CASE STUDIES IN DIAGNOSTIC IMAGING  Series editor: V N Cassar-Pullicino*

Multiple painful bone cysts in a young man

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Clinical history
A 32 year old white man complaining of pain in the sacrum, lumbar, and right inguinal regions was referred to our service with an initial diagnosis of ankylosing spondylitis. Relevant medical history included removal of a mass in the neck 10 years previously, but the pathological diagnosis was not known. There was no family history of illness.

Physical examination of the neck revealed a soft, mobile, painless tumour, 5 x 3 cm in size in the left side of the neck, just below the sternocleidomastoid muscle. This tumour had been growing progressively for the previous six months. Mobility of the spine and peripheral articulations showed no abnormalities. There was no osseous tenderness. Laboratory data were not remarkable.

Radiological findings
Plain film radiographs (fig 1) showed normal sacroiliac joints, and a degenerate right hip joint with a subchondral cyst lesion with a sclerotic border, on the acetabular roof. The vertebral bodies of L1, L2, and L4 displayed increased vertical striations ('corduroy' vertebra) (fig 2). Computed tomography of the pelvis (fig 3) showed multiple intraosseous, well circumscribed lytic areas involving the ilium, sacrum, L5 vertebra, pubic rami, and femoral neck. No matrix calcification was evident. Magnetic resonance imaging of the lumbosacral spine displayed multiple vertebral body involvement predominantly, with low (T1) and high (T2) signal intensity (fig 4). Mixed signal characteristics were also noted at the L4 level. Coronal views of the right acetabulum showed high signal intensity cysts (fig 5).

Differential diagnosis
The interesting feature of this case is the presence of multiple, well defined osseous lytic lesions involving the axial skeleton. The table lists the wide range of causes of multiple osseous cysts,1,3 which we have divided into two groups according to their frequency of occurrence.

Among the ‘common causes’ of multiple lucent lesions are multiple myeloma and osseous metastasis. These two diseases produce involvement of the flat bones such as the pelvis with a well defined profile, but without reactional...
Multiple painful bone cysts in a young man

Figure 3 Computed tomography of the pelvis, showing multiple bone lesions affecting ilium, sacrum, L5 vertebra, pubic rami, and femoral neck.

Figure 4 Low (T1, left) and high (T2, right) signal characteristics of lumbar vertebral lesions seen on magnetic resonance imaging.

Figure 5 High signal intensity of multiple iliac cysts on T2 weighted magnetic resonance imaging scan in the parasagittal plane.

Multiple painful bone cysts in a young man

Figure 6 Computed tomography of the lumbar spine, showing multiple bone lesions affecting vertebral bodies, ribs, and long bones.

Differential diagnosis of multiple lytic bone lesions

Common causes
- Multiple myeloma
- Metastasis
- Lymphoma
- Amyloidosis

Less frequent causes
- Histiocytosis X
- Gaucher's disease
- Fibrous dysplasia
- Enchondromatosis
- Diffuse cystic angiomatosis

Diagnosis

Cervical computed tomography revealed a homogenous left sided solid tumour in the soft tissues, near to vascular elements (fig 6). This was removed surgically, and a well capsulated, multiloculate mass with a cystic appearance and a milky content was found. Histologically (fig 7), there were numerous empty spaces, lined with smooth endothelium, that stained positively with factor VIII associated antigen.
The anatomopathological diagnosis was lymphangioma.

Some months later, a bone biopsy specimen obtained from the right ilium (fig 8) revealed the existence of multiple osseous cysts, some with a lymphatic content, surrounded by a layer of flat endothelial cells that stained positively with factor VIII associated antigen. The final diagnosis was diffuse cystic angiomatosis. Computed tomography of the abdomen searching for visceral foci of disease displayed several hypodense images in the spleen, suggestive of angiomas (fig 9).

Discussion

Cystic angiomatosis is a rare pathological entity of vascular origin that is characterised by osseous lesions frequently combined with angiomatous involvement of the viscera and soft tissue. The aetiology is unknown; it could be a true neoplasm or, as the majority of authors believe, a congenital malformation: a vascular hamartoma. It is more common in men, with half of the cases appearing at puberty, and most of them revealed coincidentally during radiological examination. Up to 1984, the number of published cases of diffuse angiomatosis had not exceeded 100.

Histologically, angiomatosis consists of multiple dilated vascular canals, of cystic appearance and with walls lined with a layer of flat endothelial cells. The cysts may contain blood or a proteinaceous fluid, which often makes it impossible to determine if the dilated canals are related to a haemangioma or a lymphangioma; patients may in reality have a lymphangiomatous lesion at one site, and a typical haemangiomma at another. Because of this, the name ‘cystic angiomatosis’ is preferable.

In the soft tissues, the angiomas are usually located in the neck or axillary regions. Visceral involvement, usually of the lung, and less frequently the spleen, liver, or mediastinum, reaches 60–70% in all cases. The condition carries a variable prognosis; some cases produce death in infancy. Osseous lesions produce symptoms when a pathological fracture occurs, but, as in the patient reported here, osseous pain may exist without fracture, mimicking arthropathy, and rheumatologists may be left to deal with the problem. When the condition is confined to the skeleton, the prognosis is good, as the lesions tend to remain static. Soft tissue and visceral involvement such
as occurred in this patient are associated with a more serious outcome.

Radiological changes appear in the pelvis, femora, skull, and ribs; the humerus, scapulas, clavicles, and spine are frequently also affected, but the hands and feet rarely so. Radiologically, the multiple osseous areas in the bone have well defined edges and are surrounded by a sclerotic ring with a honeycomb appearance. The intramedullary 'cysts' are round or oval, and the cortex may appear expanded without breaking unless a pathological fracture occurs. Periostitis is not frequent.

Angiomas are variable in appearance on magnetic resonance imaging. On T1 weighted images, the signal intensity varies from low to high, depending on the amount of adipose tissue present and the predominant tissue components—haemangioma or lymphangioma. T2 weighted images usually show areas of very high intensity corresponding to the vascular or fluid components. In the patient we describe, and in another recent report, the magnetic resonance signal characteristics differed somewhat from those of vertebral haemangiomas, with which high signal intensity is seen on both T1 and T2 weighted sequences.

Summary
To confirm the diagnosis of diffuse cystic angiomatosis, it is necessary to biopsy the bone: the walls of the cysts react to immunological markers of the endothelium (antigens related to factor VIII and CD31). Alternatively, lymphography can avoid the necessity for biopsy. Evolution of the condition is variable and depends on the extent of visceral involvement, and usually the extent of soft tissue and visceral involvement dictates the morbidity and mortality. There is no specific treatment, though osseous lesions can regress spontaneously.

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