

Gas Bubbles in the Bone: A Case Report

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ABSTRACT

Intraosseous pneumatocysts are benign gas-filled cavities within bones which are most commonly found in ilium, sacrum and vertebrae. The lesions are asymptomatic and found incidentally while evaluating for other injuries. Here, we present an intraosseous pneumatocyst of ilium in a 23-year-old male patient. Although once thought to be rare, intraosseous pneumatocyst are now believed to be more common. Thus, familiarity with their appearance is essential to avoid unnecessary workup. Intraosseous pneumatocysts are differentiated from more clinically significant differential diagnoses like osteonecrosis and osteomyelitis by their characteristic appearance of intraosseous air collections with sclerotic rim.

CASE REPORT

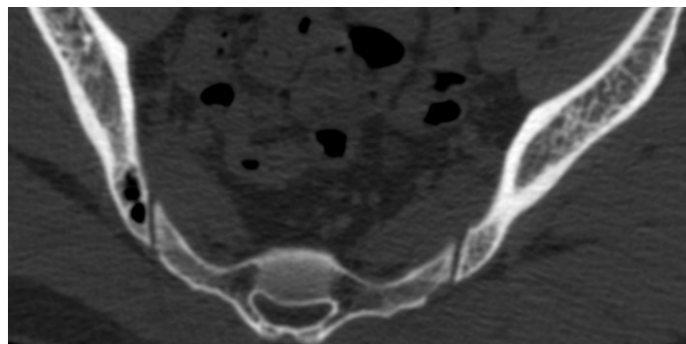
A 23-year-old male was brought in the emergency department by Emergency Medical Service (EMS) after a motor vehicle collision. He was lying on a backboard but alert and responsive. His vitals on arrival were respiratory rate of 18 breaths per minute, pulse rate of 88 beats per minute, temperature of 37.3°C, blood pressure of 122/85 mmHg and O₂ saturation of 95% in room air. We detected no superficial abrasions or bruise. He complained of posterior pelvic pain and had mild localized swelling and tenderness over the symphysis pubis on physical examination. He had normal range of motion of the both hips, without any limb shortening or rotational deformity. Other physical examination findings were unremarkable. A pelvic plain radiograph was obtained and no obvious pathology was detected [Table/Fig-1]. A pelvic Computed Tomography (CT) scan was performed to evaluate for posterior arc injuries. The CT scan revealed no fracture line or pelvic hematoma. Incidentally, a well-defined 207mm lobulated lesion was detected within the right ilium adjacent to the sacroiliac joint. The lesion contained gas densities with a mean Hounsfield number of -666 and had a thin sclerotic rim [Table/Fig-2]. There was no surrounding soft tissue swelling. The lesion was not visible on plain radiograph. The patient had no pain on the right side of pelvis and did not mention any previous history



[Table/Fig-1]: Anteroposterior pelvic radiograph depicts no abnormality.

Keywords: Ilium, Intraosseous, Pneumatocyst, Tomography

of pain or trauma except that recent one. He was followed on the outpatient service and the pain disappeared after a week. He had no complaints after 3 months of follow-up.



[Table/Fig-2]: Axial pelvic CT scan in bone window shows a well-defined lobulated gas collection with a thin sclerotic rim within the right ilium. The lesion is located adjacent to the sacroiliac joint. There is no cortical breakthrough or connection to the joint space.

DISCUSSION

Intraosseous pneumatocyst is an uncommon condition of gas accumulation within a bone that was first described in 1984 by Ramirez et al., [1]. True pneumatization is not expected in any human bone except paranasal sinuses and middle ear, and other gas collections within bone are either a variant of normal or pathologic finding [2]. The most common involved bones are ilium and sacrum near the sacroiliac joint. The lesion is benign and usually discovered while evaluating for other injuries. Although more frequent that was initially thought, the lesion is still unknown to most physicians and might cause clinical confusions [3]. The clinicians should be familiar with this condition in order not to confuse it with other considerable differential diagnoses such as osteonecrosis, osteomyelitis or post-embolization state [4].

The pathogenesis of the lesion is poorly understood [5]. They are believed to be acquired and the nature of the accumulated gas is nitrogen [2]. Some lesions are near degenerative joints and are thought to be produced by a mechanism similar to vacuum phenomenon [6,7]. In other cases, like our patient, the lesions are seen in young people and not near a degenerative joint. These are believed to be primary lesions with unknown pathogenesis [5].

Pneumatocysts are believed to be perceptible on plain radiographs as lucent areas. In our patient there was mild prominence of bowel loops and fecal materials that were proposed to mask the lesion.

Intraosseous pneumatocysts are usually single and 2-5 mm [2], while in our case the lesion was solitary but large and lobulated. Their incidence is now believed to be more than estimated, and because of being asymptomatic, they usually remain undetected [2].

It is important to appreciate the benign nature of the process, as intraosseous air might be seen in some severe conditions like osteonecrosis, osteomyelitis, post-embolization, post-operative or post-traumatic states [2,8]. CT scan is the modality of choice and the presence of gas collection within ilium or sacrum near the sacroiliac joint, with no associated soft tissue reaction suffice for diagnosis. However, air collection in uncommon regions like vertebral bodies may warrant further evaluation [2].

The lesion has no clinical significance, but familiarity with the appearance is important for clinicians to prevent unnecessary workup. No further workup, biopsy or surgical resection is required for the lesion.

CONCLUSION

Intraosseous pneumatocysts are rare gas collections within the bone that most commonly appear in ilium and sacrum near the sacroiliac joint. Although these lesions have no clinical significance, they have important differential diagnoses that should be excluded.

ACKNOWLEDGEMENTS

This research was financially supported by a grant provided by the Chancellor for Research of Mashhad University of Medical Sciences, Mashhad, Iran.

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Date of Submission: **Feb 12, 2016**

Date of Peer Review: **Apr 07, 2016**

Date of Acceptance: **Apr 30, 2016**

Date of Publishing: **Jul 01, 2016**

FINANCIAL OR OTHER COMPETING INTERESTS: As declared above.