

Simple Bone Cyst in the Body of the Lumbar Vertebra

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ABSTRACT

Simple bone cysts are usual, benign, fluid-filled, cystic lesions that often occur in the metaphysis of the long bones and are rarely detected in vertebrae. A case of a simple bone cyst in the body of the fifth lumbar vertebra in a 28-year-old woman with complaint of intermittent low back pain is described. According to the radiologic findings, the lesion was detected as a simple bone cyst, and the diagnosis was determined by imaging.

Keywords: Simple Bone Cyst; Lumbar Vertebra; Low Back Pain

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CASE PRESENTATION

An otherwise healthy 28-year-old female patient presented with a 4 month history of non-radiating lumbar pain. Her lumbar pain was intermittent and aggregated during activity without any radiating pain to extremities. No neurologic deficits or abnormal values were noted on physical examination or in laboratory data. The patient was suspected of having degenerative disk disease, so she

was referred to our radiology department for examination.

Lumbosacral MRI showed a unilocular homogeneous cyst having regular margin and measuring 10 × 8 mm in the body of L5 vertebra. The lesion was homogeneous and hyperintense on axial T2*-weighted images, and no blood degradation products were observed (Figure 1). Minimal peripheral enhancement was detected in T1-weighted images following contrast medium administration



Figure 1. Sagittal T2-weighted and T1-weighted MR images of lumbar vertebrae show the body, unilocular, and homogeneous cystic lesion of L5. Sagittal T1-weighted with contrast show minimal peripheral enhancement.

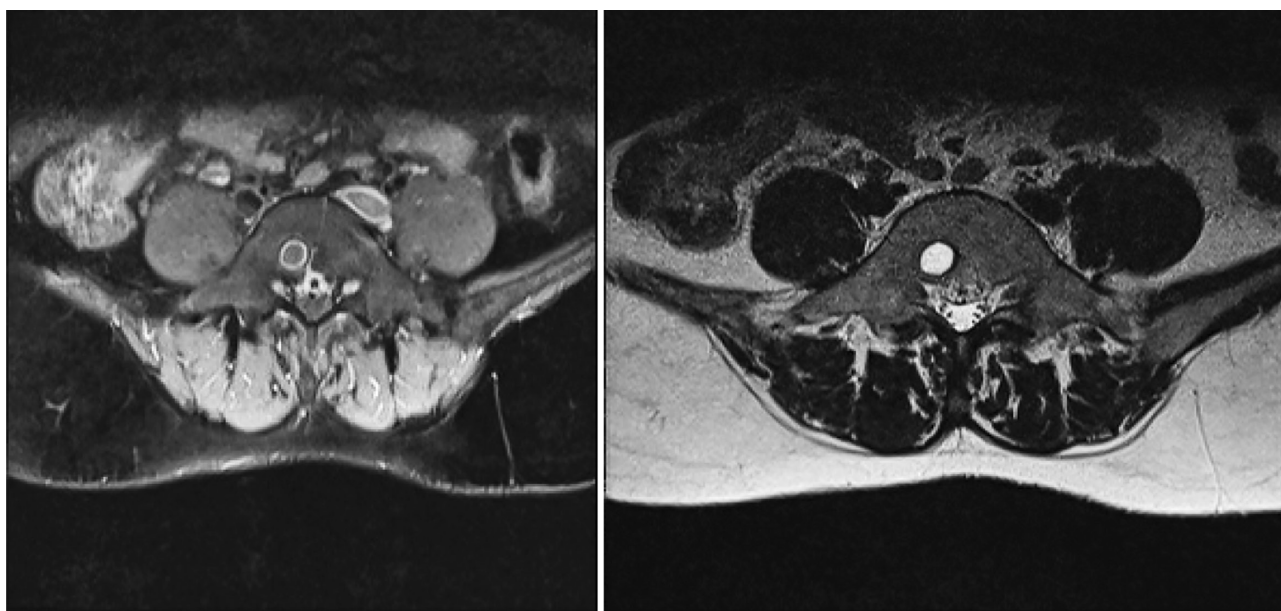


Figure 2. Axial T2*-weighted MR image of the fifth lumbar vertebra shows homogeneous and hyperintense appearance of the lesion. Axial T1-weighted with contrast show minimal peripheral enhancement.

(Figure 2). When all of the radiologic findings were evaluated, we concluded that the lesion had the typical radiologic presentation of a simple bone cyst.

DISCUSSION

Although Bloodgood first recognized simple bone cysts as a distinct disease entity in 1910, Jaffe and Lichtenstein¹ were the first to present a detailed describe of the simple vertebral bone cyst in 1942. Simple bone cysts are common, benign, fluid-filled, cystic lesions that result in minimal expansion of the bone and frequently involve the metaphysis of long bones. To date, 10 cases of simple bone cysts have been reported in the articles², and those bone cysts occur in vertebral bodies (three), spinous process (three), lamina (one), pedicle (one), both spinous processes and lamina (one), and all elements of the vertebrae (one)²⁻⁶. To our knowledge, only four were in cervical vertebrae³⁻⁶, and the remain were in lumbar vertebrae^{2,4}. We present a simple bone cyst involving the body of L5 vertebra of a 28-year-old female patient. We describe the radiologic differential diagnosis of simple vertebral bone cysts, and the surgical and histopathologic issues of the diagnosis are discussed. In our case diagnosis can be made only based on imaging findings.

The differential diagnosis of an expansile cystic lesion consisted of the posterior parts of vertebrae, such as spinous processes in children or young adults, should consisted of aneurysmal bone cyst, giant cell tumor, and

simple bone cyst⁵.

Aneurysmal bone cysts are multiloculated, expansile, hypervascular, osteolytic lesions that are filled with free-flowing blood products with fluid levels. They are usual in patients younger than 30 years, with a minimal female predilection. They may happen in all parts of the skeleton and specially involve the metaphysis of long bones^{5,7} but incidentally spine is affected, mainly cervical and thoracic areas. When aneurysmal bone cysts are identified in vertebrae, they classically occur in the posterior components, including the transverse process, spinous process, lamina, and neural arches. Often, however, they extend secondarily into the pedicles and vertebral body⁷. Roentgenographic and CT views display an osteolytic lesion that cause an expansion and thinning of the adjacent cortical bone. A soft tissue mass is often recognized. Aneurysmal bone cysts are usually identified by their lobulated and multiseptated morphology with fluid-fluid levels and blood degradation products on MR finding. The radiologic presentation of the lesion of our patient was not multiloculated and did not have fluid-fluid levels, blood degradation products, or soft tissue surrounding the lesion.

Giant cell tumors are expansile, lytic, locally invasive, primary benign bone tumors with thinning of the cortex. Most patients are between 20 and 40 years old. Giant cell tumors have been explained at the ends of long bones, typically around the knee. Giant cell tumors of the spine only responsible for 3–7% of primary bone tumors. In

the spine, the most known site of involvement is the sacrum; other vertebral parts are uncommonly affected⁷. Radiographs and nonenhanced CT images exhibit lytic lesions producing cortical thinning and expansion with a destructive sacral or vertebral mass. MR images show a multiloculated mass of heterogeneous signal intensity that frequently has blood products within⁷. In the case of our patient, because the cystic lesion was not destructive or invasive and did not have multiple compartments and had homogenous signal intensity without any blood degradation products on MR images therefore the radiologic findings were not in favor of a giant cell tumor.

Simple bone cysts are common, benign, fluid-filled, cystic lesions that cause slight expansion of the bone and happen mostly in the metaphysis of long bones. Those cysts mainly affect male patients with a ratio of 2.5:1. Most happen in children and adolescents. Simple bone cysts are recognized in the metaphysis of long tubular bones in 90–95% of cases, and 5–65% of such cysts involve the proximal humerus; 25–30%, the femur; and the rest, the proximal tibia, fibula, radius, ulna, ileum, patella, rib⁸, and calcaneus⁹.

The pathogenesis of simple bone cysts is not still clear. According to many authors, the lesions in the long bones are as a result of the developmental inadequacy of the epiphyseal plate⁴. Another theory is that venous occlusion of interstitial fluid drainage might be the cause¹⁰. Aegerter and Kirkpatrick¹¹ proposed that the cause of the simple bone cysts is post-traumatic and posthemorrhagic, except the ones in the long bones. This may be the reason why simple bone cysts happen in vertebrae in an older age group than do the cysts of long bone. Moreover, our patient was 28 years old, well over the common age for lesions in the long bones⁷.

Most of the simple bone cysts are asymptomatic, unless they come with pathologic fracture. They are recognized occasionally on radiographic evaluation. Any other prior symptoms are mild pain, local tenderness, and swelling⁵. Although roentgenography is usually adequate to detect the simple bone cyst, CT and MR imaging should be used for diagnosis of lesions in anatomically complex sites such as the vertebrae. So, we used all these three imaging techniques to make a true diagnosis. CT and MR imaging were also applied to recognize the extent of the lesions and identify possible complications such as fractures.

Roentgenography generally displays simple bone cysts as well-defined, intramedullary, metaphyseal, and pure lytic lesions. Some of them are found in diaphysis. They may result in inflation of the bone with thinning of the covering cortex. Simple bone cysts frequently result in fracture of the bone; therefore, some of these fractures may result in the movement of a fractured bone tissue into the cystic cavity. This uncommon pathognomic radiologic presentation is known as “fallen fragment sign”¹². In the case of our patient, the lesion did not cause any such pathological fracture in the bone.

Recently, to our knowledge, only 10 cases of a simple bone cyst affecting the vertebrae have been reported, with four of them identified in the cervical vertebrae. Dawson et al³. In our case L5 body as a very rare location of simple bone cyst involvement reported.

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