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Case Report
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Metastatic Salmonella Thoracic Discitis in a 52-Year-Old Woman Following Febrile Diarrheal Illness and Mediastinal Lymphadenitis: A Complex Diagnostic Journey Across Two Continents

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Abstract

A 52-year-old woman developed a febrile diarrhoeal illness during a pilgrimage in India, requiring intravenous ceftriaxone. She later experienced persistent dry cough and mediastinal lymphadenitis. Two months after returning to the UK, she developed sudden severe thoracic pain with systemic symptoms. Early investigations and non-contrast MRI were non-diagnostic. A focused contrast-enhanced MRI revealed destructive T8–T9 discitis. CT-guided biopsy confirmed Salmonella typhi. This case highlights the diagnostic challenges of metastatic Salmonella discitis, the limitations of reporting early imaging due to lack of clinical information, non-contrast study and non-focused whole spine request, the importance of integrating travel history, evolving symptoms, and targeted investigations.

Keywords: Salmonella Spondylodiscitis; Thoracic Discitis; Travel-Related Infection; Enteric Fever; Mediastinal Lymphadenitis; Vertebral Osteomyelitis; Contrast-Enhanced MRI; CT-Guided Biopsy; Diagnostic Delay; Spinal Infection

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Introduction

Vertebral osteomyelitis caused by Salmonella species is rare, representing a small proportion of spinal infections [1-14]. It typically follows gastrointestinal infection and may present weeks to months later [2, 4]. Diagnosis is often delayed due to non-specific symptoms, normal early imaging [5, 6], and culture-negative presentations after prior antibiotic exposure [12]. This case illustrates the complexity of recognizing metastatic Salmonella infection in a patient whose symptoms evolved across gastrointestinal, respiratory, and spinal systems.

Discitis and vertebral osteomyelitis are uncommon but potentially life-threatening conditions [5, 9, 10]. Diagnosis is often delayed, particularly when early imaging is normal [5, 6, 15] or when prior antibiotic exposure results in culture-negative presentations [12]. Travel-related infections add further complexity, especially when patients have limited access to pre-travel vaccination or timely medical care. This case illustrates the intersection of travel medicine, infectious disease, and emergency care, emphasizing the need for high clinical suspicion when systemic symptoms accompany severe spinal pain [5, 7].

This case describes a rare presentation of metastatic Salmonella typhi spondylodiscitis [3, 4, 8, 14], occurring several weeks after a febrile gastrointestinal illness [2] and a subsequent respiratory phase with mediastinal lymphadenitis. The case is notable for its evolving multisystem manifestations, the limitations of early non-contrast MRI [5, 6, 15], and the eventual diagnosis achieved through focused contrast-enhanced imaging [13, 15] and CT-guided biopsy [7].

Case Presentation

Phase 1: Travel context and Febrile Diarrhoeal Illness (India, July-October 2012)

The patient travelled urgently to rural India in July 2012 due to her elderly mother's terminal

illness. Pre-travel vaccinations could not be arranged because of limited appointment availability and the urgency of travel. Following her mother's death, she undertook a 500-mile walking pilgrimage from 26 August to 4 October 2012.

During the second week of the pilgrimage, she developed acute fever, rigors, pallor, sweating, diarrhoea, and profound weakness. A nurse specialist accompanying the group performed point-of-care tests for malaria, which were negative. Empirical antimalarial and antidiarrheal therapy, including metronidazole, produced no improvement. She was temporarily unable to walk.

Empirical treatment with ceftriaxone 1g intramuscularly for three days, followed by oral third-generation cephalosporin (cefpodoxime/CEFTUM), resulted in rapid clinical recovery, allowing her to resume the pilgrimage the next day.

Phase 2: Respiratory Illness and Metastatic Mediastinal Lymphadenitis (India, October 2012)

In the second week of October, she developed a severe dry cough, fever, and rigors similar to the earlier episode. Investigations - including urine tests, blood tests, and chest radiography - were normal except for low white cell count and a drop in haemoglobin. Symptoms did not respond to amoxicillin - clavulanate. Given the similarity to her earlier illness, she was restarted on oral CEFTUM, with marked improvement within three days. She discontinued the course after five days and carried the remaining tablets back to the UK.

Phase 3: Sudden Thoracic Pain- Primary care and Urgent care (UK- December 2012)

On 10 December 2012, she developed sudden, severe mid-thoracic back pain radiating in a belt-like or girdle pattern across the chest, accompanied by fever, rigors, sweating, pallor, and profound weakness. The pain was distinct from her known lumbar osteopenia-related discomfort and was rated 10/10. A paramedic attended but did not transport he as the portable ECG was normal and had no concerns of cardiac lifesaving emergency.

Analgesics (paracetamol, diclofenac), hot fomentation, and rest provided no relief.

A GP assessed her on 12 December and attributed symptoms to gastritis, prescribing lansoprazole. Her condition deteriorated, and she contacted emergency services. A paramedic assessed her but no ambulance transport was provided despite concerns about a serious non-cardiac cause.

Phase 4: Emergency assessment and hospital admission

Over the next 48 hours, pain escalated and she remained febrile and systemically unwell. On 14 December, her husband and son - both medically trained - suspected spinal infection and requested urgent GP review. A second GP attended promptly. Examination revealed Pulse: 115/min, Blood pressure: 100/52 mmHg, Respiratory rate: 28/min, Temperature: 38.9°C The GP suspected sepsis with possible septic shock, emphasising the need for urgent hospital evaluation. She arranged immediate ambulance transfer.

In the emergency department, investigations showed relative bradycardia following antipyretics despite hypotension, normal urine analysis normal ECG, chest radiograph showed mediastinal widening, normal abdominal ultrasound, negative malaria screen, CRP: 64 mg/L, platelets: low, hemoglobin: decreased from initial 15 g/dL to 11.2 g/dL, WBC: 3.2 $\times 10^{9}$/L with neutrophils 1.77 $\times 10^{9}$/L.

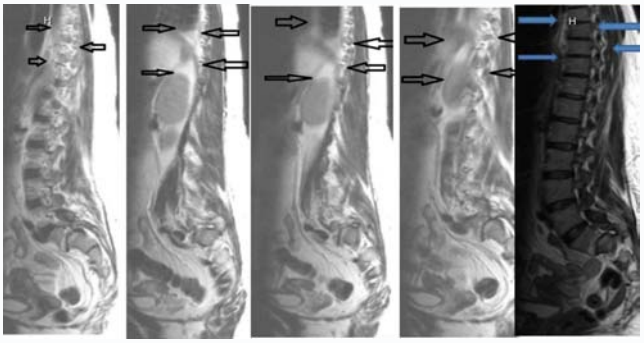

Figure 1: Early MRI and Missed Paraspinal Abnormality. Early MRI and chest X-ray findings at the patient's second ED presentation. Orthopaedic review identified a fusiform paraspinal mediastinal shadow on the earlier chest *X*-ray, consistent with a possible paraspinal collection. Review of the initial MRI - previously reported as normal - showed that the abnormality was in fact present in retrospect but had been overlooked. The registrar explained that this finding should have prompted earlier specialist referral. (Figure 1 and Figure 2, except final panel).

Given the clinical picture - recurrent fever with rigors, cytopenias, thoracic spine tenderness, radicular pain, widened mediastinum on chest radiograph, and prior response to cephalosporins - the senior emergency physician suspected septic discitis, likely blood culture-negative due to prior antibiotic exposure in India. Empirical IV amoxicillin–clavulanate was initiated, with plans for acute medicine admission with a view to assessment by infectious disease and microbiology consultation, MRI of the thoracic spine, and consideration of long-term IV therapy via PICC line.

Phase 5: Hospital Course and Discharge as Mechanical thoracic backpain with TENS machine and without any antibiotics or narcotic pain relief

The acute medical admission registrar assessed the patient and thought it is mechanical thoracic back pain, stopped antibiotics as blood culture was negative. The patient and family escalated to on call geriatrician consultant who did not agree with need for an MRI and deferred for the weekend discharged and review on Monday with repeat bloods. Review on Monday showed deterioration of symptoms and worsening signs. The repeat bloods showed CRP of 100 mg/L. The patient needed acute pain relief overnight and the nurses labelled her morphine addict and psychological patient as the label was of back pain of mechanical origin. They escalated to senior on call gastroenterology consultant to discharge the patient as soon as possible as the patient was demanding more pain relief. The on-call registrar assessed the patient and requested junior doctor to request an MRI scan of spine. Initial whole spinal non-contrast, whole-spine screening MRI with sketchy one-word clinical detail of back pain without any detailed account of symptoms, signs and initial investigation details. The radiology reported lumbar spondylolisthesis only and missed the thoracis spine discitis at T8-9 (Figure 1). The patient and her husband insisted that the clinical picture was very much suggestive of metastatic gram negative bacterial septic discitis of thoracic spine and for having a look at the MRI scans but were refused to see any scans. However, a young fresh junior consultant on call for acute medical unit told the patient that all investigations are normal, it is mechanical pain and offered the pain relief *via* TENS machine and withdrew narcotic pain relief. Husband got investigated for possible regulatory body referral and discharged the patient on

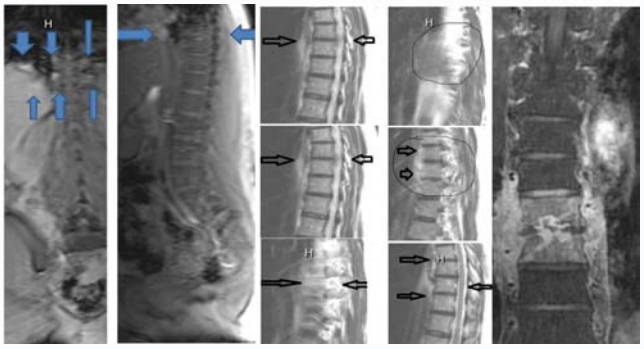

Figure 2: Contrast-Enhanced Thoracic Spine MRI Demonstrating Disease Progression. Focused contrast-enhanced thoracic spine MRI showing advanced infectious changes. The targeted study revealed septic discitis with extensive destruction of the T8-T9 vertebral bodies and a paraspinal inflammatory collection, consistent with progression of the underlying infection (last right-hand panel). Compare and contrast initial and subsequent studies.

19th December 2012.

Further Primary care and Christmas -New Year holiday break Course

The patient remained in severe pain with systemic symptoms. She was discharged with provisional diagnosis of mechanical back pain and without a definitive diagnosis. The general practitioner struggled to understand the rationale and needed an HDU care in primary care setting and cannot start antibiotics when the hospital consultants have discharged her from the hospital without them. The patient out of desperation, took five days of oral 3rd generation cephalosporin left over from her previous course for chest symptoms in India and got partial pain relief. GP repeat blood test showed improvement of CRP of 81 mg/L Surgery and private practice get closed for the Christmas break.

Home care and Diagnostic Escalation to Private sector (UK, 24 December 2012–25 January 2013)

Following discharge from her initial hospital admission, the patient continued to experience severe mid-thoracic girdle pain, fever, and rigors. Despite a normal screening MRI and partial reduction in inflammatory markers following 5 days of oral 3rd generation cephalosporin. Her symptoms persisted. A private rheumatology consultation with University Professor on provided a turning point. After reviewing the full clinical history, performing a detailed examination and reviewing all investigations available, he concluded that the presentation was entirely consistent with thoracic 8-9th septic discitis, not mechanical or rheumatologic pathology. He emphasised that the patient's girdle-type thoracic pain, mid-thoracic spinal tenderness, and preceding gastrointestinal and chest illnesses with similar systemic features were classic for discitis. He noted that a double blind, non-contrast, whole-spine screening MRI without giving any clinical and investigative findings details was inadequate and likely to miss focal pathology. He expressed concern that the patient had been discharged despite ongoing systemic illness and significant pain.

Professor personally called the general practitioner for arranging emergency readmission to the same hospital for an urgent contrast-enhanced MRI focused on the symptomatic thoracic region. He identified classic features of discitis, provided education to the patient's son regarding the clinical differences between mechanical back pain and discitis, reinforcing the diagnostic reasoning. GP referred the patient to emergency department.

Timeline of Events

Date / Period	Clinical Events	Investigations / Findings	Management
July 2012	Urgent travel to India; unable to obtain vaccinations	–	–
Aug 2012 (Week 2 of pilgrimage)	High fever, rigors, diarrhoea, profound weakness	Malaria tests negative	**IV ceftriaxone × 3 days**, then oral cefpodoxime → rapid improvement
Oct 2012 (post-pilgrimage)	Persistent dry cough, fever, rigors	Normal CXR; cytopenias; mediastinal lymphadenitis	Amoxicillin–clavulanate ineffective → **oral cefpodoxime** with improvement
10 Dec 2012 (UK)	Sudden severe mid-thoracic pain, girdle radiation, fever, rigors	–	Analgesics; GP review
12–14 Dec 2012	Worsening pain; difficulty mobilising	Paramedic ECG normal	Second GP identifies sepsis → urgent hospital transfer
14 Dec 2012 – ED	Fever, tachycardia, hypotension, rigors	CRP 64; WBC 3.2; Hb drop; CXR subtle paraspinal shadow	IV amoxicillin–clavulanate; screening MRI (non-contrast)
Late Dec 2012	Persistent pain; no diagnosis	Screening MRI normal	Discharged; ongoing symptoms
Jan 2013 – Private review	Severe thoracic pain persists	Clinical suspicion of discitis	Urgent referral for focused MRI
25 Jan 2013	–	**Focused contrast MRI: T8–T9 discitis with vertebral destruction**	MDT review
Late Jan 2013	Diagnostic uncertainty (TB vs pyogenic discitis)	CXR: retropleural changes	Plan for biopsy
Biopsy Day	Initial confusion re: open vs percutaneous procedure	–	**CT-guided needle biopsy**
Biopsy Result	–	***Salmonella typhi* isolated**	Targeted antimicrobial therapy
Follow-up	Chronic girdle pain; structural damage	Risk of compression fractures	Long-term monitoring; spinal precautions

Figure 3: Timeline chart. Timeline summarizing the chronological evolution of illness in a 52-year-old woman following travel to India. The timeline illustrates the initial gastrointestinal phase with febrile diarrheal illness, subsequent respiratory phase with mediastinal lymphadenitis, and later onset of severe thoracic back pain. It highlights the diagnostic turning point when contrast-enhanced MRI revealed destructive T8–T9 discitis after an initially missed diagnosis on MRI, followed by repeat focused contrast MRI and CT-guided biopsy confirming Salmonella infection. The figure also outlines the course of targeted antimicrobial therapy and the patient's gradual recovery over the following months.

Re-presentation to Emergency Department

The patient returned to the ED, where orthopaedic review identified a fusiform paraspinal mediastinal shadow on the earlier chest *X*-ray, consistent with a paraspinal collection and showed previous MRI which did in retrospect demonstrated it but was missed

(Figure 1 and 2 except last panel). The registrar explained that this should have prompted earlier specialist referral.

Definitive imaging (25 January 2013)

A focused contrast-enhanced region focused thoracic spine MRI revealed septic discitis, extensive destruction of T8–T9 vertebrae, and paraspinal inflammatory collection consistent with disease progression (Figure 2 last right panel). Patient was admitted to orthopaedic surgery ward as there was no spinal surgery unit under joint care with infectious disease specialists. An orthopaedic MDT initially considered tuberculosis and planned for the anterolateral decompression. Patient insisted on further review by Professor of infectious diseases before the implementation of the orthopaedic plan.

Diagnostic Conflict: Tuberculosis *vs* Salmonella Discitis

An orthopaedic surgeon with an interest in spinal tuberculosis initially proposed thoracotomy for drainage and decompression based on imaging appearances. The patient and her medically trained family members questioned this diagnosis, noting the rapid vertebral destruction inconsistent with typical tuberculosis, absence of respiratory symptoms, lack of detailed history-taking, and radiological features more consistent with a retro pleural paraspinal abscess due to retro pleural tracking.

Reconsideration of diagnosis

Detailed history, examination and all investigations reviewed by Professor of microbiology and agreed that the presentation was more consistent with Salmonella discitis rather than a tuberculous discitis. The professor requested and invited one of the spinal surgeons from the regional hospital for a CT guided percutaneous drainage and needle biopsy as minimum invasive option to get culture and histopathology. After further review, microbiology professor and consultant infectious diseases agreed that and informed the spinal team.

Biopsy and Microbiological Confirmation

A percutaneous needle biopsy was planned. In the anaesthetic room, the patient was initially told an open operation was planned, but this was clarified as a miscommunication. The spinal team confirmed the procedure would be percutaneous. The needle aspiration biopsy grew Salmonella typhi, confirming the metastatic Salmonella spondylodiscitis diagnosis. The patient expressed deep gratitude to both the professors of rheumatology and microbiology, the only consultants who took a comprehensive history and recognised the diagnosis clinically before imaging or cultures.

Complications and Long-Term Implications

The infectious disease team explained that prolonged discitis with paraspinal collections can be associated with endocarditis, pericarditis, and mycotic aneurysm. Given her family history of aneurysmal rupture, this caused significant anxiety. She was advised that destruction of T8-T9 placed her at lifelong risk of compression fractures and chronic girdle-type pain. During follow up patient has lost her height from initial 165 cm to 148 cm now due to loss of two vertebrae and gets intermittent radicular pains due to compression of the intercostal nerves.

Patient-Experienced System Challenges

The patient reported several difficulties during her illness, including inadequate pain control after discontinuation of opioids, masking of fever by regular antipyretics, interruption of IV antibiotics

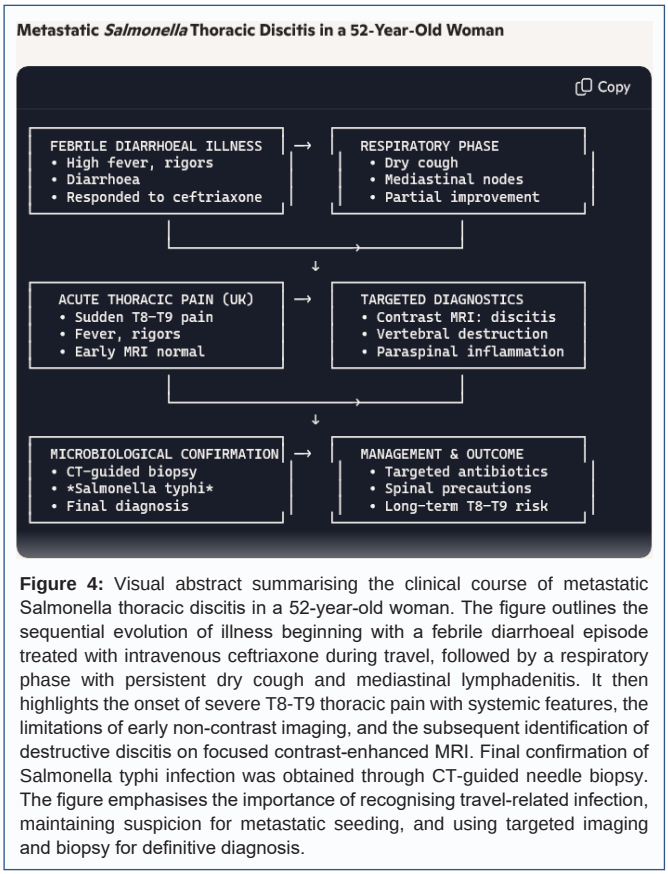

Figure 4: Visual abstract summarising the clinical course of metastatic Salmonella thoracic discitis in a 52-year-old woman. The figure outlines the sequential evolution of illness beginning with a febrile diarrhoeal episode treated with intravenous ceftriaxone during travel, followed by a respiratory phase with persistent dry cough and mediastinal lymphadenitis. It then highlights the onset of severe T8-T9 thoracic pain with systemic features, the limitations of early non-contrast imaging, and the subsequent identification of destructive discitis on focused contrast-enhanced MRI. Final confirmation of Salmonella typhi infection was obtained through CT-guided needle biopsy. The figure emphasises the importance of recognising travel-related infection, maintaining suspicion for metastatic seeding, and using targeted imaging and biopsy for definitive diagnosis.

despite ongoing systemic symptoms, cancellation of focused imaging, documentation inconsistencies labelling symptoms as mechanical back pain, communication challenges between teams, physiotherapy advice later deemed inappropriate for suspected discitis, prolonged immobility and pain leading to disease progression. These experiences contributed to significant emotional distress and highlight the importance of early recognition of red-flag symptoms, accurate documentation, and timely specialist involvement.

Differential Diagnosis included Tuberculous spondylitis, Pyogenic discitis, Metastatic malignancy, Sarcoidosis, Paraspinal abscess secondary to mediastinal infection.

Discussion

Salmonella spondylodiscitis is rare, accounting for a small proportion of vertebral osteomyelitis cases [1-4]. It often follows gastrointestinal infection and may present weeks to months after the initial illness [2, 4]. Diagnosis is frequently delayed due to non-specific symptoms, normal or inadequate early imaging [5, 6, 15], and blood culture-negative presentations when prior antibiotics have been administered [12]. This case illustrates the complexity of recognising metastatic Salmonella infection in a patient with multiple evolving symptoms across different organ systems.

This case demonstrates the diagnostic complexity of metastatic Salmonella discitis, particularly when early symptoms involve multiple organ systems [3, 4, 8]. Early MRI was abnormal retrospectively, and non-contrast non-focused screening studies may miss focal pathology [5, 6, 15]. A detailed travel history, awareness of prior antibiotic exposure [12], and recognition of red-flag symptoms are essential [5, 7].

This case demonstrates the diagnostic complexity of blood culture-negative discitis, particularly in the context of prior antibiotic exposure [12] and travel-related infection [2]. It highlights the limitations of early non-contrast MRI [5, 6, 15], the importance of focused imaging [13, 15], and the need for multidisciplinary collaboration [7]. It also underscores the value of thorough history-taking and clinical reasoning, which ultimately guided the correct diagnosis.

We believe this report offers significant educational value for clinicians because Salmonella discitis is uncommon in high-income settings [3, 4, 8] and may be overlooked. Early MRI, although abnormal, was reported as normal due to limited clinical information, contributing to diagnostic delay [5, 6, 15]. Prior antibiotic exposure can suppress blood culture yield [12], complicating microbiological confirmation. The case highlights the importance of integrating travel history [2], systemic symptoms, and targeted imaging [13, 15] in patients with severe back pain. The manuscript includes a timeline, visual abstract, flowchart, and one-page teaching summary to support clinical learning.

Discussion of System Factors

1. Diagnostic anchoring

Early attribution of symptoms to mechanical back pain may have contributed to delays in recognising discitis, despite systemic features [5, 7].

2. Imaging strategy

A non-contrast, whole-spine screening MRI study was insufficient for detecting early discitis [5, 6, 15].

Focused, contrast-enhanced imaging is essential when red-flag symptoms are present [13, 15].

3. Impact of prior antibiotics

Multiple courses of cephalosporins abroad likely suppressed culture yield [12], complicating diagnosis.

4. Communication across teams

Transitions between primary care, emergency services, acute medicine, orthopaedics, and infectious diseases introduced opportunities for miscommunication and inconsistent documentation [7].

5. Pain management considerations

Analgesic regimens that included regular antipyretics may have masked fever patterns important for clinical assessment. Non-narcotic analgesics and TENS therapy may have underestimated the severity of pain, though reduced mobility may have inadvertently protected the spine.

6. Rarity of presentation

Salmonella spondylodiscitis is uncommon in high-income settings [3, 4, 8], which may contribute to diagnostic uncertainty.

7. Importance of comprehensive history-taking

The eventual diagnosis was strongly supported by linking gastrointestinal illness [2], recurrent febrile episodes, and thoracic pain. Comprehensive history-taking across gastrointestinal, respiratory, and spinal symptoms is crucial for maintaining a high index of suspicion.

8. Value of tissue diagnosis

Needle biopsy remains the gold standard for identifying the causative organism, especially in culture-negative or atypical presentations [7].

9. Diagnostic delay due to non-specific multisystem shifting symptoms

The evolution from gastrointestinal illness to respiratory symptoms and finally to spinal pain illustrates how metastatic Salmonella infection can mimic multiple conditions [2-4].

10. Mediastinal lymphadenitis as an intermediate presentation

The patient's persistent cough and mediastinal lymphadenitis may have represented transient immune activation or early dissemination [3, 4], complicating the diagnostic picture.

11. Importance of travel and infection history

The patient's initial febrile diarrhoeal illness was a crucial clue [2]. Salmonella species can enter the bloodstream during enteric infection and seed distant sites, including mediastinal lymph nodes and the spine [3, 4, 8].

12. Patient experience

The patient reported distress related to delays, conflicting information, and difficulty navigating multiple teams, highlighting the importance of patient-centred communication [7].

Patient's Perspective

From the very beginning of my illness, I felt as though my body was giving me clear signals that something serious was wrong, yet the cause remained hidden for a long time. My symptoms changed from gastrointestinal illness to persistent cough, and then to severe thoracic pain that I had never experienced before. Each phase felt disconnected, and I often struggled to explain how unwell I felt.

The most difficult part of the journey was the uncertainty. I knew the pain was not mechanical, and I felt frightened when investigations did not show anything abnormal. As my symptoms worsened, I became increasingly anxious about being misunderstood or not taken seriously. The severe pain, the fevers, and the inability to breathe deeply were overwhelming, and I felt vulnerable when I could not advocate for myself effectively.

When the correct diagnosis was finally made, I felt both relief and sadness. Relief that there was an explanation for everything I had been experiencing, and sadness that the infection had progressed so far before it was recognised. Learning that two of my vertebrae had been damaged was emotionally difficult, and I worried about the long-term consequences for my mobility and independence.

I am deeply grateful to the clinicians who took the time to listen to my full history and consider the possibility of discitis even before the investigations confirmed it. Their careful attention and clinical insight changed the course of my care. At the same time, this experience has taught me how important it is for patients to be heard, especially when symptoms evolve or do not fit neatly into common patterns.

Even now, I continue to live with the physical reminders of this illness, but I also carry a strong sense of resilience. I hope that sharing my experience will help clinicians recognise similar cases earlier and

help other patients feel empowered to speak up when something does not feel right.

Learning Points

• Salmonella spondylodiscitis is rare but should be considered in patients with severe back pain following recent gastrointestinal infection or travel to endemic regions.

• MRI request must include symptoms, signs and previous investigation results for the proper reporting by the radiologist and most common back pain is lower backache so reported spondylolisthesis only missing the findings in thoracic spine. The best practice is to arrange contrast-enhanced, region-focused MRI which is essential when red-flag symptoms persist despite non-diagnostic initial imaging.

• Prior antibiotic exposure can suppress blood culture yield, making CT-guided biopsy crucial for definitive microbiological diagnosis.

• Evolving multisystem symptoms (gastrointestinal → respiratory → spinal) should prompt clinicians to revisit the differential diagnosis and avoid anchoring bias.

• Clear communication, thorough history-taking, and early multidisciplinary involvement can significantly reduce diagnostic delay in complex spinal infections.

Conclusion

This case illustrates the diagnostic complexity of metastatic Salmonella spondylodiscitis, particularly when symptoms evolve across multiple organ systems and early imaging although showed changes was missed. A detailed travel history, awareness of prior antibiotic exposure, and recognition of red-flag features such as severe thoracic pain with systemic symptoms are essential for timely diagnosis. Contrast-enhanced, region-focused MRI and CT-guided biopsy remain critical tools when initial investigations are inconclusive. Early multidisciplinary involvement and careful clinical reassessment can significantly reduce diagnostic delay and improve outcomes in rare spinal infections such as Salmonella discitis.

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