**Summary:** Parosteal lipoma is a rare tumor, accounting for approximately 0.3% of all lipomas. Bony lesions are often found in patients with this tumor (59.2%), making the differential diagnosis of malignant tumors important. Our case was a 64-year-old male patient who complained of a 25 × 15-cm mass on his right thigh that had grown rapidly over a 2-month period. On magnetic resonance imaging, a high-intensity lesion was observed on the surface of the femur beneath the vastus medialis muscle on T1 and T2 images, with low intensity on a T1 fat suppression image. No significant bony changes were detected. During total tumor resection, the tumor was found on the femur with tight continuity, with tiny areas of spiculation palpable on the bone surface. The exact tumor size was 18 × 13 × 6 cm. The pathological diagnosis was lipoma, the same result as in the former open biopsy. This case was the largest parosteal lipoma of the femur reported without periosteal changes. In cases of deep parosteal lipomas, the detection of rapidly progressive and growing pseudotumors with ossification or chondromatous changes implies malignancy. A preoperative biopsy is mandatory and must be followed by careful planning and preparation for handling in malignant cases. Plastic surgeons should therefore keep the diagnosis of parosteal lipoma in mind to provide appropriate (not too much or too little) surgical treatment.

**CASE REPORT**

A 64-year-old man complained of a 25 × 15-cm large mass on his right thigh that had grown rapidly over the last 2 months (Fig. 1).

The mass was elastic and firm, with a round shape and smooth margin. It exhibited decreased mobility in the deep tissue, whereas no adhesion with the skin was seen. The patient had no relevant history, such as trauma of the affected limb.

A large clear, lucent lesion was noted on the x-ray image. On the magnetic resonance imaging (MRI), a high-intensity lesion was observed on the surface of the femur beneath the vastus medialis muscle on T1 and T2 images, with low intensity on a T1 fat suppression image (Fig. 2). No significant bony changes were detected. During total tumor resection, the tumor was found on the femur with tight continuity, with tiny areas of spiculation palpable on the bone surface. The exact tumor size was 18 × 13 × 6 cm. The pathological diagnosis was lipoma, the same result as in the former open biopsy. This case was the largest parosteal lipoma of the femur reported without periosteal changes. In cases of deep parosteal lipomas, the detection of rapidly progressive and growing pseudotumors with ossification or chondromatous changes implies malignancy. A preoperative biopsy is mandatory and must be followed by careful planning and preparation for handling in malignant cases. Plastic surgeons should therefore keep the diagnosis of parosteal lipoma in mind to provide appropriate (not too much or too little) surgical treatment.

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cant bony changes were detected. Based on these findings and the patient’s present illness, a diagnosis of malignancy, such as liposarcoma, was considered.

An open biopsy was first performed under local anesthesia. The results showed lipoma without malignancy, although we included liposarcoma as a possible differential diagnosis.

Total tumor resection was performed 3 weeks later. Tumor was found to be located on the femur with tight continuity, with tiny areas of spiculation palpable on the bone surface. The exact size of the tumor was $18 \times 13 \times 6$ cm. The patient experienced neither motor paralysis nor major sensory disturbances, except for a small area of dysesthesia on the upper patella, after the surgery.

Six months later, the dysesthesia had completely disappeared, with restoration of the patient’s senses, allowing him to return to work.

**DISCUSSION**

The condition “periosteal lipoma,” first described by Seering in 1836, is strictly defined as a lipoma originating from the periosteum. “Parosteal lipomas,” as described by Power in 1888, refers to lesions adjacent to the bone but not necessarily arising from it. This term is suitable for these lesions, which are not easily definitively diagnosed. According to the World Health Organization definition, lipoma of the bone is a benign neoplasm of adipocytes that arises within the medullary cavity or cortex or on the surface of bone. As parosteal lipoma is included in this “surface of bone” category, it should originate from the periosteum in principle.

Parosteal lipoma is a rare tumor. The incidence of parosteal lipoma was reported to be 0.3% of all lipomas in 1887, and Rosenberg documented that lipoma of the bone accounts for less than 0.1% of all primary bone tumors. These lesions are mostly found on the diaphyses of long bones in middle-aged men and women. In addition, these tumors are well known to be associated with blister-
ing periosteal changes mimicking malignancy; such changes are detected in approximately two thirds of cases of parosteal lipoma.³

The 200 cases reported in the English literature since 1888 indicate that the periosteum of almost all the bones in the body may be affected, although lesions in the femur tend to be larger than those at other sites. In our opinion, there are differences between lesions arising from periosteum covered with thick organs, such as muscles and/or adipose tissue, and those arising from periosteum without this feature. In recent years, deep parosteal lipomas have become more frequent and larger in size, which can be easily diagnosed on MRI; such cases require additional care regarding the potential for malignancy. In contrast, superficial tumors are often found early with a small size. It is possible to misdiagnose these tumors as normal lipomas, especially those without periosteal reactions, while normal lipomas may also be diagnosed as parosteal lipomas. This is because there is currently no reliable method to obtain a definitive diagnosis of parosteal lipoma.

Under these circumstances, x-ray, computed tomography, and MRI are useful for diagnosis. MRI is most valuable for assessing morphological findings showing the lipoma to be derived from the periosteum or tissue adjacent to the bone.

Treatment involves simply surgical excision, and no cases of recurrence have been reported.⁶ However, it is not easy to provide simple treatment in many cases due to the presence of periosteal reactions. In particular, in cases of deep parosteal lipomas, the detection of rapidly progressive and growing pseudo-tumors with ossification or chondromatous changes implies malignancy. As a matter of course, a preoperative biopsy is mandatory and must be followed by careful planning and preparation for handling in malignant cases. Plastic surgeons should therefore keep the diagnosis of parosteal lipoma in mind to provide appropriate (not too much or too little) surgical treatment.

We identified 9 cases of parosteal lipoma of the femur, in which the size of the lesion was greater than 15 cm, in the English literature using PubMed (Table 1). Types 1 and 4² are even more rare, not only in the femur but also in other tissues.² The current case is the largest parosteal lipoma of the femur without periosteal changes (type 1).²,³,⁵,⁷,⁸,⁹,¹⁰

Miller et al² suggested that type 1 parosteal lipomas are not related to other types of lipomas in terms of origin. In the present case, tiny areas of spiculation were only palpable on the surface of the femur, although this finding was due to the physical reactions of the large tumor. This case provides collateral evidence of the different origins of each type of parosteal lipoma.

**CONCLUSIONS**

We reported one of the largest and most rapidly growing parosteal lipomas recorded to date. As there is currently no method for confirming the diagnosis preoperatively, the possibility of a malignant tumor, such as liposarcoma or malignant fibrous histiocytoma, should not be ignored, and careful follow-up must be provided after surgery. In order to provide appropriate surgical treatment, parosteal lipoma should be included in the differential diagnosis of soft tissue tumors.

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