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Typhoid osteomyelitis of the lumbar spine

腰椎位置的傷寒性骨髓炎

A 25-year-old Nepali man presented with a 20-day history of fever associated with a lower backache. Physical examination found tenderness over the lower lumbar vertebrae. Magnetic resonance imaging following intravenous contrast injection showed enhancement of the L4 and L5 vertebrae, particularly pronounced around the intervening disc, and areas of endplate erosion. Extra-vertebral enhancement and a small subligamentous anterior collection were also noted. Computed tomography-guided needle aspiration was performed at the level of L4/5 disc material and culture of the specimen grew *Salmonella typhi* sensitive to ampicillin, ciprofloxacin, and ceftriaxone. The patient received intravenous ampicillin 2 g per 4 hours for 6 weeks. The back pain resolved completely and the patient was discharged. Typhoid osteomyelitis of the spine should be considered in the differential diagnosis in patients from endemic areas who present with fever and backache.

一名25歲尼泊爾男性連續20日出現發燒和下背部痛楚。身體檢查發現下腰脊椎有壓痛，而靜脈顯影注射和磁力共振掃描顯示脊椎L4和L5位置增大，尤其以脊椎隔層圈周圍和終板位置更明顯；此外亦發現外脊椎增大和小量副韌帶前端相連。以電腦掃描作細針抽取脊椎L4/L5位置的物質化驗，培植的樣本發現沙門氏菌，並對氨西林、環丙沙星和頭孢曲松有反應。病人繼後六星期每隔四小時接受2 g的氨西林靜脈注射，背痛完全消除並可出院。對於來自疫區而出現發燒和背痛的病人，在鑑別診斷時須要考慮患上腰椎位置的傷寒性骨髓炎的可能性。

Introduction

Salmonellae are motile gram-negative bacilli that infect or colonise a wide range of mammalian hosts and cause characteristic clinical infections in humans including gastroenteritis, enteric fever (systemic illness with fever and abdominal symptoms), bacteraemia and endovascular infection, focal metastatic infections such as osteomyelitis and abscesses, and an asymptomatic chronic carrier state.^{1,2} Nonetheless, typhoid osteomyelitis of the spine is extremely rare; only four cases have been reported in the literature.

Case report

In May 2005, a 25-year-old Nepali man presented with a 20-day history of fever associated with a severe lower backache. The pain was constant, dull, and without radiation. The patient had difficulty walking since the previous week. He came from Nepal 1 month earlier, with an unremarkable medical history.

On examination, the patient appeared ill, conscious, with a pulse rate of 110/min, blood pressure of 115/75 mm Hg, temperature of 38°C, and respiratory rate of 21/min. He had no jaundice, rash, lymphadenopathy or neck stiffness. His chest X-ray showed clear lung fields and his cardiovascular system was normal. The abdomen was soft, with no organomegaly. A rectal examination was normal. The cervical and thoracic vertebrae were normal while the lower lumbar spine was tender to palpation. The cranial nerves and fundi were normal, so were muscle power and tone. Sensation was intact and reflexes were normal; the plantar reflexes were flexor on both sides.

Key words:

Osteomyelitis;
Salmonella infections;
Typhoid fever

關鍵詞：

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Fig 1. Sagittal reconstruction of a computed tomographic scan showing irregular erosion of the anterior aspect of the inferior endplate of L4 and superior endplate of L5 vertebrae, widening of the intervening disc space and the epidural space posterior to the L4 and L5 vertebral bodies

Blood investigations found a haemoglobin level of 100 g/L, a total leukocyte count of 10 000 /mm³ with a normal differential, a platelet count of 112 000 /mm³, and an erythrocyte sedimentation rate (ESR) of 66 mm/hour. Blood chemistry, liver profile, and coagulation studies were within normal limits. A malaria parasite smear was negative and the urine dipstick and microscopy were normal. Blood, urine, and stool cultures were negative. A tuberculin skin test and human immunodeficiency virus enzyme-linked immunosorbent assay were negative, but the Widal test was positive.

Chest and abdominal radiographs and an abdominal ultrasound were normal. Initial X-rays of the lumbar spine and pelvis were unremarkable. A sagittal computed tomographic (CT) scan reconstruction showed ill-defined erosions involving the anterior aspect of the inferior endplate of L4 and the superior endplate of L5 vertebrae and a less well-defined erosive process distally within the vertebral bodies. Widening of the intervening L4/L5 disc material was also noted. Involvement of two adjacent vertebrae and the intervening disc space indicated an infective process (Fig 1). A magnetic resonance imaging (MRI) scan showed vertebral oedema involving the bodies of the L4 and L5 vertebrae, with low T1-weighted- and high T2-weighted-signal changes. The changes were most pronounced in the

adjoining aspects of both vertebrae with irregular erosive changes in the inferior endplate of L4 and the superior endplate of L5 vertebrae. There was an area of central liquefaction noted within the intervening disc space and extending to the adjacent endplate (Fig 2a, b). Intravenous administration of gadolinium enhancement revealed full involvement of both L4 and L5 vertebrae, particularly pronounced around the intervening disc and the endplate erosion. Extra-vertebral enhancement and a small subligamentous anterior collection were also noted (Fig 2c). Bacteriologic culture of a CT-guided needle aspiration of the L4-5 disc space grew *Salmonella typhi* sensitive to ampicillin, ciprofloxacin, and ceftriaxone. The patient received intravenous ampicillin 2 g/4 hours for 6 weeks. The patient recovered completely and was discharged. Two months after recovery, the patient's MRI and Widal titres became normal.

Discussion

Vertebral osteomyelitis was regarded as a distinct clinical entity by Hippocrates and Galen. It is primarily a disease of adults; most patients being over 50 years.³ *Salmonella* is a rare cause of osteomyelitis, accounting for approximately 0.5% of all cases.⁴ It accounts for 2% of vertebral osteomyelitis cases in Qatar.⁵ *Salmonella* osteomyelitis is divided into two broad categories with different epidemiological features: typhoid (caused by *S typhi* and *S paratyphi*) and non-typhoid osteomyelitis. *Salmonella typhi* or *Salmonella paratyphi* cause typhoid fever and have high host specificity for humans. Infection indicates contact with an acutely infected individual, a chronic carrier, or food and water contaminated with sewage. Non-typhoidal *Salmonellae* are associated with animal reservoirs and therefore agricultural products, especially eggs and poultry.²

Salmonella osteomyelitis is uncommon and typhoid osteomyelitis of the spine is extremely rare; only four cases of typhoid osteomyelitis have been reported in the literature.⁶⁻⁹ Osteomyelitis is uncommon in the acute stage of typhoid fever but may complicate convalescence, or develop months or even years after infection. It can affect any bone, but is usually localised to the long bones or spine and occasionally the ribs and sternum. It may become chronic. Involvement of the spine is usually without symptoms of active intestinal disease (this may have occurred months or years earlier). Our patient presented with lower backache and fever without symptoms of active intestinal disease. Pathogens can reach the spine by three basic routes: haematogenous spread from a distant site or focus of infection, direct inoculation from trauma or spinal surgery, and contiguous spread from adjacent soft tissue infection.¹⁰ Haematogenous spread is the major mechanism in vertebral osteomyelitis and our patient probably developed typhoid osteomyelitis during typhoid bacteraemia.

Although a variety of host immune deficiencies such as

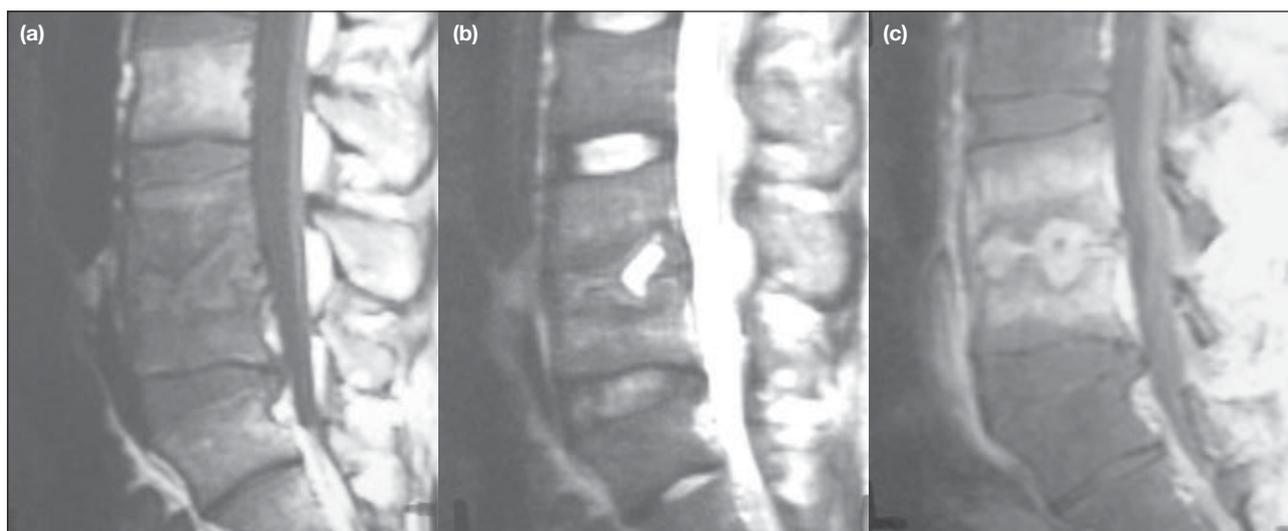


Fig 2. Magnetic resonance imaging scans of the patient

(a) Sagittal T1-weighted image showing generalised reduced signal intensity within the body of L4 and L5 vertebrae with irregular erosive changes within the inferior endplate of L4 and superior endplate of L5. Widening of the intervening disc space and a small anterior sub-ligamentous collection is noted. (b) Sagittal T2-weighted image showing increased signal within the body of L4 and L5 vertebrae with a focal area of liquefaction in the intervening disc space and adjacent endplate erosions. (c) Sagittal contrast-enhanced image with fat suppression showing intense enhancement within almost all of the L4 and L5 vertebrae, particularly in the intervening irregular disc space. There is a central area with no enhancement within the enhancing disc space. Extension of the enhancement anteriorly and posteriorly with a small anterior sub-ligamentous collection is noted

depressed cell-mediated immunity (eg acquired immune deficiency syndrome, glucocorticoid therapy) and altered phagocyte function (eg sickle cell anaemia, malaria) predispose to more severe and complicated non-typhoidal salmonellosis, such relationships have not been well described in typhoidal infections. All reported cases of typhoid osteomyelitis, including ours, did not involve immunocompromised patients. The pain experienced in vertebral osteomyelitis offers no diagnostic characteristics. Spinal pain usually begins insidiously and progressively worsens over several weeks or months. In a series of 64 patients with spontaneous vertebral osteomyelitis, the mean duration of symptoms was 48 ± 40 days.¹¹ Raised ESRs and positive blood cultures are present in 50 to 70% of patients with vertebral osteomyelitis.^{12,13} In our patient the ESR was 66 mm/hour and the blood culture was negative. The only evidence for diagnosis of typhoid osteomyelitis is the growth of the *S typhi* organism on culture. Differentiation of typhoid osteomyelitis from other types of infectious osteomyelitis may be difficult if using clinical and radiographic examination alone. Other forms of pyogenic osteomyelitis and tuberculosis must be considered in the differential diagnosis. Clinico-radiological images of our patient may have suggested tuberculosis of the spine, but the diagnosis of typhoid osteomyelitis of the lumbar spine was established from the culture of the disc space aspirate which grew *S typhi*.

Before the discovery of antibiotics, approximately 25% of patients with vertebral osteomyelitis would die.¹⁴ Antimicrobial therapy and, in rare cases, surgery should lead to a good outcome in most patients with typhoid vertebral osteomyelitis. Most cases of typhoid vertebral

osteomyelitis respond to antimicrobial therapy. The treatment should continue for a minimum of 6 weeks. Parenteral antibiotics should be directed against the known or suspected pathogen if the culture and/or gram stain of the CT-guided needle biopsy is positive. Typhoid osteomyelitis of the spine should be considered in the differential diagnosis for patients from endemic areas who present with fever and backache.

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