

Vertebral Body Emphysematous Osteomyelitis in a Diabetic Patient: A Rare Entity Revealed by CT scan

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Abstract

Case Report

Background: Emphysematous osteomyelitis is an extremely rare and potentially life-threatening infection, defined by the presence of intraosseous gas, most often caused by gas-forming Gram-negative. The vertebral column is an uncommon site of involvement, with very few cases reported to date. Diabetes mellitus is a well-recognized predisposing factor, as it compromises host immunity and creates a favorable environment for rapid bacterial proliferation. We report the case of emphysematous osteomyelitis of the L4 vertebra in a 69-year-old female patient admitted to the intensive care unit for diabetic ketoacidosis.

Keywords: Emphysematous osteomyelitis, diabetes, vertebral body, CT scan, critical emergency.

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INTRODUCTION

Emphysematous osteomyelitis is a rare bone infection caused by gas-producing bacteria, most commonly *Klebsiella pneumoniae* [1]. Since its first description in 1981, only about 45 cases have been reported worldwide. However, given its high mortality rate, prompt recognition and early management are crucial [1].

CASE PRESENTATION

We report the case of a 69-year-old diabetic woman admitted to the intensive care unit for diabetic ketoacidosis. During her hospitalization, she developed severe low back pain, fever, chills, and she was slightly drowsy.

Her vitals were unstable, with a blood pressure of 80/65 mmHg, pulse of 114/min, body temperature of 39.3°C, respiratory rate of 27/min, and oxygen saturation of 94% (on room air).

An emergency abdominal CT scan revealed the presence of gas bubbles within the L4 vertebral body, associated with subtle cortical bone disruption and extension of the gas into the spinal canal, the L3–L4

intervertebral disc, and in close proximity to the aorta and the inferior vena cava.

There was associated involvement of the iliopsoas muscles, which demonstrated heterogeneous enhancement after contrast administration, containing intramuscular gas bubbles, along with a small-volume peritoneal effusion.

The diagnosis of emphysematous osteomyelitis of the L4 vertebral body was established. Laboratory tests revealed leukocytosis (16,000/mm³), thrombocytopenia (43,000/mm³), and markedly elevated C-reactive protein (312 mg/L). Both blood and urine cultures were positive for *Escherichia coli*.

The patient received appropriate antibiotic therapy, along with fluid and electrolyte repletion, glycemic management, and analgesia. She showed clinical improvement, and a follow-up blood test on day three demonstrated a decrease in leukocytosis to 11,000/mm³ and C-reactive protein to 86 mg/L.

She completed a prolonged course of antibiotic therapy, and at the three-month follow-up she showed sustained clinical improvement.

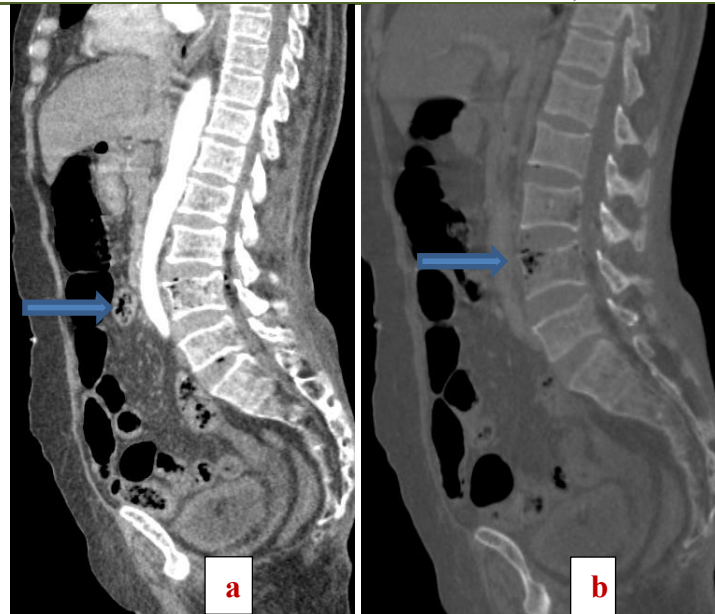


Figure 1: Abdominal CT in parenchymal (a) and bone windows (b) showing the L4 vertebral body containing air bubbles (arrow) extending into the spinal canal and the L3–L4 intervertebral disc, associated with subtle cortical bone disruption

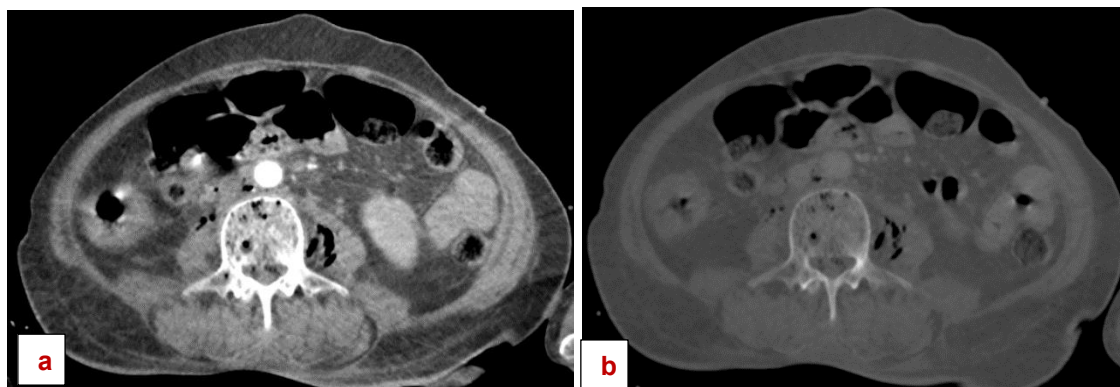


Figure 2: Abdominal CT in parenchymal (a) and bone windows (b) demonstrating air bubbles within the L4 vertebral body, extending to the psoas muscles, the interaortocaval space, and the laterocaval region.

DISCUSSION

Spinal emphysematous osteomyelitis represents an uncommon, aggressive, and life-threatening form of osteomyelitis due to gas-producing bacteria. Its hallmark radiological feature is the detection of intravertebral gas in the absence of penetrating trauma, open fractures, or recent biopsy [2,3].

However, the presence of intraosseous air, particularly within the axial skeleton, should be carefully distinguished from degenerative changes, osteonecrosis, or neoplastic processes [4].

Emphysematous osteomyelitis is more strongly suspected when associated with fluid collections or abscesses in the surrounding soft tissues, or when intraosseous gas appears extensive with a heterogeneous, mottled distribution [4].

CT is the gold standard for diagnosing spinal emphysematous osteomyelitis, as it detects even minimal intraosseous gas, often overlooked on conventional radiographs [3, 5, 6].

Unlike spondylodiscitis or spinal epidural abscesses, where MRI is the imaging modality of choice, CT plays a pivotal role in promptly identifying EO and thereby preventing delays in surgical intervention when required [3, 5, 6].

Biopsy is advised only when microbiological identification cannot be obtained from blood, urine, or other laboratory tests [7]; or when antibiotic treatment fails to achieve clinical improvement [8]. Indeed, previous reports have shown that image-guided biopsy has a limited yield in isolating specific pathogens [7].

Emphysematous osteomyelitis should be managed with antimicrobial therapy for 4–6 weeks,

similar to standard osteomyelitis treatment. Surgical intervention is reserved for cases complicated by abscess formation or tissue necrosis, or for patients who fail to respond to medical therapy [9].

CONCLUSION

Emphysematous osteomyelitis of the vertebral body is a rare and potentially life-threatening condition. Early CT recognition is crucial to differentiate it from other spinal conditions and to initiate timely treatment. Prompt antimicrobial therapy, with surgery reserved for complications or treatment failure, is crucial to improve patient outcomes.

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