Case report 553

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Radiographic studies

Fig. 1A, B. Anteroposterior and lateral views of the right femur show a well circumscribed, partially lucent soft tissue mass with large areas of mineralization and what appears to be a periosteal spur (arrow).

Fig. 2. An axial CT scan through the right lower extremity confirms the presence of a multilobulated, low attenuation, parosteal mass with several areas of mineralization, one of which abuts on the periosteum.

Fig. 3. On MRI, the mass surrounds but does not invade bone. By this technique, the mineralized cortical bone is of low signal intensity, whereas marrow fat and lipoma exhibit high signal intensity.

Clinical information

This 32-year-old man presented with a slowly enlarging painless mass in the right thigh. According to the patient, the mass had been present since the age of 12 years, but had recently increased in size, making it difficult for him to dress. Physical examination revealed a large mass in the medial soft tissues of the thigh located just proximal to the knee. The mass was firm, nontender, and was unassociated with any peripheral neurological deficit. CT- and MRI-scans were performed prior to surgical excision. The diagnoses being considered were an osteochondroma with an overlying lipoma and a parosteal lipoma.

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Diagnosis: Parosteal ossifying lipoma of femur

The surgical specimen consisted of a multilobulated mass of adipose tissue measuring 18 x 13 x 8.5 cm, covered by a delicate fibrous membrane. On cut section, the bony areas noted on the radiographic studies were easily identified, including the osteocartilaginous point of attachment (Fig. 4). By light microscopy, this attachment site was composed of mature hyaline cartilage with endochondral ossification that extended into the main body of the soft tissue mass (Fig. 5). Examination of the more peripheral bony areas revealed numerous spicules of mature and maturing cancellous bone, surrounded by mature adipose tissue (Fig. 6). Also present, but less frequently observed in the body of the tumor, were nodules of metaplastic cartilage undergoing enchondral ossification. In areas of active change, apparent transition zones from fat to cartilage and fat to bone were identified (Fig. 7). The radiographic lucent zones were composed exclusively of mature adipose tissue traversed by fibrovascular septa (Fig. 8).

Discussion

Parosteal lipomas are rare, benign tumors of mature adipose tissue which, as the name suggests, are found in direct apposition to bone. On occasion, these tumors are associated with reactive changes in the underlying bone.

In his review of 32 cases of parosteal lipomas culled from the world literature from 1918 to 1962, Fleming found that 16 of these lesions were associated with bone changes [3]. These included five cases of osseous bowing or cortical erosion and eleven cases of overproduction of bone, including nine with formation of osseous projections. Kenin was the first in the English literature to report a bony pedicle at the base of a parosteal lipoma [5]. Histologically the pedicle was composed of sclerotic bone trabeculae surrounded by mature adipose tissue. Fleming supplied an additional case from his own material when he reported a 9 x 17 cm parosteal lipoma of the thigh which was firmly adherent to a 2.5 x 7 cm plateau of reactive new bone.

Since Fleming's excellent review, only four cases of bony excrescences in association with parosteal lipoma have been reported [1, 4, 9]. In the three on whom clinical and pathological data were available, all the lipomas were relatively large, all occurred in the extremities of middle aged patients, and all had a long history of slow growth. Two of these, as in the current case, contained foci of cartilaginous as well as osseous differentiation, thus mimicking a benign exostosis or osteochondroma [1, 4] (Table 1).

The radiographic features of this lesion are characteristic: a well circumscribed, radiolucent mass around a bony excrescence which clearly arises from the underlying cortex. CT scans that have been performed in three cases, including our own [1, 9], confirm the parosteal location of a fatty mass and clearly demonstrate the reactive bone formation. The appearance of this lesion on MRI, which has not previously been reported, is as expected and again shows the close relationship of the tumor to bone. The specificity of MRI in the diagnosis of lipomas, however, must be qualified; as old hematoma may exhibit a similar signal intensity [2]. Thus, the CT scan remains easier to interpret and is probably of greater assistance in the evaluation of this kind of lesion.

As has been noted, the pathological features of these pedicles are variable and may or may not include cartilage. In those cases where cartilage was not present, the production of bone has been presumed to be a reactive or metaplastic process. The presence of cartilage in conjunction with bone, however, has raised the question of perhaps two coexisting lesions – a lipoma and an osteochondroma. In the only previous report with an illustration of the osteocartilaginous changes between parent bone and the parosteal lipoma, fat is seen adjacent to a cartilage cap which overlies bony trabeculae. This histological pattern is consistent with the usual osteochondroma. In our case, however, it was cartilage which was in direct apposition to cortical bone and ossification proceeded away from the medullary cavity. Close scrutiny of the CT scan, in fact, discloses this thin rim of cartilage between the cortex of the femur and the mineralized bone within the lipoma (Fig. 2). Additional support exists for the contention that these osteocartilaginous changes are indeed reactive rather than an indication of a preexisting osteochondroma. This support consists of the lack of continuity between the medullary cavity of the parent bone and the bone of the exostosis, which in a true osteochondroma can be demonstrated by CT scan. None of the cases investigated by CT [1, 9], including those presented by Demos et al. [1], has shown such a communication, despite claims by these authors that the parosteal lipoma was overlying an enlarging osteochondroma. Rather, in both cases the CT clearly shows contiguity between cortical bone and the reactive bone within the parosteal lipoma.

In the present case, the osteocartilaginous