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Intraosseous lipomata of adjacent vertebral bodies

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Abstract Osseous lipomata of vertebral bodies are rare. We present a very unusual case where adjacent vertebrae are involved and the plain radiographic and scintigraphic appearances gave cause for some concern. The findings on plain films, scintigraphy, computed tomography and magnetic resonance imaging are discussed.

Key words Lipoma · Computed tomography · Magnetic resonance imaging · Radiography · Vertebral

Case report

A 35-year-old male patient presented to the orthopaedic outpatient department with low back pain. Plain films of the lumbosacral spine demonstrated linear sclerotic changes in the body of L2 with posterior scalloping and thinning of the pedicles of L1 and L2 (Fig. 1). Bone scintigraphy revealed striking photopenic vertebral bodies at L1 and L2 (Fig. 2), causing some concern about a possible aggressive infiltrative process. CT imaging of the area of interest through L1 and L2 vertebral bodies demonstrated increased sclerosis of the bodies with scalloping of the posterior margins and the pedicles and widening of the spinal canal. Increased soft tissue of fatty attenuation is seen in the paravertebral region, especially adjacent to the right lateral aspect of the spinous processes of L1 and L2 (Fig. 3).

MRI of the spine demonstrated homogeneous high-signal changes in the bodies and posterior elements of L1 and L2 on T1-weighted images with intermediate to high-signal changes on T2-weighted scans, with suppression of this higher signal on short tau inversion recovery sequence, confirming the fatty nature of the vertebral and soft tissue abnormalities (Fig. 4). Disc degeneration at L3/4 and L4/5 levels was identified and was eventually considered to be the cause of this patient's back pain.

Based on these imaging characteristics a diagnosis of vertebral intraosseous lipoma was made, which was confirmed by histological examination of fluoroscopically guided biopsy material.

Discussion

Osseous lipomata are rare benign lesions representing 1% of bone tumours [2]. They affect both sexes equally in a wide age range from 5–70 years [4] and are often asymptomatic, being discovered as an incidental finding. The vast majority of cases affect the metaphyses of long bones, especially the proximal femur and fibula [8]. The axial skeleton is involved less often but there are reports of lesions involving the spinous processes [6, 7], vertebral bodies [10], coccyx [4] and sacrum [3]. The true nature of osseous lipomata is disputed. It has been considered either a neoplasm or a degenerative phenomenon related to trauma, infection, or vascular compromise [9].

Fig.1 **A** Anteroposterior and **B** lateral films of the lumbar spine demonstrating scalloping of the posterior margins of the bodies and pedicles of L1 and L2 with sclerotic changes in the body of L2 (arrows)

Fig.2 Isotope bone scan demonstrating marked photopenia in L1 and L2 vertebrae

Fig.3 **A** Computed tomogram showing low-attenuation fat-density material within the vertebral body. **B** Further computed tomogram demonstrating paravertebral fat (arrow)

The characteristic appearance on plain films is that of an osteolytic lesion with a well-defined thin sclerotic border, but in smaller bones such as the ribs and fibula lesions tend to be expansile [8]. Calcification and ossification are well-recognised features of soft tissue lipomas and indicate fat necrosis. This occurs more frequently in osseous lipomata due to the pressure effects generated by an enlarging lipoma against the rigid trabecular bone [7]. Osseous lipomata may rarely have an aggressive appearance [1], with cortical destruction and periosteal reaction mentioned in one case report. CT and MRI demonstrate the fatty nature of these tumours. However, it must be borne

Fig. 4A–D MRI: **A** T1-weighted spin echo sagittal image, **B** T2-weighted spin echo sagittal image, **C** STIR sagittal image, **D** T1-weighted spin echo axial image. These images demonstrate high signal on T1-weighted images within the vertebral bodies and in the right-sided paraspinal soft tissues (*arrows*). The same regions visualised on a STIR sequence have a very low signal (*arrows*), and since this is a fat-suppression technique it characterises the lesions as consisting of fat

in mind that other bony lesions can have a marked fatty component. Bone infarction can undergo fatty necrosis although this can be distinguished from a lipoma because bony expansion, cystic change and resorption of pre-existing bone only occur in lipomata. Similarly, fat necrosis with consequent calcification within an osseous lipoma can appear similar in appearance to an enchondroma, necessitating histological examination to make the distinction. Occasionally haemangiomas and osteoporotic bone with increased fatty marrow can also be confused with lipomata, but generally distinction can be made on the imaging characteristics if CT and/or MRI are available. There is one report in the literature [5] of malignant

change in an osseous lipoma, emphasising the fact that malignant change is rare.

In the present case imaging exquisitely demonstrated the fatty nature of this tumour. Biopsy confirmed the diagnosis. To our knowledge there are no case reports of lipomata involving adjacent vertebrae, a factor which prompted a biopsy of this lesion. Earlier reports only mention single sites. Whilst CT and MRI would normally suffice in characterising such lesions, the atypical presentations of pathological phenomena mentioned above can necessitate histological evaluation in order to arrive at a definitive diagnosis and exclude the rare cases of lipomatous malignant change.

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