebral interspace, and erosion of the end plates (Figure 1). MRI, showed narrowed disc space, hypointensity of the affected vertebras in T1 and hyperintensity in T2-weighted MRI. In GD enhanced T1-weighted MRI, disc material was faintly enhanced with moderate destruction of the endplates. Anterior to the hypointense vertebral bodies, paraspinal collection with some enhancement extending from T11 to T8 could be demonstrated. The most prominent feature was epidural collection at the affected vertebras which had caused marked canal compromise (Figure 2).

Because of progressive neurological signs despite medical treatment, surgical intervention was decided. Via the transthoracic approach, the corresponding affected vertebras were reached. The disc space was narrowed and the end plates of the involved vertebras facing the disc space were partly destroyed. After removal of the disc and debridement of the affected vertebras, a four to
five mm layer of epidural granulomatous collection was stripped off the dura till the normal pulsation of the dura reappeared. The specimen was sent both for culture and pathology. Subsequently, an autogenous bone graft was placed in the gap between the two already shaved off vertebrae (Figure 3).

Postoperatively, the patient showed marked recovery in pain and disability and became able to walk within a few days. Culture of the material obtained from the site of surgery revealed heavy growth of Salmonella paratyphi A. Later for scientific purposes, appropriate serologic tests were requested which disclosed positive Widal test for S. paratyphi A at a titer of 1/640.

Ciprofloxacin in the dose of 400 mg and Ceftriaxone 2 gr, both twice daily, were started parenterally and were continued for two weeks. The patient was discharged on his own feet without any neurological sign. Medication was continued with oral Ciprofloxacin 500 mg three times for an additional eight weeks.

Post-operative plain radiographs after a year disclosed fusion of T9 to T10 (Figure 4). At the present time, four years after the surgery, the patient is doing very well. (Figure 5).

DISCUSSION

Vertebral osteomyelitis has been a rare complication of Salmonella infection but is well established entity (1-4,6,7,9-12,14-17,20,22,23,27-29,30,31,33-36,42,43,46,47). It often develops in immunocompromised hosts. Occurrence of Salmonella osteomyelitis in the absence of high risk underlying disease in immunocompetent healthy individuals is rare and it accounts for only 0.5% of all cases of osteomyelitis (9-24). Moreover, the incidence

![Figure 3](image3.png)  
*Figure 3: Showing the affected vertebrae with some granulomatous tissues on the vertebra bodies. Autogenous graft is in place. Note the dura which is exposed after removal of epidural collection.*

![Figure 4](image4.png)  
*Figure 4: Demonstrating fusion of the affected vertebral bodies.*

![Figure 5](image5.png)  
*Figure 5: The patient 4 years after surgery, healthy and strong.*
of Salmonella spondylitis in otherwise normal subjects is approximately 0.1% to 0.2% of all infectious spondylitis cases. Various serotypes are responsible for Salmonella spondylitis (4,11,20,29,30,36,37).

S. paratyphi is known as a less virulent serotype, and vertebral affection with this gram negative pathogen is regarded as rare. With careful review of the English literature, we could encounter only eight cases (6,27,35,42). Information regarding these cases and the current case is shown in Table 1.

Spondylitis regardless of the serotype begins by hematogenous spread and infective microvascular infarcts of vertebrae near to the end plates are thought to be the site at which osteomyelitis develops subsequent to bacteremia (14).

S. spondylitis predominantly affects males. Age distribution in this spondylitis is bimodal, with one peak in the second decade of life and the other peak occurring around the age of sixty (6,11,14,2336,37,42). The usual sites of involvement of the spine are the lumbar and thoracolumbar regions reflecting the lymphatic and venous drainage of the lower intestine (18,26,38,41,44). Bone destruction with preservation of disc material due to lack of proteolytic enzymes is seen in a large number of these three infections (18,26,38,39,41,44).

Moreover, epidural collection which is frequent finding in tuberculosis and brucellosis is seldom seen in Salmonella spondylitis (1,3,8,32,33).

Clinically, S. spondylitis can presents itself as an acute illness or in chronic forms. Acute variants of this spondylitis present with fever, sweating and severe back pain of sudden onset (7,9,28,31,37,47). In chronic forms, the disease in very insidious with back pain as the most common presenting feature (8,19,27,37). Pain has a tendency to increase with time and usually radiates to the extremities or to the intercostal territory. In both clinical variants, neurological impairment might develop with an incidence of 15% to 20% if the condition is not diagnosed properly (15). This might even result in paraplegia or quadriplegia in rare instances (3,32). Fatalities are not uncommon in undiagnosed spondylitis and it is usually due to rupture of a mycotic aortic pseudoaneurysm which is the most serious complication of Salmonella spondylitis (5,21,24,48). Actually, mycotic aneurysm of the aorta and its branches is so common in Salmonella spondylitis that with its presence the diagnosis of this type of infection should be made unless proven to be due other types of infection (9,48). This pathology that is easily overlooked is a lethal condition and its clinical picture is only abdominal pain, fever and anemia due to constant extravasation of blood (9,21,39).

In endemic regions, the Widal test is advised to be included in the routine laboratory tests. However it should be reminded that the Widal test is not positive in all serotypes of salmonella. This means that a negative Widal test does not rule out salmonella spondylitis (40).

MRI findings in Salmonella spondylitis is similar to tuberculosis and brucellosis (18,26,38,41,44). Bone destruction with preservation of disc material due to lack of proteolytic enzymes is seen in a large number of these three infections (18,26,38,39,41,44).

Moreover, epidural collection which is frequent finding in tuberculosis and brucellosis is seldom seen in Salmonella spondylitis (1,3,8,32,33).

Table 1:

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Age &amp; Sex</th>
<th>Location</th>
<th>Medical</th>
<th>Surgical Management</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rozansky et al</td>
<td>1948</td>
<td>48 M</td>
<td>L3-L4</td>
<td>None</td>
<td>Repeated opening of a fistula</td>
<td>Poor</td>
</tr>
<tr>
<td>Mnyamneh</td>
<td>1977</td>
<td>16 M</td>
<td>L2-L3</td>
<td>Yes</td>
<td>Anterior debridement</td>
<td>Good</td>
</tr>
<tr>
<td>Sundararaj et al</td>
<td>2007</td>
<td>51 M</td>
<td>L4-L5</td>
<td>Yes</td>
<td>Anterior Debridement+ Graft+ PSF</td>
<td>Excellent</td>
</tr>
<tr>
<td>Kumar et al</td>
<td>2007</td>
<td>32 M</td>
<td>L3-L4</td>
<td>Yes</td>
<td>Only CT guided biopsy+ culture</td>
<td>Excellent</td>
</tr>
<tr>
<td>Amritanand et al</td>
<td>2010</td>
<td>68 M</td>
<td>T5-T6</td>
<td>None</td>
<td>None</td>
<td>Died</td>
</tr>
<tr>
<td>Amritanand et al</td>
<td>2010</td>
<td>29 M</td>
<td>L2-L3</td>
<td>Yes</td>
<td>None</td>
<td>Excellent</td>
</tr>
<tr>
<td>Amritanand et al</td>
<td>2010</td>
<td>21 M</td>
<td>L4-L5</td>
<td>Yes</td>
<td>None</td>
<td>Excellent</td>
</tr>
<tr>
<td>Current Case</td>
<td>2012</td>
<td>60 M</td>
<td>T9-T10</td>
<td>Yes</td>
<td>Anterior Debridement+ Graft</td>
<td>Excellent</td>
</tr>
</tbody>
</table>
Paratyphi Spondylitis: Report of a Case and Review of the Literature

There are several frustrating problems with the diagnosis of salmonella spondylitis. This spondylitis particularly in chronic forms shares several clinical features similar to those of tuberculous and brucella vertebral osteomyelitis (1,8,20,27,37,49). Therefore these infections should be included in the differential; diagnosis of salmonella spondylitis, particularly with concern of bi-modal age distribution, male preponderance and affection of lumbar and thoracolumbar spine (8,18,26,27,37-39,41,44). Moreover concerning the pathology, the granulomatous inflammation seen in Salmonella spondylitis are actually indistinguishable from that seen in tuberculosis or brucellosis. Particularly with concern to osseous lesions of these etiologies that bear many radiologic similarities. Notably, in endemic areas of developing countries the majority of patients suffering from chronic infective lesions of the vertebral bodies are in particular presumed to have tuberculosis (1,6,8,23,27) and since tuberculosis is the commonest, many clinicians start medical treatment of TB on basis of the clinical picture or MRI report (1,6,23,27,35,42). Therefore, the correct diagnosis might be delayed and the definitive diagnosis of Salmonella vertebral osteomyelitis depends on isolation of the organism in the culture obtained from the bony specimen or paravertebral abscess either by CT guided biopsy or open surgery (1).

Unfortunately, the success rate of CT guided biopsy in obtaining a positive specimen or culture in infectious spondylitis in the best situation is estimated to be positive in only half of the patients (1,23).

With establishment of a definitive diagnosis of Salmonella vertebral osteomyelitis, appropriate antibiotic treatment should be started, Antimicrobial agents currently used for treatment of systemic Salmonella are Cefotaxime and Ciprofloxacin, particularly because of their low toxicity and high serum concentration (13,23).

In spondylitis regardless of the serotype of salmonella, the dose of 400 mg of Ciprofloxacin and Cefotaxime 2 gr twice daily parenterally for a duration of two weeks is advised. Continuation of these antibiotics orally for an additional 8 weeks is of paramount importance (9,13,23). Relapse rate of 9% with less than two months antibiotic therapy indicates that overall medication should exceed 60 days.

With successful medical treatment, the affected vertebrae have a tendency for spontaneous interbody fusion with subsequent relief of pain (6,28,37). This fusion gives appropriate stability to the spinal column.

About 25% of the patients with Salmonella spondylitis ultimately undergo surgery either because of lack of correct diagnosis or due to progressive neurological impairment despite medical treatment. The latter group usually suffers from epidural abscess or extensive vertebral destruction and instability (6,32,35,36,42).

Debridement of the affected interspace anteriorly followed by autogenous bone graft is the most accepted mode of treatment (6,36,42). Posterior spinal instrumentation is advised in spondylitis of mobile segments.

Despite a delay, the ultimate outcome is satisfactory once the diagnosis is made, particularly in young and middle age adults (3,9,25,28,36). If the diagnosis of the condition is more delayed, it might be complicated with the development of an aortic mycotic aneurysm that mostly ends with a fatal scenario.

In conclusion, tuberculosis, brucellosis and salmonellosis are endemic in similar parts of the world and since the clinical and imaging features of these granulomatous infections are indistinguishable, all of these three pathogens must considered in the differential diagnosis of spinal infectious. Actually, these bacterial infections commence near the end plates and progress insidiously within weeks to months in a similar manner. Therefore, specific laboratory tests for these three diseases should be included in routine laboratory test of the patients. Early recognition of the responsible pathogens and institution of appropriate antibiotic therapy might be sufficient to cure the infection.

Surgical intervention may be necessary either to establish the diagnosis and isolate the organism in ambiguous cases or to affect cure when conservative treatment fails. Finally, this report emphasizes the necessity of obtaining material for bacteriological study in all cases of spondylitis, whether by needle biopsy or open surgery.

Address correspondence to: Abollazl Rahimizadeh, Pars Hospital, Neurospinesociety of Iran, Tehran, Islamic Republic of Iran
Phone: +91 232 261 49
email: a_rahimizadeh@hotmail.com