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CASE REPORT

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Ossifying lipoma

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Abstract Lipomas are very common, but osseous changes within these tumours are rare. A lipoma with osseous components is presented, with an overview of the literature and pathogenesis of this unusual lesion and considerations relating to the differential diagnosis.

Key words Ossifying lipoma · Mesenchymoma · Parosteal lipoma

Introduction

Solitary lipomas are frequent, especially among adults. They can appear in any location of the body, but are usually found in the subcutaneous regions [15], very often in the soft adipose tissue of the neck, back and extremities [6]. They are rarely adjacent to bone, but those that are in such sites frequently contain osseous and/or chondrous components and are referred to as parosteal or periosteal lipomas [10].

Even less frequently, lipomas with no connection to bony structures show osseous or chondrous changes [3]. One case of this interesting phenomenon is presented.

Clinical history

A 70-year-old male patient was referred to the Department of Neurosurgery for the evaluation and treatment of a tumour at the lateral aspect of the right scapula. The patient himself had not noticed the mass, but his wife had discovered it incidentally a few months before admission to the hospital. Since its discovery, it had not increased in size. The patient experienced no discomfort. On examination the tumour was found to be a solid, mobile soft tissue swelling approximately the size of a fist. Apart from a slight hypaesthesia of the overlying skin, no neurological abnormalities were found. There were no signs or history suggestive of neurofibromatosis or any other systemic disease.

Magnetic resonance imaging and computed tomography were performed. CT imaging revealed a well-defined mass of fat attenuation attached to the lateral aspect of the right scapula. There was a spiculated and honey-combed bony density within the mass.

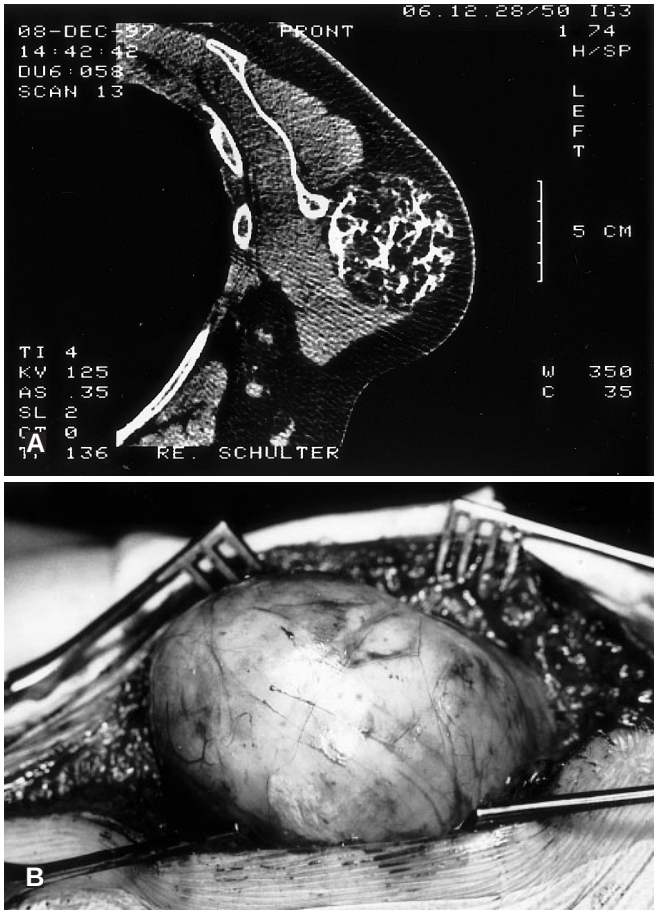

Fig. 1A, B Imaging of the tumour. **A** Axial CT of the right shoulder showing a well-circumscribed soft tissue mass with irregular trabeculae of bony density closely connected to the right scapula. **B** Intraoperative photograph showing a well-demarcated oval tumour with a thin fibrous capsule

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Magnetic resonance imaging confirmed the smooth fat tissue, which had increased signal intensity on T1-weighted spin echo images, and bony arborization within it. Displacement of intact fascial planes and adjacent muscle without evidence of invasion were demonstrated. Spiculated areas of signal void within the mass were present, corresponding to areas of ossification seen on CT (Fig. 1A).

During the surgical intervention the tumour was found to be located in the adipose tissue close to the scapula. At the base of the tumour a pedicle with several small blood vessels was attached. Neither the tumour nor its pedicle showed any tight connection to bony structures (Fig. 1B). It was removed surgically by blunt dissection, and its pedicle was excised. The postoperative course was uneventful.

Pathological findings

The specimen consisted of a large oval mass measuring 14×6.5×6.5 cm, with a smooth surface due to a thin vascularized fibrous capsule. Sectioning revealed mainly yellow soft tissue with numerous interlacing fine bony structures (Fig. 2A).

Histological examination disclosed that the tumour consisted largely of mature adipose tissue with an increased amount of fibrous septae. The adipocytes were uniform in size and shape. Fibrous tissue formed a thin layer around the tumour. Thin trabeculae of vital lamellar bone were found throughout the tumour, especially alongside the fibrous septa. To a lesser extent plump bone formation with lymphocytic infiltrates as well as osteoblasts and osteoclasts were encountered in the centre, where limited mucoid degeneration but no necrosis was found. No haematopoietic cell islands were identified. A small area of thin cartilage was found in the subcapsular zone. In addition, one nest of cartilage was found in the centre of the tumour in proximity to a thick bone trabecula. No nuclear atypia was encountered. Neither cellularity nor the rate of mitosis was increased (Fig. 2B). Muscular tissue outside the tumour showed reactive focal lymphocytic infiltrates. The tumour was diagnosed as a benign ossifying lipoma.

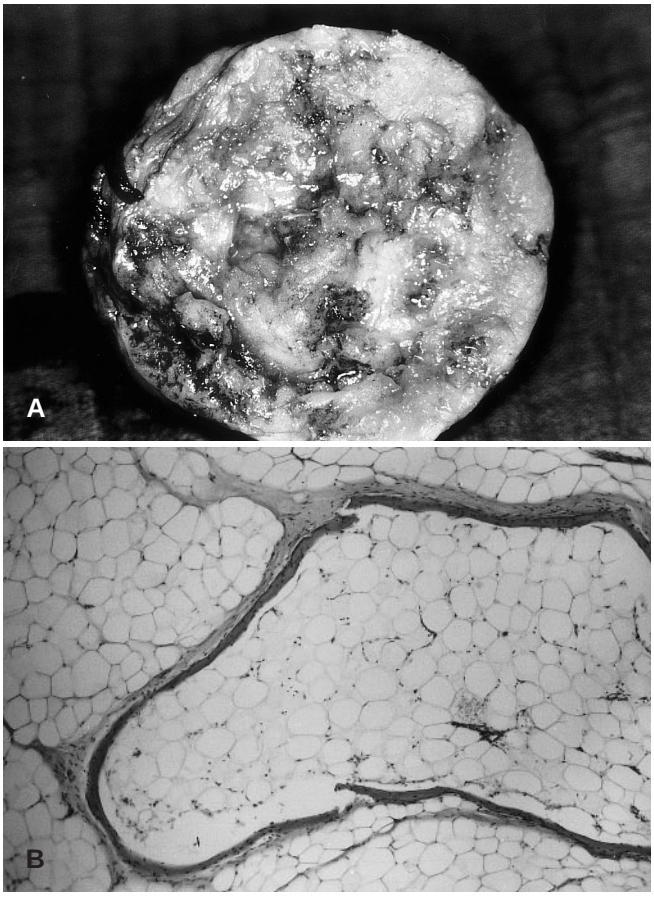

Fig. 2A, B Pathological findings. **A** Cut section of the gross specimen indicating the predominantely fatty composition. Portions of arborizing bony structures appear on the surface of this cross section. **B** Photomicrograph showing mainly mature adipose cells. Thin trabeculae of bone are lying alongside fibrous septa. (H&E, ×10)

Discussion

Lipomas are benign tumours composed of mature adipose cells. Occasionally they contain uncommon or rare components (fibrolipoma, angiolipoma). Lipomas displaying osseous or chondrous structures are referred to as osteolipomas or chondrolipomas respectively. The lipomatous component is always predominant in these lesions, so that the diagnosis does not pose any problem.

Lipomas with ossification are very rare variants of lipomas, described for the first time in 1959 [12]. In a series of 635 lipomas seen over a 5-year period only 6 cases with ossification were found [3]. In general, ossifying lipomas are usually located adjacent to periosteum and are referred to as parosteal lipomas [3]. A number of sites have been recorded: the region of the tuber cinereum [17], the soft tissue of the head and neck, and related to the oral cavity – the commonest site [2, 4, 16]. Other possible locations are the wrist, palm of the hand and trunk [3].

Two main theories of the pathogenesis of ossifying lipomas exist, according to which foci of bone in lipomas originate variously from multipotent cells or from different cell lines [9]. If this is the case, the term “mesenchymoma” is certainly adequate [9]. Because this term has been applied to many unrelated mesenchymal tumours many authors avoid it because of its lack of pathological specificity [3]. The pathogenesis of ossifying lipomas as primary mixed tumours seems improbable [7], as ossification is usually found in tumours of long standing [11].

Alternatively, chondro-ossification originating from pre-existing fibro-fatty mesenchymal elements has been suggested [12]. Fibrous tissue with myxoid and chondroid changes develops in a lipoma, and chondrocytes mature and hyaline cartilage is formed. Finally bone forms within the cartilage [7]. Our histological findings and the very likely long history of the tumour presented here support the second hypothesis. Therefore, the expression ossifying lipoma is favoured over the term osteolipoma.

The pathogenesis of ossifying lipomas is unknown. Osseous changes can be caused by mechanical trauma. Permanent mechanical stress, repeated microtraumas and the occurrence of just one traumatic incident have all been suggested as causes of bone formation in lipomas [7, 13]. Permanent mechanical stress on subcutaneous adipose tissue does not normally lead to metaplasia [7], but the combination of trauma and special reactivity of the mesenchyme can explain the histopathogenesis of osseous or chondrous metaplasia within a lipoma. Septal ossification is not found in fat necrosis.

Lipomas with osseous changes have the same prognosis as plain lipomas. Surgical excision is the recommended treatment [1, 18]. The differential diagnosis includes benign tumours which may contain bone, including teratomas or dermoids [5]. Tumour calcinosis and calcification in a bursa must also be considered [8]. Other conditions, such as ossifying fibromas, myositis ossificans and osteosarcomas, have to be taken into consideration [11], but imaging and histology should help in the differential diagnosis, since the usually diffuse fine pattern of mature ossification and bland mature fatty tissue is unique to the ossifying lipoma. Although ossyifing lipomas are very rare, it is important to keep them in mind when a lesion with adipose tissue in combination with ossification is encountered.

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