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journal homepage: [www.casereports.com](http://www.casereports.com)Parosteal lipoma of humerus—A rare case<sup>☆</sup>

Rohan Jagat Chaudhary\*, Vandana Dube, Chirag Bhansali, Amit Gupta, Sachin Balwantkar

Department of Surgery, Sassoon Hospital, Pune, India

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## ABSTRACT

**INTRODUCTION:** Parosteal lipoma is an extremely rare benign tumor composed mainly of mature adipose tissue with a bony component.

**PRESENTATION OF CASE:** This study reports the case of a 65-year old woman with a big mass on the posteromedial aspect of the right upper arm since 1 year. The swelling was a slow growing, painless, nontender, immobile mass which was not fixed to skin. She had no complaints of painful or restricted movements of the shoulder joint. She had no history of trauma to the upper limb.

MRI revealed a large 13 cm × 5 cm × 8 cm well defined, nonenhancing, lobulated, heterointense, predominantly fat intensity lesion with a small area of chondroid component measuring 2 cm × 1.6 cm in posteromedial aspect of proximal right humerus, seen completely separate from the adjacent muscles.

**DISCUSSION:** The patient underwent surgery under general anesthesia. Vertical elliptical incision was taken over the posterior border of the upper arm over the mass. The tumor was below the lower part of deltoid near the upper end of humerus, which formed the roof, and between the long and medial heads of triceps muscles. A part of tumor, measuring 6 cm × 5 cm × 5 cm, was under the long head of triceps displacing it along with radial nerve and vessels medially while the other part, measuring 7 cm × 6 cm × 3 cm, was under the medial head of triceps displacing it laterally. The tumor was excised undocking its periosteal attachment. The specimen weighed 250 g. On histopathology, the lesion was composed of mature lipocytes that had an intimate relationship with the periosteum. No cellular atypia or lipoblasts were seen.

**CONCLUSION:** Parosteal lipomas are rare neoplasias with no proven malignant potential. These tumors can be resected without much damage to the adjacent structures, thus preserving the function of the upper limb.

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## 1. Introduction

Parosteal lipoma is an extremely rare benign tumor composed mainly of mature adipose tissue with a bony component. It is among the rarest neoplasias of skeleton, accounting for less than 0.1% of primary bone tumors and 0.3% of all lipomas.<sup>1</sup> The most common locations for this tumor are the femur, proximal radius, humerus, tibia, clavicle and pelvis. It affects, almost exclusively, adults over 40 years, of either sex.

Parosteal lipoma is situated directly on the cortex of bone. Thought to arise from mesenchymal cells in the periosteum, parosteal lipomas share histopathologic features with the commonly occurring soft-tissue lipomas, and cytogenetic evidence suggests a common histopathogenesis. Depending on the degree

of chondroid modulation and enchondral ossification, parosteal lipomas may rest directly on the cortex without cartilage or bone elements; may have a narrow bony stalk with a lucent lipomatous cap, mimicking a pedunculated exostosis; may have a densely ossified broad-based osteochondromatous element beneath a thin lipomatous cap, simulating a sessile exostosis; or may have patches of chondroid and bone scattered throughout the lipomatous mass.<sup>1</sup>

## 2. Case report

This study reports the case of a 65-year old woman with a big mass on the posteromedial aspect of the right upper arm since 1 year (admitted on 05/07/2013). The swelling was slow growing, painless, soft, nontender, immobile, with well defined margins and no fixity to skin. She had no complaints of pain or restriction of movements. She had no history of trauma.

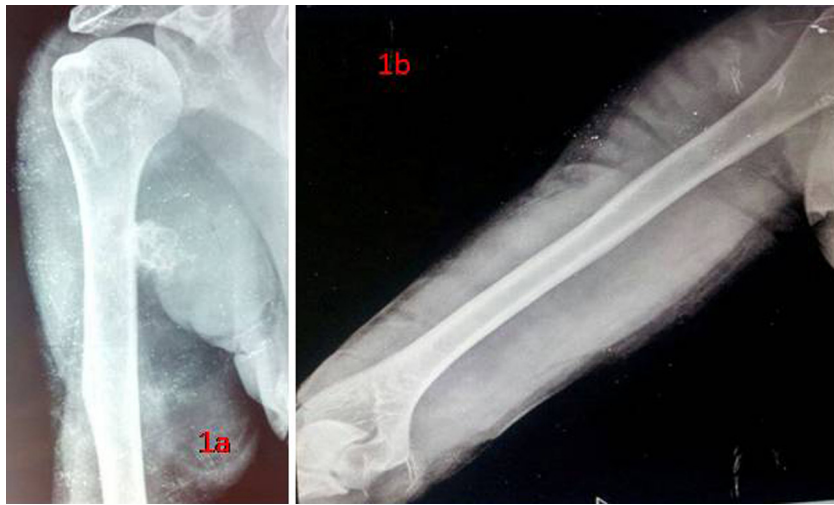
On Roentgenogram of right humerus there was an evidence of ill defined soft tissue swelling in the upper arm posteromedially with radiopacity in continuation with the surface of humerus suggestive of bony excrescences (Fig. 1a).

MRI right shoulder joint (plain+contrast) revealed a large 13 cm × 5 cm × 8 cm well defined, nonenhancing, lobulated, heterointense, predominantly fat intensity lesion with a small area of

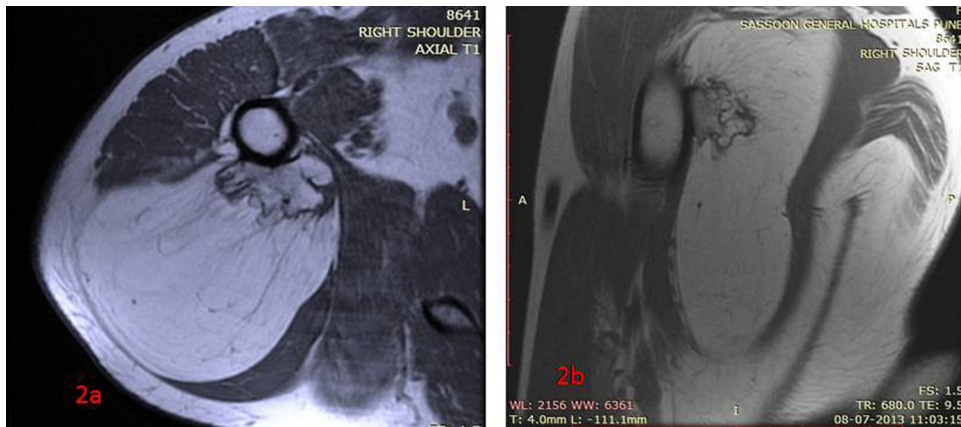
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\* Corresponding author at: Resident Quarters, Room No. 19, Sassoon Hospital, BJMC, Near Pune Railway Station, Pune 411001, Maharashtra, India. Tel.: +91 8806664771.

E-mail address: [rohanjcl@gmail.com](mailto:rohanjcl@gmail.com) (R.J. Chaudhary).



**Fig. 1.** X-ray of right humerus (comparison). (a) Preop X-ray showing soft tissue shadow with bony excrescences. (b) Postop X-ray shows no bony excrescences.

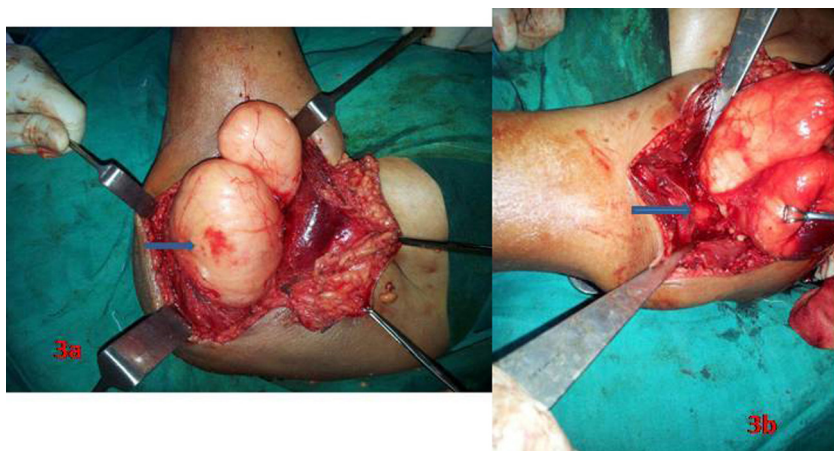


**Fig. 2.** MRI (plain + contrast) of right shoulder joint. (a) Transverse section shows a soft tissue mass with chondroid component free from adjacent muscles. (b) Coronal section shows it displaces long head of triceps medially and is under the deltoid at the upper end of humerus.

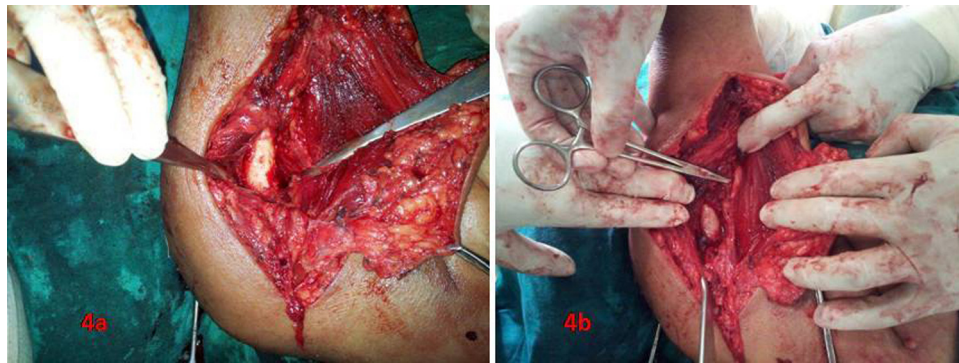
chondroid component measuring 2 cm × 1.6 cm in posteromedial aspect of the proximal right humerus, seen completely separate from the adjacent muscles (Fig. 2a and b).

The patient underwent surgery under general anesthesia. Vertical elliptical incision was taken over the posterior border of the right upper arm over the tumor. The tumor was under the

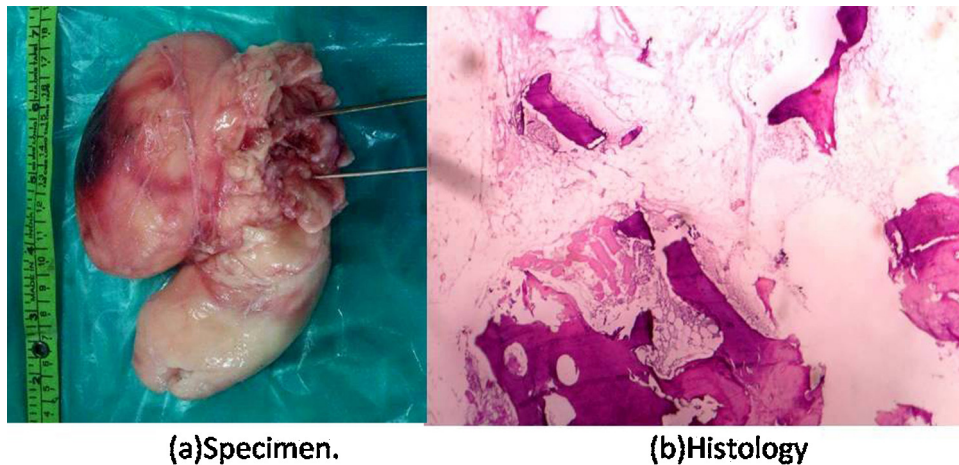
lower part of deltoid which formed the roof near the upper end of humerus, between the long and medial heads of triceps muscles (Fig. 3a and b). 6 cm × 5 cm × 5 cm sized part of the tumor was under the long head of triceps displacing it medially along with radial nerve and vessels. 7 cm × 6 cm × 3 cm sized part of tumor was under the medial head of triceps displacing it laterally. The tumor



**Fig. 3.** Two components of parosteal lipoma. (a) Lipoma component. (b) Bony attachment.



**Fig. 4.** Lipoma excised. (a) Undocking the periosteal's attachment. (b) Preserving the radial nerve.



**Fig. 5.** (a) Specimen. (b) Histology.

was excised undocking the periosteal attachment (Fig. 4a). After hemostasis, wound was closed with a suction drain in situ. The specimen (Fig. 5a) weighed 250 g. Postoperatively a shoulder sling was given for 3 weeks to prevent any inadvertent fracture following the use of osteotome over the humerus during the surgery. Sutures were removed on postoperative day 10. Postoperative course was uneventful. Postoperative X-ray (Fig. 1b) of right humerus was normal and showed no bony excrescences.

On gross pathology, the lesion was multilobulated, well circumscribed and irregular mass of size 12 cm × 5 cm × 8 cm with a bony part measuring 2.5 cm × 2 cm × 1 cm. Cut surface was soft, yellowish and homogeneously greasy (Fig. 5a).

On histopathology (Fig. 5b), the lesion was composed of mature lipocytes that had an intimate relationship with the periosteum, consistent with parosteal lipoma. No cellular atypia or lipoblasts were seen.

### 3. Discussion

Parosteal lipomas, benign adipose tissue tumors situated directly on bone cortex, are unusual neoplasms that appear to emerge from multidirectional mesenchymal “modulation” within the periosteum. These tumors have been described as “periosteal lipomas”, “chondrolipomas of soft tissue” and “lipomas of nerves” but they are most commonly believed to originate from the periosteum. These tumors are frequently associated with chondroid and/or osseous modulation, which permit subclassification into 4 distinct variants: (I) no ossification; (II) pedunculated exostosis; (III) sessile exostosis; and (IV) patchy chondro-osseous

modulation.<sup>1</sup> Parosteal lipoma presents as an immobile, nontender, slow growing mass over bones that is not fixed to skin.<sup>2</sup>

On radiographs, a parosteal lipoma is a well-defined area of lucency located adjacent to a long bone. In one series of parosteal lipomas,<sup>3</sup> 60% had definite bony alterations, mostly hyperostotic reactive changes (fine linear densities, calcification, cortical thickening or undulation, or frank excrescences of bone), but these lipomas also have cortical bowing and smooth cortical erosions. Bone destruction was consistently absent.

On CT and MR imaging,<sup>4,5</sup> parosteal lipomas have a homogeneous lobulated appearance and are adherent to the surface of the adjacent bone. When present, osseous excrescences may mimic osteochondromas, but the former lack the contiguity of the marrow space with the underlying bone that is characteristic of the latter. Parosteal lipomas that gain clinical attention are those that compress neurovascular bundles and cause motor and sensory function deficits. Common sites of involvement include the proximal forearm and the sciatic nerve.<sup>3</sup>

MR imaging is considered superior to CT for evaluation of parosteal lipoma. The tumor is identified on MR images as a juxtacortical mass with signal intensity identical to that of subcutaneous fat, regardless of pulse sequence. Heterogeneity in these lesions is invariably present and corresponds to the pathologic components in the lesion. Areas with intermediate signal intensity on T1-weighted images that are high signal intensity on T2-weighted images represent the cartilaginous components in parosteal lipoma. Fibrovascular septa may cause a lobulated appearance of the fat component, with low-signal-intensity strands on T1-weighted images that become higher in signal intensity on the long TR images (particularly with fat suppression). Larger areas



of bone production surrounded by the lipomatous components are also well demonstrated with MR imaging. Adjacent muscle atrophy, poorly demonstrated by CT, is identified on MR images as increased striations of fat in the affected muscle and is caused by associated nerve entrapment. This finding is best appreciated on T2-weighted images because of the decreased signal intensity of normal muscle relative to fat. Finally, MR imaging best demonstrates the relationship of the tumor to the underlying native bone and muscle, and this information is important for surgical planning because parosteal lipoma is usually firmly adherent to the underlying cortex at the site of surface bone production.<sup>4</sup>

Pathologically the lesion is usually a multi-lobulated yellowish mass composed of mature adipocytes, and it is well encapsulated with a broad base of attachment to the underlying bone.<sup>3</sup>

Microscopically, the fat cells of a parosteal lipoma appear histochemically identical to the adipocytes that are found in the subcutaneous tissues. There has been no indication to date that this tumor undergoes malignant degeneration, although minimal cellular pleomorphism may occasionally occur.<sup>1</sup>

The treatment of parosteal lipoma is complete surgical resection. In the case with nerve entrapment, the tumor must be removed before irreversible muscle atrophy occurs so as to maintain function. The nerve must also be separated from the parosteal lipoma and care must be taken to spare it during surgical excision.<sup>6</sup> In our case, the radial nerve was secured by carefully dissecting it from the mass (Fig. 4b). Adequate surgical removal of a parosteal lipoma requires either subperiosteal dissection, which is the separation of the lesion from the underlying bone using an osteotome or segmental resection of bone; this is in contrast to the relatively easy dissection for a soft tissue lipoma lying adjacent to bone.

Several cases have shown a malignant transformation having radiological and histological features of benign lipomas together with histologic fields of either malignant fibrous histiocytoma or liposarcoma. Malignant transformation of a lipoma should be suspected when rapid bone destruction is seen in a radiolucent lipoma.<sup>7</sup> Parosteal osteosarcomas and well-differentiated liposarcomas (WDLPS) of soft tissue share several features: they are slowly progressive, locally aggressive tumors, tend to recur locally, and rarely or never metastasize if not dedifferentiated. Microscopically, both are well differentiated tumors, very like their normal tissue counterpart. A Biopsy is required from its two components, i.e. bony base and peripheral fat.<sup>8</sup> These tumors are included in the differential diagnosis of parosteal lipoma.

#### 4. Conclusion

This is a well documented rare case of chondro-osseous parosteal lipoma. These soft tissue tumors are benign with an excellent prognosis and 'no' recurrence.<sup>2</sup>

#### Conflict of interest

None.

#### Funding

None.

#### Ethical approval

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

#### Author contributions

Dr. Rohan Chaudhary performed the study design, data collections, data analysis, writing and he was the operating surgeon. Dr. Vandana Dube was the consulting surgeon. Dr. Amit Gupta, Dr. Sachin Balwantkar and Dr. Chirag Bhansali were the assistant surgeons. Dr. Chirag Bhansali also contributed in data analysis, writing and did the proof reading.

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