UCLA

UCLA Previously Published Works

Title

Malignant mesenchymoma of the thigh.

Permalink

<https://escholarship.org/uc/item/3271p503>

Journal

Skeletal radiology, 24(4)

ISSN

0364-2348

Authors

Massengill, AD
Seeger, LL
Yao, L
et al.

Publication Date

1995-05-01

DOI

10.1007/bf00198421

Peer reviewed

Malignant mesenchymoma of the thigh

Alan D. Massengill, M.D.¹, Leanne L. Seeger, M.D.¹, Lawrence Yao, M.D.¹, Joseph M. Mirra, M.D.², Jeffrey J. Eckardt, M.D.³

¹ Department of Radiological Sciences, UCLA School of Medicine, Los Angeles, California, USA

² Department of Pathology, Orthopaedic Hospital, Los Angeles, California, USA

³ Department of Orthopaedic Surgery, UCLA School of Medicine, Los Angeles, California, USA

Clinical information

A 39-year-old radiation oncology technologist presented to her physician after noting a painless mass in the anterior aspect of her right thigh for several weeks. She stated that the mass was exactly at the height of her therapy table, and she repeatedly bumped the table with her thigh when positioning patients. Radiographs and computed tomography (CT) revealed a homogeneously enhancing 6×2.5×2.5 cm mass within the rectus femoris muscle, with mineralization in portions of the peripheral margin (Fig. 1). On the basis of the history of chronic repetitive trauma and the peripheral mineralization, the mass was believed to represent heterotopic ossification (myositis ossificans). Periodic radiographic surveillance was suggested to follow the lesion to maturity.

Two years after initial presentation, the patient returned and stated that the mass had continued to grow slowly but had recently become tender and was growing more rapidly. During this time, she reported continued trauma to the area during her daily work. Radiographs at this time showed enlargement of the mass and increased peripheral ossification (Fig. 2A). CT images confirmed enlargement of the mass and further ossification confined exclusively to the

periphery of the lesion (Fig. 2B). Due to the progressive enlargement and increased symptoms, tissue confirmation was recommended.

An excisional biopsy was performed. At surgery, a 10.6×6.5×6 cm

mass was found which was confined to the central portion of the rectus femoris muscle. Grossly, the lesion was of a variegated yellow-tan color and had a gelatinous consistency. Multifocal areas of ossification were

Fig. 1. **A** Lateral radiograph of the right thigh. Distinct ossification is seen in the periphery of a soft tissue mass in the anterior segment of the thigh. **B** CT image showing the enhancing mass within the rectus femoris muscle. The mass shows incomplete peripheral mineralization

Fig. 2. **A** Twenty-two months later, the size of the mass and the peripheral ossification have increased. **B** Corresponding CT image at the same level as Fig. 1B. The ossification remains confined to the periphery

Correspondence to: A.D. Massengill, Department of Radiology, University of Texas HSC/Houston, 6431 Fannin, 2.100 MSMB, Houston, TX 77030, USA

Fig. 3. **A** Biopsy specimen showing a mixture of vacuolated cells (lipoblasts) and woven bone (H&E, $\times 125$). **B** Portion of specimen showing numerous bizarre, high-grade malignant lipoblasts with large vacuoles within the cytoplasm that compress the nucleus (H&E, $\times 250$). **C** Other areas showed osteoid and woven bone produced by high-grade malignant osteoblasts. The combination of liposarcoma and osteosarcoma fits the definition for a primary malignant mesenchymoma (H&E, $\times 400$)

present. Histologic analysis revealed a high-grade heterogeneous sarcoma with divergent cell lines showing features of malignant fibrous histiocytoma, pleomorphic liposarcoma, and osteogenic sarcoma (Fig. 3), indicating a diagnosis of malignant mesenchymoma. The patient underwent chemotherapy, followed by complete resection of the rectus femoris muscle to achieve a wide surgical margin.

Discussion

Malignant mesenchymoma (MM) is a sarcoma that is composed of two or more differentiated (distinctive) mesodermal phenotypes which may include osteosarcoma and/or chondrosarcoma, liposarcoma, rhabdomyosarcoma, leiomyosarcoma, neurogenic sarcoma, or angiosarcoma. Fibro-

sarcoma or malignant fibrous histiocytoma are often present in soft tissue sarcomas, but are nondistinctive and do not define the lesion. It is recommended that the term "malignant mesenchymoma" be reserved for sarcomas meeting this specific criterion [1, 2]. The histogenesis of MM is uncertain, but the most widely accepted theory postulates differentiation of undifferentiated mesenchymal elements along multiple malignant cell lines [1]. "Benign mesenchymoma" is a term advocated by some pathologists for a lipoma with benign chondroid or osseous metaplasia, and is unrelated to MM [1].

By the above criterion of at least two distinct mesenchymal elements exclusive of malignant fibrous tissue, MM is considered quite rare. Only isolated case reports and small series exist in the pathology literature [3]. This tumor has been found in all age

groups and in all areas of the body. In most series, the average patient age is in the mid-50s, and no predisposition for either sex has been identified [3]. The two most common sites of occurrence are the retroperitoneum and the thigh [1]. Most authors report a poor prognosis, with death occurring within months of the initial diagnosis; whereas others report a less aggressive time course [1–5].

The findings of MM on imaging studies are not well established [4–7]. The few reports describing the imaging features of MM of the extremities reflect the heterogeneous make-up of the tumor. Tumors may contain calcification or ossification, or may lack mineralization [5, 6, 8]. The ossification may be confined to one quadrant of the lesion. The CT appearance of fat density within the lesion, corresponding to liposarco-

Fig. 4A–C. Another patient (a 48-year-old woman). **A** Lateral radiograph of the knee reveals a superficial mass with peripheral mineralization. **B** Axial T1-weighted MR image (SE 450/20). The subcutaneous mass is predominantly isointense with muscle, with some heterogeneity including low signal foci corresponding to the mineralization. **C** Coronal T2-weighted MR image (SE 1800/80). The mass appears more heterogeneous, showing areas of high, intermediate, and low signal intensity

matous elements, has been described [6].

We include here an additional patient, a 48-year-old woman with a 2-year history of a painless mass in her popliteal fossa. Plain radiographs were similar to those in the first case presented, and showed apparent peripheral mineralization (Fig. 4A). The MR features were nonspecific, showing a subcutaneous mass with heterogeneous high, intermediate, and low signal foci without surrounding edema (Fig. 4B,C). Biopsy revealed MM. To our knowledge, this is the first MR imaging report of MM of the soft tissues.

The differential diagnosis of soft tissue ossification includes heterotopic ossification (myositis ossificans), fibrodysplasia ossificans progressiva, soft tissue osteoma, soft tissue osteosarcoma, melorheostosis, benign mesenchymoma, and MM [8]. Soft tissue calcification is seen with soft tissue chondroma, extraskeletal chondrosarcoma, synovial

osteochondromatosis, synovial sarcoma, gouty tophi, pilomatricoma, tumoral calcinosis, and metastatic or dysplasia calcification [8]. Myositis ossificans (MO) is common, but the other entities are uncommon or rare.

MO is characterized histologically by a distinctive centrifugal pattern of central immature cells surrounded first by more mature osteoid, then by mature lamellar bone [9]. MO may enlarge up to 8 weeks from the inciting event [9], and may enhance in a fashion identical to a malignant neoplasm [10]. Although only faint calcifications may be present initially, peripheral ossification is identified as MO matures. Eventually, MO shrinks and nearcomplete ossification occurs in a centripetal fashion [8]. MO matures histologically and radiographically within 2–6 months. When this distinctive pattern is manifested on radiographs, the appearance is felt to be specific enough for MO to be classified as a “don’t touch me” lesion.

It is rare for a soft tissue sarcoma to manifest exclusively peripheral ossification, and it can be difficult to identify the unusual instances when peripheral soft tissue ossification is not due to MO. In the case reported here, the history of “repetitive trauma” was misleading. It is well known that a history of recognized trauma may not be present with MO, but the patients will usually have moderate to severe pain [9]. The radiographic and CT imaging features of our first case initially were consistent with a diagnosis of myositis ossificans. The only imaging feature missing was surrounding soft tissue edema. This edema cannot always be identified on CT images but has been uniformly present with MRI [10]. When the patient returned with an enlarging, painful mass that had not completely ossified, the diagnosis of MO became doubtful even though she had continued trauma to the area. Despite the nearly identical imaging appearance, this case illustrates how either an unusual history, radiographic documentation of a growing mass, incomplete ossification, or increasing symptoms, do not support a diagnosis of classic MO and may suggest a more sinister lesion.

In *summary*, we present two examples of a seldom reported and rare lesion, a malignant mesenchymoma. Both lesions had peripheral mineralization, and in one case an erroneous initial diagnosis of myositis ossificans was made. Periodic radiographic surveillance and/or biopsy of presumed myositis ossificans may be prudent in those situations where an atypical radiographic appearance, interval growth, or persistent symptoms are present.

References

1. Enzinger FM, Weiss SW. Soft tissue tumors, 2nd edn. St Louis: Mosby, 1988: 958.
2. Newman PL, Fletcher CDM. Malignant mesenchymoma: clinicopathologic analysis of a series with evidence of low-grade behaviour. *Am J Surg Pathol* 1991; 15: 607.
3. Marasa L, Nuara R, Tomasino RM. Mesenchymoma. Report of two cases and review of literature. *Pathologica* 1980; 72: 189.

4. Al-Kana R, Rangwala AF, Sills C, Rienzo A. Case report: malignant mesenchymoma of the mediastinum. *Jersey Med* 1992; 89: 851.
5. Gruchala A, Wasilewska A, Rys J, Szklarski W, Niezabitowski A. Mesenchymoma malignum of the buttocks. *Pathol Res Pract* 1989;185: 405.
6. DePaolo CJ, Foster WS, Dabezies EJ, D'Ambrosia RD. A case report of malignant mesenchymoma with discussion of musculoskeletal tumor staging: the Enneking system. *Orthopedics* 1988; 11: 1263.
7. Scheele PM, Von Kuster LC, Krivchenia G. Primary malignant mesenchymoma of bone. *Arch Pathol Lab Med* 1990; 114: 614.
8. Kransdorf MJ, Meis JM. Extraskeletal osseous and cartilaginous tumors of the extremities. *Radiographics* 1993; 13: 853.
9. Mirra JM, Picci P, Gold RH. Myositis ossificans. In: *Bone tumors: clinical, radiologic, and pathologic correlations*. Philadelphia: Lea & Febiger, 1989; 1550.
10. Kransdorf MJ, Meis JM, Jelinek JS. Myositis ossificans: MR appearance with radiologic-pathologic correlation. *AJR* 1991; 157: 1243.