"Chronic ossified subperiosteal hematoma of the iliac bone"

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LETTER / *Musculoskeletal imaging*

Chronic ossified subperiosteal hematoma of the iliac bone

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Subperiosteal hematoma (SPH) is a rare post-traumatic condition, mainly affecting skull, tibia [1] or iliac bone [2]. In its chronic form, the SPH has been described as a lens-shaped ossified lesion with smooth edges [2].

When it is localized on the iliac bone, SPH can go unnoticed after initial trauma and be fortuitously found on pelvic CT or bone scintigraphy.

Case report

A 42-year old woman presented with a 12-month history of mechanical back pain. Her only medical history was a low-speed car accident complicated with clavicle fracture 10 years ago. The clinical examination did not show any deficit or lumbar radiculopathy. Radiographs of the lumbar spine and the pelvis were performed (Fig. 1) and showed a large lens-shaped lytic lesion of the left iliac bone, with peripheral osteosclerosis and heterogenous center, without periosteal reaction. CT (Fig. 2) showed an ovoid hypodense area, centered on the inner table of the left iliac bone, with smooth edges. This area was surrounded by a peripheral lens-shaped sclerosis. Its inner border shifted the left iliacus muscle medially. Its outer border separated the central matrix of the lesion from the trabecular bone, thus forming a ''ghost native cortex'' [2]. MRI was performed (Fig. 3). The center of the lesion was heterogeneously hyperintense on STIR and intermediate on the T1-weighted sequence. The peripheral rim had low signal intensity on T1-weighted and T2-weighted sequences. The bone marrow showed normal signal characteristics. There was no edema in the surrounding tissue and bone. These features were compatible with a non-aggressive lesion and no contrast injection was done. Tc99 m scintigraphy with SPECT/CT was performed to look for other localizations (Fig. 4). Both showed a unique circular fixation on the left iliac bone (''doughnut sign''). Despite the non-aggressive pattern, a fine-needle aspiration cytology was performed and showed inflammatory and hemorrhagic liquid with no malignant tissue.

Diagnosis of SPH was established, although this did not account for the initial symptoms. Additional exploration of the spine concluded that back pain was due to osteoarthrosis of the L4-L5 facet joints.

Discussion

SPH occurs in children and young adults [2], and is mainly caused by blunt trauma.

The underlying physiopathological mechanism involves loose attachment of periosteum to the bone in young

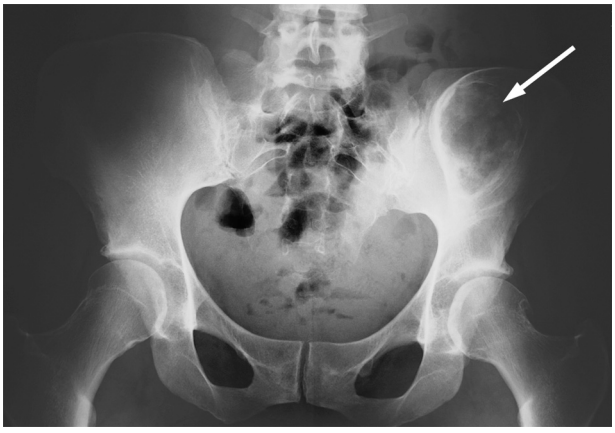

Figure 1. Pelvis radiograph showing large lens-shaped ossification on projection of the left iliac bone (arrow).

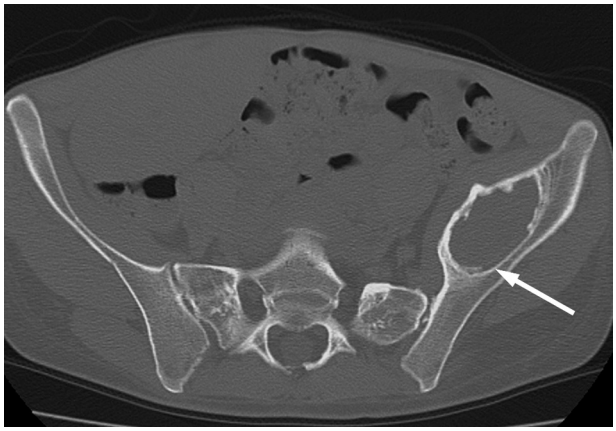

Figure 2. Pelvis CT shows lens-shaped hypodensity of the inner table of the left iliac bone. Line of ghost native cortex is seen (arrow).

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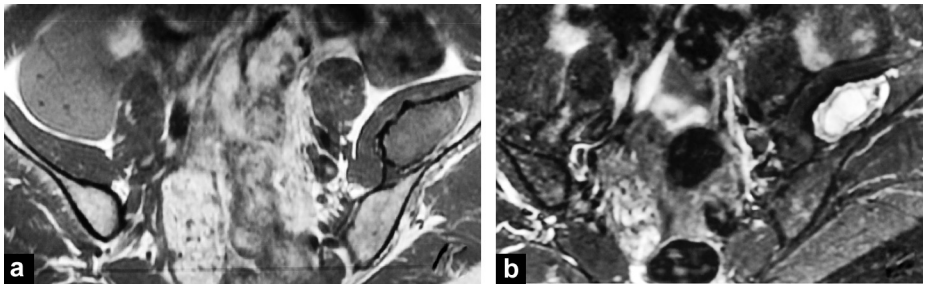

Figure 3. Pelvis MRI shows subperiosteal lesion of intermediate signal on T1-weighted sequence (a) and high heterogenous signal on T2-weighted sequence (b).

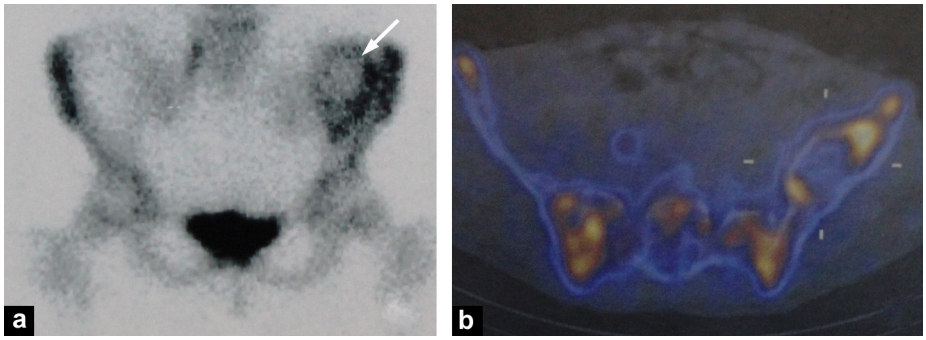

Figure 4. Bone scintigraphy (a) shows a peripheral rim of scintigraphic fixation surrounding a clear center (''doughnut sign'', arrow). SPECT-CT (b) shows similar features with peripheral activity and central lucency.

patients leading to vascular detachment during traumatic movements (e.g. gymnastics, horse riding, high jump) [2]. In the acute phase, the diagnosis is suggested by a recent trauma and/or pain, and the treatment is often conservative [3]. The acute hematoma can evolve towards complete recovery, but also towards ossification in an unknown proportion [2].

Subperiosteal localization should be evoked in case of an eccentric and lens-shaped lesion that shifts the surrounding muscles. SPH shares several criteria with non-aggressive tumors: no soft tissue or bone marrow invasion; no periostitis; no pain upon clinical examination; no peritumoral edema on MRI [2,4]. The ''ghost native cortex'' sign has recently been described and could help confirm the diagnosis. It is defined as the presence of a dense line between the lesion and the residual bone marrow, and has never been reported in other bone lesions [2]. Central blood shows MRI features of a chronic, liquefied hematoma with high intensity signal on T2-weighted sequences and intermediate signal on T1-weighted sequences. On scintigraphy, SPH usually appears as a ''doughnut sign'' although this sign has no specificity and has been described for other bone lesions (e.g. giant cell tumors, skull and visceral metastasis) [1]. At last, incidental discovery of the lesion could itself evoke a SPH [2].

SPH may mimic several other lesions. First, aneurysmal bone cyst has different characteristics: it is highly osteolytic, grows rapidly, and is associated with fluid-fluid levels on MRI. Second, simple bone cysts more often involve the proximal femur (21%) than the iliac bone (7%) and are located centrally rather than peripherally [5]. The ''ghost native cortex'' sign could be of use to differentiate SPH from a bone cyst [2]. However, the radiological findings of these two entities remain similar. Third, monostotic form of bone dysplasia often has a ground-glass matrix [5] in contrast to SPH.

In conclusion, SPH of the iliac bone is an often asymptomatic condition and its typical form should be recognized with radiological studies in order to avoid unnecessary invasive explorations.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

References

[1] Mandell GA, Harcke HT. Subperiosteal hematoma. Another scintigraphic ''doughnut''. Clin Nucl Med 1986;11(1):35—7.
[2] Guillin R, Moser T, Koob M, Khoury V, Chapuis M, Ropars M, et al. Subperiosteal hematoma of the iliac bone: imaging features of acute and chronic stages with emphasis on pathophysiology. Skeletal Radiol 2012;41(6):667—75.
[3] Herrera-Soto JA, Crawford AH, Loveless EA. Ossifying subperiosteal hematoma associated with neurofibromatosis type 1. Diagnostic hesitation: a case report and literature review. J Pediatr Orthop B 2005;14(1):51—4.
[4] Cronin ML, Tudor TH. Bone tumors and tumor-like conditions of bone. Appl Radiol 2012;41(10):6—15.
[5] Bloem JL, Reidsma II. Bone and soft tissue tumors of hip and pelvis. Eur J Radiol 2012;81(12):3793—801.

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