

Case Report

Spontaneous emphysematous osteomyelitis of spine detected by computed tomography: Report of two cases

Senthil Kumar Aiyappan, Upasana Ranga, Saveetha Veeraiyan

Department of Radiodiagnosis and Imaging, Saveetha Medical College and Hospital, Thandalam, Kancheepuram, Tamil Nadu, India

Corresponding author: Dr. Senthil Kumar Aiyappan, Department of Radiodiagnosis and Imaging, Saveetha Medical College and Hospital, Thandalam, Kancheepuram - 602 105, Tamil Nadu, India. E-mail: senthilkumarpgi@yahoo.co.in

Journal of Craniovertebral Junction and Spine 2014, 5:19

Abstract

We hereby report two cases of spontaneous emphysematous osteomyelitis of spine caused by gas forming organisms in diabetic patients, which were diagnosed using computed tomography (CT) and magnetic resonance imaging with one case managed successfully. These cases highlight the role of CT in diagnosis of gas forming spinal infections, especially in diabetic patients. Early and aggressive management is required in those cases to avoid mortality.

Key words: Computed tomography, diabetes, emphysematous osteomyelitis

INTRODUCTION

Emphysematous osteomyelitis of the spine by gas forming infection is quite rare and most commonly seen in diabetic patients.^[1,2] Although there are many case reports of pyogenic osteomyelitis of spine in diabetic patients, we could find only very few case reports of osteomyelitis of spine due to gas forming organisms. Here, we emphasize the role of computed tomography (CT) in detection of intraosseous and intraspinal gas, which can help in diagnosing this entity early and correctly.^[3]

CASE REPORTS

Case 1

The first case is about a 53-year-old female patient who was admitted with the complaints of severe back pain and pelvic

pain. The patient was diagnosed with type 2 diabetes mellitus 5 years back and was put on oral hypoglycemic medications, however, the patient was not taking drugs regularly and no proper blood sugar maintenance was done. She gave no history of any vertebral injury or surgeries. On admission, she was having severe muscle spasm over the lower lumbar spine with tenderness. No sensory or motor deficit could be elicited. She was febrile with body temperature of 38.2°C.

Laboratory investigations showed random blood sugar of 450 mg/dl, glycated hemoglobin (HbA1c) of 9%, which indicated uncontrolled diabetes. Total and differential white blood cell count showed neutrophilic leukocytosis. Lumbar spine radiographs did not show any significant abnormality. CT scan of the lumbar spine showed presence of air pockets/gas within L2 and L3 vertebral bodies with extension of gas into prevertebral and bilateral paravertebral soft tissues at L2 and L3 level and also into bilateral upper psoas muscles [Figure 1a and b]. There was no intradiscal gas. Hence, infectious osteomyelitis by gas forming organism was suspected and patient was advised a magnetic resonance imaging (MRI) examination of spine. MRI showed presence of altered signal intensities involving L2 and L3 vertebral bodies on inversion recovery images with associated prevertebral and bilateral paravertebral small collections extending to involve bilateral upper psoas muscles [Figure 2a and b]. Multiple gas pockets were also noted within L2 and L3 vertebral bodies extending to

Access this article online	
Quick Response Code:	Website: www.jcvjs.com
	DOI: 10.4103/0974-8237.139207

prevertebral, bilateral paravertebral regions and into upper psoas muscles. The intervening intervertebral disc appeared normal. Hence, possibility of emphysematous osteomyelitis involving L2, L3 vertebral bodies was suggested and the patient was subjected to CT guided fine-needle aspiration cytology. The material was also sent for culture, which grew *Klebsiella pneumoniae* sensitive to third generation cephalosporins. The patient was started on insulin initially to control blood glucose and later switched over to oral hypoglycemic agents. Intravenous ceftriaxone 2 g/day for 4 weeks was started as antibiotic treatment, followed by oral levofloxacin 400 mg/day for 2 weeks. Patient showed marked symptomatic improvement and was discharged from the hospital after 4 weeks. Repeat CT scan of spine showed clearance of gas from L2 and L3 vertebral bodies.

Case 2

A 45-year-old male patient who had uncontrolled diabetes presented with the complaints of severe lower back pain and fever for the past 3 days. There was severe muscle spasm over lower lumbar spine. Laboratory investigations revealed random blood sugar of 350 mg/dl, HbA1c of 8%, indicative of uncontrolled diabetes. Lumbar spine radiographs did not show any significant abnormality. Initially, MRI of lumbar spine was done which showed diffuse edema of bilateral iliopsoas muscles and marrow edema of L4 and L5 vertebral bodies [Figure 3a] suggestive of infective etiology. This was immediately followed by CT scan, which showed presence of multiple airpockets within psoas muscle on both sides associated with intraspinal and paravertebral air [Figure 3b]. Imaging features were suggestive of infection of spine and adjacent soft tissues by gas forming organism. Patient was shifted to intensive care unit for further management; unfortunately the patient did not survive due to sudden cardiac arrest.

DISCUSSION

Intraosseous gas was described first as a sign of osteomyelitis in 1981.^[3] When it is seen in axial skeleton, it is almost always due to noninfectious cause, however osteomyelitis is likely, if there is extensive intravertebral gas, bone edema and/or associated adjacent collections like in our cases.^[1] Most of the cases of emphysematous osteomyelitis reported in the English literature are monomicrobial.^[1] Hematogenous spread is the most common cause in monomicrobial and contiguous spread in polymicrobial infections. Most commonly associated comorbidity was diabetes mellitus, as in our cases.^[1] Most common causative organisms include an anaerobe or member of Enterobacteriaceae family.^[1,4] Our cases are examples of hematogenous spread and can be considered spontaneous as there was no source of infection elsewhere or any surgery.^[2]

Emphysematous osteomyelitis should be considered whenever intraosseous gas is seen, particularly in the extraaxial skeleton, but also in vertebra as 40% of cases in the series of 25 patients had vertebral involvement.^[1,3] Pyogenic osteomyelitis of spine should be considered in the differential diagnosis of patients,



Figure 1: (a) Sagittal multiplanar reformatted and (b) axial computed tomography images showing presence of intravertebral gas involving L3 vertebral body (white arrow) with extension of gas into pre and bilateral vertebral soft tissues anterior to L2 and L3 vertebral bodies (black arrows)

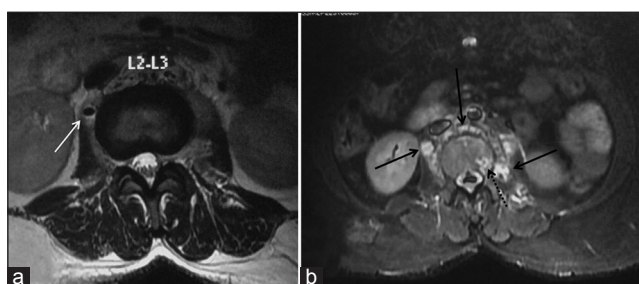


Figure 2: (a) Axial T2-weighted and (b) short tau inversion recovery (STIR) magnetic resonance images showing small air focus in right upper psoas muscle (white arrow) in axial T2-weighted image and multiple small collections in pre and bilateral paravertebral locations (black arrows) with L3 vertebral involvement (dotted black arrow) in STIR images

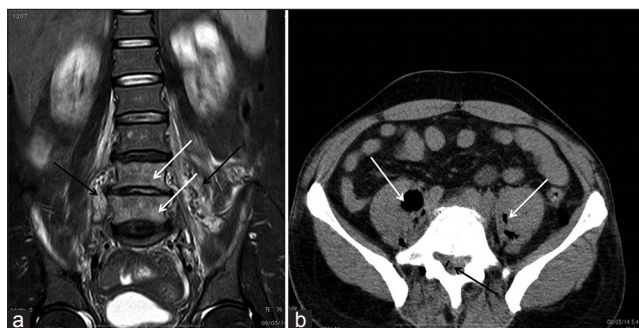


Figure 3: (a) Coronal inversion recovery magnetic resonance images showing abnormal hyperintensity of L4 and L5 vertebral bodies (white arrows) and adjacent bilateral iliopsoas muscles (black arrows). (b) Axial computed tomography image showing presence of airpockets in bilateral psoas muscle (white arrows) and intraspinal location within lower lumbar spinal canal (black arrow)

particularly with diabetes presenting with low back pain and if associated with intravertebral air, an aggressive approach of treatment is advised.^[2,5-7] Any delay in diagnosis and treatment can be associated with worsened outcome.^[2] MRI is the ideal investigation of choice for evaluating vertebral infections and the reported sensitivity and specificity are 96% and 93%, respectively.^[2,8] We could identify the causative organism from the lesion itself in one case. Blood cultures are positive

only in one-third of patients with spinal infections.^[2] Since emphysematous osteomyelitis of spine is associated with significant morbidity and mortality, aggressive management with antibiotics and surgery is indicated.^[1] Detection of intraosseous gas in vertebra on CT in diabetic patients presenting with backpain should provide a clue to early diagnosis of this condition, since plain radiographs may not pick up small amounts of intraosseous gas.

REFERENCES

1. Luey C, Tooley D, Briggs S. Emphysematous osteomyelitis: A case report and review of the literature. *Int J Infect Dis* 2012;16:e216-20.
2. Kosai K, Seki M, Yanagihara K, Imamura Y, Nakamura S, Kurihara S, et al. Spontaneous pyogenic spondylitis caused by *Klebsiella pneumoniae*. *Intern Med* 2008;47:1121-4.
3. Ram PC, Martinez S, Korobkin M, Breiman RS, Gallis HR, Harrelson JM. CT detection of intraosseous gas: A new sign of osteomyelitis. *AJR Am J Roentgenol* 1981;137:721-3.
4. Al-Wakeel J, Al-Ballaa SR, Sergani H, Abu-Aisha H, Huraib S, Mitwalli A. Non-clostridial gas-forming infections in diabetic patients. *Ann Saudi Med* 1995;15:71-3.
5. Lewin F, Visser MR, van Vroonhoven TJ, van der Werken C. Intra-osseous gas formation in osteomyelitis of vertebrae and pelvis by *Klebsiella pneumoniae*. *Ned Tijdschr Geneesk* 1999;143:1001-3.
6. Kouroussis C, Georgoulas V, Souglakos J, Simvoulakis E, Karabekios S, Samonis G. Spontaneous spondylodiscitis caused by *Klebsiella pneumoniae*. *Infection* 1999;27:368-9.
7. Chen CW, Yang CJ, Huang JJ, Chuang YC, Young C. Gas-forming vertebral osteomyelitis in diabetic patients. *Scand J Infect Dis* 1991;23:263-5.
8. Santiago Restrepo C, Giménez CR, McCarthy K. Imaging of osteomyelitis and musculoskeletal soft tissue infections: Current concepts. *Rheum Dis Clin North Am* 2003;29:89-109.

How to cite this article: Aiyappan SK, Ranga U, Veeraiyan S. Spontaneous emphysematous osteomyelitis of spine detected by computed tomography: Report of two cases. *J Craniovert Jun Spine* 2014;5:90-2.

Source of Support: Nil, **Conflict of Interest:** None declared.

Author Help: Online submission of the manuscripts

Articles can be submitted online from <http://www.journalonweb.com>. For online submission, the articles should be prepared in two files (first page file and article file). Images should be submitted separately.

1) First Page File:

Prepare the title page, covering letter, acknowledgement etc. using a word processor program. All information related to your identity should be included here. Use text/rtf/doc/pdf files. Do not zip the files.

2) Article File:

The main text of the article, beginning with the Abstract to References (including tables) should be in this file. Do not include any information (such as acknowledgement, your names in page headers etc.) in this file. Use text/rtf/doc/pdf files. Do not zip the files. Limit the file size to 1024 kb. Do not incorporate images in the file. If file size is large, graphs can be submitted separately as images, without their being incorporated in the article file. This will reduce the size of the file.

3) Images:

Submit good quality color images. Each image should be less than **4096 kb (4 MB)** in size. The size of the image can be reduced by decreasing the actual height and width of the images (keep up to about 6 inches and up to about 1800 x 1200 pixels). JPEG is the most suitable file format. The image quality should be good enough to judge the scientific value of the image. For the purpose of printing, always retain a good quality, high resolution image. This high resolution image should be sent to the editorial office at the time of sending a revised article.

4) Legends:

Legends for the figures/images should be included at the end of the article file.