

## CASE REPORT

# Salmonella Vertebral Osteomyelitis of Thoracic Spine

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## ABSTRACT

Salmonella spondylitis is a rare illness and may present as pyogenic spondylodiscitis, septic discitis, vertebral osteomyelitis and epidural abscess. The diagnosis depends on clinical, radiological, blood and tissue cultures and histopathological findings. We describe a rare case of 63-year-old male, with diagnosis of pyogenic Salmonella vertebral osteomyelitis of thoracic spine. Timely surgical intervention and appropriate antibiotic treatment resulted in complete cure.

**Keywords:** Pyogenic, Vertebral osteomyelitis, Spondylodiscitis, Epidural abscess, Salmonella.

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## INTRODUCTION

Salmonella has been recognized as causative organism of osteomyelitis for more than ten decades. Paget et al in 1876 first showed that Salmonella causes osteomyelitis during the typhoid fever.<sup>1</sup> The incidence of osteomyelitis has been reported to be very low at approximately 0.8 to 1%.<sup>2</sup> Pyogenic spinal infection may present as pyogenic spondylodiscitis, vertebral osteomyelitis and epidural abscess. Around 95% of pyogenic spinal infections involve the vertebral body and/or the intervertebral disk, with only 5% involving the posterior elements of the spine. It is primarily a disease of fifth decade of life, and males are affected twice as often as females. Predisposing factors include diabetes mellitus, sickle cell anemia, immunosuppressive states and septicemia. Pyogenic spondylitis typically involves two adjacent vertebrae and the intervening disk. In the cervical spine, the prevertebral pharyngeal venous plexus and, in the lumbar spine, the Batson's paravertebral venous plexus may act as a potential route of infection.<sup>3</sup>

## CASE REPORT

A 63-year-old man with known history of diabetes mellitus (type II) and hypertension presented with back pain and mild fever for last 1 month. Patient had gradual onset of weakness in both lower limbs and urinary incontinence for last 7 days. There was no history of significant weight loss and trauma. Neurological examination revealed spastic paraparesis with power in both lower limbs was 3/5. Deep tendon reflexes (DTR) were exaggerated with extensor plantar reflex in both lower limbs. Routine blood examination was within normal limits except raised ESR level (116 mins/hr). Chest X-ray was suggestive of mild opacity on right side. Ultrasound abdomen revealed grade I hepatomegaly with mild pleural effusion on the right side. Magnetic resonance imaging (MRI) whole spine was suggestive of altered signal intensity in the D6 and D7 vertebra involving body, pedicles and laminae. There was large heterogeneously enhanced soft tissue seen in the pre and paravertebral region involving the bilateral costovertebral joints, posterior ribs and transverse process. The soft tissue was also seen in the anterior and posterior epidural space and causing severe compression of the dorsal cord at D6 and D7 levels (Figs 1A to D). D6-7 laminectomy and decompression was done. Intraoperatively, laminae were very soft and abnormal tissue and pus was seen in the anterior and posterior epidural space. Postoperatively, patient was improved neurologically but, on 4th postoperative day, he developed pain and swelling over the surgical site. On 15th postoperative day, soakage and copious serosanguineous discharge was noticed at the operative site. MRI dorsal spine was done, which was suggestive of intramuscular abscess in the posterior paraspinous muscles with large posterior epidural collection causing severe compression of dorsal cord from D4 to D7 levels (Fig. 2A). On re-exploration, debridement with removal of epidural pus and granulation was done. Pus and bone biopsy was taken and sent to pathology. Postoperative MRI revealed marked reduction in paravertebral component at D6-D7 level (Fig. 2B). Pus culture was suggestive of Salmonella typhi. Vertebral bone biopsy was suggestive of chronic suppurative inflammation. Postoperatively, antibiotics were started for 8 weeks according to culture sensitivity. Follow-up was done at 1 and 6 months, 1, 2 and 4 years with no neurological deficit.

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**Figs 1A to D:** Radiology studies at admission: (A) Plain radiograph of spine at admission demonstrated paravertebral soft-tissue collection on both sides (left > right), (B) sagittal T2-weighted image showing abnormal soft tissue in the anterior and posterior epidural space and causing compression of the dorsal cord at D6-D7 level, (C) T2-weighted axial image showed well-defined altered signal intensity in the D6 and D7 vertebrae involving body, pedicles and laminae and (D) coronal STIR (short inversion time inversion recovery) sequence showing large heterogeneously enhanced soft tissue in the pre and paravertebral region, more on left side



**Figs 2A and B:** Radiology study after surgery: (A) Sagittal T2-weighted image showing compression of dorsal cord at D6-D7 level and (B) coronal STIR (short inversion time inversion recovery) sequence showing marked reduction in paravertebral component following surgery at D6-D7 level

## DISCUSSION

Salmonella (Gram-negative bacillus) causes a broad spectrum of human illnesses from gastroenteritis, typhoid fever and bacteremia to the asymptomatic carrier state. In Indian subcontinent, Africa and South East Asia, the most common presentation is severe gastroenteritis. It has been reported that salmonella is the causative bacteria in less than 1% of the cases of spinal infections.<sup>2</sup> Common risk factors are diabetes mellitus, sickle cell anemia, immunosuppressive state and septicemia. Salmonella osteomyelitis is usually seen when the patient is immunologically compromised. The most common site of infection is the lumbar spine (45-50%), followed by the thoracic (35%), cervical (3-20%) and sacral regions.<sup>4</sup> In patients with normal immune function, the major symptoms of Salmonella

spondylitis are back pain (100%), fever (75%), elevation of ESR and elevated C-reactive protein (CRP) levels.<sup>5</sup>

Our case was a known case of diabetes mellitus and presented with backache and fever with raised ESR (116 mm/hr). On imaging, lesion was present in thoracic region, which is the second most common site of spinal infection and there was involvement of posterior element which is rare finding. Due to intake of antibiotics, anti-inflammatory agents with normal leukocyte and CRP levels, it was difficult to suspect salmonella infection. In patients with salmonellosis, the symptomatic period varies widely from 10 days to 12 years, and it may secondarily induce infection in the bone after several months to years.<sup>5</sup> On plain radiograph, the earliest signs are blurring of the end-plates and decrease in disk space, which occurs 2 to 8 weeks after the onset of the infection. Magnetic resonance imaging (MRI) is the gold standard for imaging of spinal infections with sensitivity, specificity, and accuracy reported as 96, 92 and 94% respectively.<sup>6</sup>

Salmonella spondylitis can be diagnosed on the basis of culture sensitivity of blood, feces, bone and abscess. Tissue culture of bone or abscess are present in 52%, blood culture is positive in 48% and the fecal or urine culture tests are shown to be positive in 36 and 23% of the cases respectively.<sup>7</sup> In our case, blood culture test was negative because of intake of antibiotics and Salmonella was detected on the pus culture. According to Ben et al<sup>7</sup> complications, like paravertebral abscess and epidural abscess were present in 39 and 4% of the cases. Both these complications were present in our case.

The primary treatment of patients with infective spondylitis is nonoperative. The length of the treatment is still controversial, minimum of 4 weeks is required to decrease recurrence rate. Improvement of the clinical symptoms and reduction of the C-reactive protein values

are the major indexes of the treatment response.<sup>8</sup> Only 10 to 20% of patients suffering from pyogenic spondylitis require open surgery. Surgery is indicated in bony instability, neurological deficits, unresponsiveness to antibiotics, and the failure of percutaneous biopsy to provide a definitive diagnosis.<sup>3,9</sup> Our patient underwent surgical intervention due to presence of cord compression resulting in spastic paraparesis and bladder involvement.

Santos et al<sup>10</sup> reviewed their cases of salmonella vertebral osteomyelitis and they found that fever and back pain were the main symptoms as in our case. Shimada et al<sup>11</sup> reported a case of vertebral osteomyelitis due to salmonella newport associated with a pleural effusion, as was there in our case. Thoracic vertebral salmonella osteomyelitis can present as pleural effusion, which may be due to reactive pleuritis as the pleura is in close contact with the thoracic vertebrae. Feng et al<sup>12</sup> reported a case of cervical spondylitis caused by *Salmonella enteritidis*. Gupta et al<sup>13</sup> reported a case of thoracic vertebral osteomyelitis due to Salmonella in an immunocompetent 17 years old patient, and concluded that osteomyelitis of the thoracic vertebrae should be among the factors considered to contribute to pleurisy and/or pleural effusion. Amritanand et al<sup>14</sup> conducted retrospective case study in India, from 1995 to 2008, in 11 patients with Salmonella spondylodiscitis and concluded excellent outcome in all patients, however, Salmonella and tuberculous spondylitis must be differentiated as they both have similar epidemiological and clinicoradiological presentations.

## CONCLUSION

High index of suspicion is needed to diagnose Salmonella as the infecting agent in vertebral infection, especially in the Indian subcontinent where tuberculosis is very common. Unusual organisms may cause spinal infection; definitive bacteriological diagnosis is essential for safe management. It is important to make every effort

to identify the organism and its antibiotic sensitivity as in this report. With appropriate treatment, prognosis is generally good in case of Salmonella vertebral osteomyelitis.

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