Lipoma of Bone

44

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44.1 Definition

- A rare benign intraosseous neoplasm constituted of adipose cells, which can also arise on the surface of bone.

44.2 Etiology

- Unknown

44.3 Epidemiology

- Less than 0.1% of primary bone neoplasms; 15% of them are surface tumors.
- Can be seen at any age, but its main incidence is in the fifth decade of life.
- There is a slight male predominance (4:3).

44.4 Sites of Involvement

- Most cases occur in the calcaneus or in the metaphysis of long bones, especially the proximal femur (Figs. 44.1, 44.2, 44.3, and 44.4).
- Flat bones are occasionally affected.
- Surface tumors may be seen over the diaphysis of long tubular bones of the extremities (Fig. 44.5).

44.5 Clinical Symptoms and Signs

- Lipomas are mostly asymptomatic but may present local aching pain and/or the presence of a mass.
- Pathological fracture is rare.

44.6 Imaging Features

44.6.1 Radiographic Features (Figs. 44.1, 44.2, 44.3, and 44.4)

- Radiographs show a lucent, usually well-defined intramedullary lesion, with or without some trabeculation and a thin marginal sclerosis.
- Expansion of the bone is slight and infrequent, except in small or thin bones.
- Parosteal lesions may produce a solid periosteal reaction.
- Dense foci of calcification may be seen in a third of the cases and more frequently in the os calcis, where it is characteristically centrally located (Fig. 44.3).

44.6.2 CT and MRI Features

- The tumor shows features similar to subcutaneous fat and may demonstrate the presence of intralesional cysts.
- MRI presents high-intensity signal on T1- and T2-weighted images and low signal on STIR or fat-suppressed T2-weighted sequences.

44.7 Imaging Differential Diagnosis

44.7.1 Chondromyxoid Fibroma

- The lesion may expand to soft parts, where it shows a thin mineralized shell of reactive bone.
- MRI shows heterogeneous, predominantly high-intensity signal on T2-weighted images.

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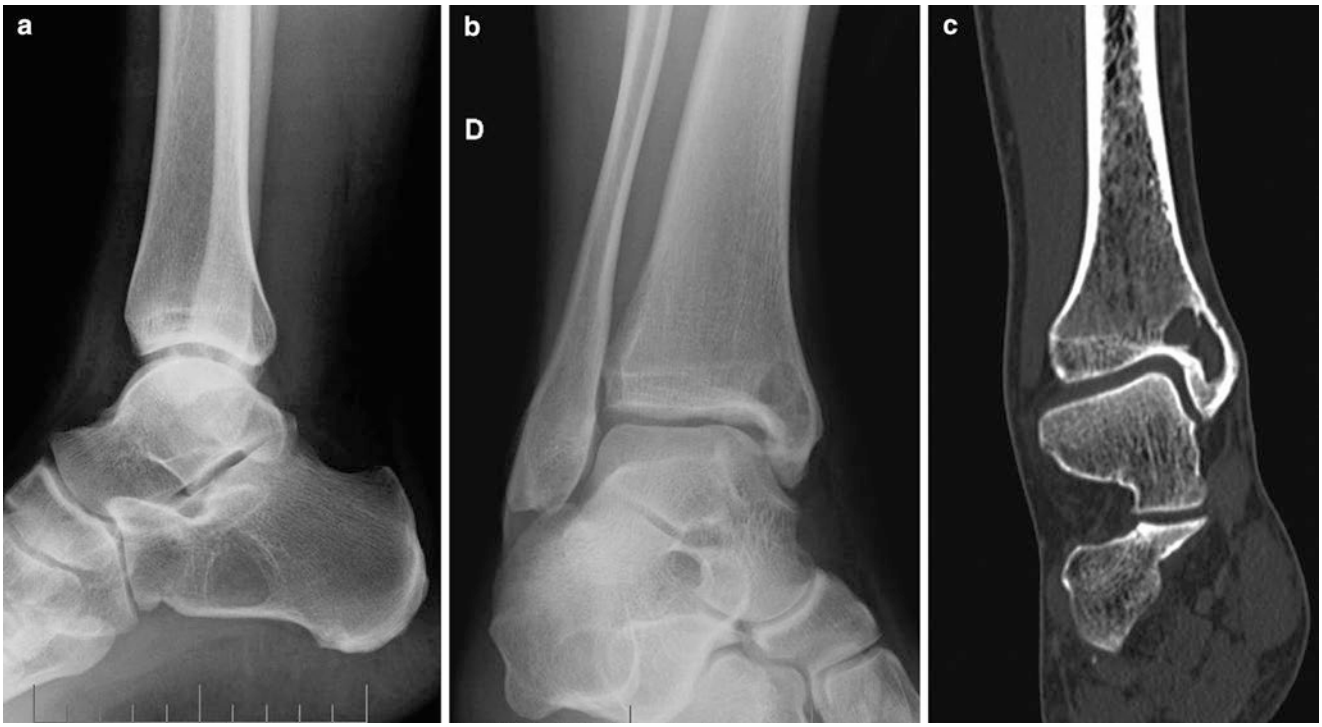

Fig. 44.1 Radiograph and CT of a case of multiple lipomas, in a characteristic calcaneal location (**a**, **b**) and in the lower tibia (**b**, **c**)

44.7.2 Bone Infarct

- Calcifications have a different pattern, the so-called chimney smoke pattern.

44.7.3 Enchondroma

- Calcifications also have a different, more scattered, pattern.
- MRI shows low- to intermediate-intensity signal on T1-weighted images.

44.7.4 Osteochondroma

- May be difficult to distinguish from parosteal lipoma on radiographs.
- CT and MRI will show an absence of cortical and medullary continuity, besides evidence of the lesion's fatty nature.

44.7.5 Simple Bone Cyst

- It may mimic lipoma on radiographs, if calcification is not present.

44.7.6 Liposclerosing Myxofibrous Tumor

- When in the inter-trochanteric area of the femur, intraosseous lipoma may participate in the genesis of this controversial lesion—at least in some cases.

44.7.7 Osteoporosis

- It may present areas devoid of bone trabeculae that can be confused with a lipoma if no clear limits can be discerned.

44.8 Pathology

44.8.1 Gross Features (Fig. 44.5)

- The cut surface shows a well-defined, yellow, and soft lesion, with a marginal sclerosis. It usually measures less than 5 cm in diameter.
- Parosteal tumors may be large, up to 10 cm in diameter.
- Dense, mineralized foci may be found inside the tumor in older lesions.

Fig. 44.2 (**a**) Radiograph of a lipoma in the proximal end of the fibula, with some central areas of calcification. (**b**) Multiplanar reconstruction (MPR) CT of the same case (coronal view). (**c**) MRI T1-weighted image, coronal view. Lesion signal intensity is similar to normal adipose bone marrow. (**d**) MRI proton-density (PD) fat-saturated image, coronal view. The lesion presents the same signal as normal adipose bone marrow

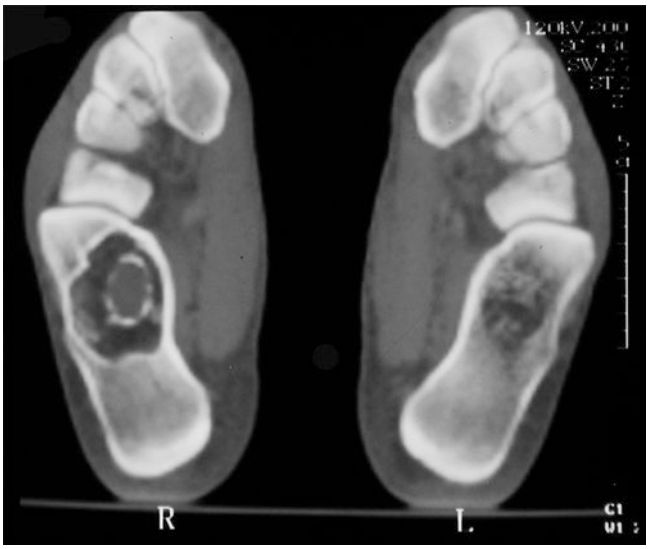

Fig. 44.3 Bilateral calcaneal lipomas with central mineral calcifications, a common finding

44.8.2 Histological Features

- Lipomas consist of lobules of well-differentiated adipocytes that may surround small bone trabeculae.
- Brown fat areas may be seen rarely.
- Fat necrosis and/or cyst formation may occur, along with foamy macrophages and fibrosis.
- Central areas of amorphous calcification may be present, more characteristically in the os calcis (Fig. 44.3).
- Ossifying lipomas present a more abundant and diffuse bony trabeculation.
- Parosteal lipomas consist of white fat with a periosteal cover (Fig. 44.4). Hyaline cartilage with endochondral ossification or reactive bone formation may be found at the tumor limit with the bone cortex.

44.9 Pathologic Differential Diagnosis

44.9.1 Normal Fat Marrow

- Lipoma presents pushing borders (which may be easily overlooked) and only scarce or no bone trabeculae.

Fig. 44.4 T1-weighted MRI (**a**) and macrophotography (**b**) of a parosteal lipoma

44.10 Genetics

- The same translocation t(3;12)(q28;q14) and fusion transcript *HMGA2-LPP* seen in soft-tissue lipoma has been identified in parosteal lipoma.

44.11 Prognosis

- Excellent; no metastatic potential.
- Complete excision is curative.
- Curettage or incomplete resection may rarely result in recurrence.

44.12 Treatment

- Marginal resection or curettage is curative.
- Non-evolutive or regressive tumors may not deserve treatment.

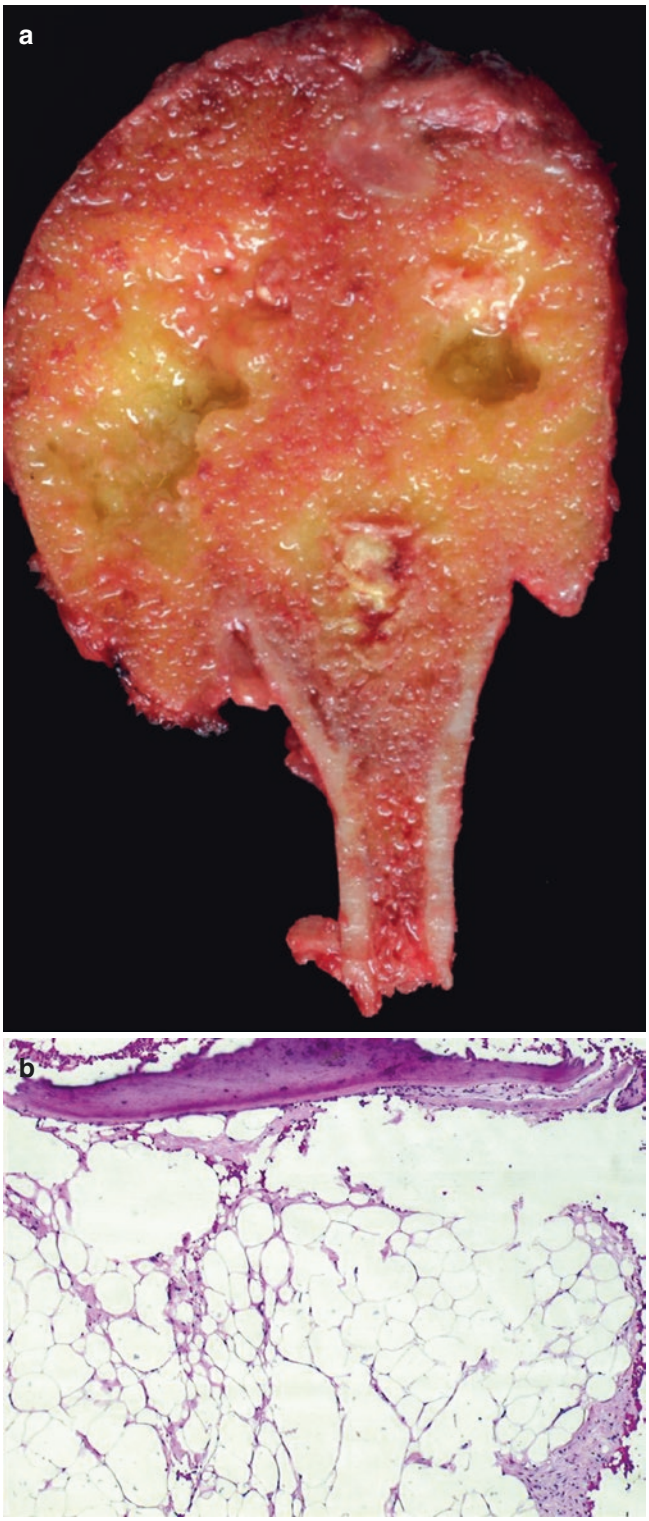

Fig. 44.5 Specimen cut surface with characteristic yellowish color (**a**). Microphotography of a surface lipoma. The histology is the same as for classic lipomas of soft parts (**b**)

Suggested Reading

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