Painful Forearm Mass

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Case Presentation
A 40-year-old woman presented with a painful mass on her forearm. She denied injury to the area or prior surgery at the site. She reported no additional lesions and stated that the mass arose over the past few weeks and has become painful to the touch. Physical examination revealed a non-compressible non-mobile nodular mass. There was no overlying skin discoloration or ulceration. Radiographs, ultrasound and MR images of the lesion were obtained. MR images are displayed (Fig.)

Figure: Axial T1 pre (A), T1 post with fat suppression (B), and T2 Fat-suppressed (C) images demonstrate an avidly enhancing mass at the superficial margin of the forearm musculature. Sagittal T1 post-contrast fat-suppressed image (D) demonstrates an enhancing fascial tail at the margin of the lesion.
Key clinical finding(s)
Painful non-mobile forearm mass
Rapid onset of symptoms

Key imaging finding(s)
Nodular enhancing mass on the surface of the forearm extensor musculature

Differential diagnoses
Nodular fasciitis
Malignant fibrous histiocytoma (or other sarcoma)
Fibromatosis

Discussion
A soft tissue mass is a relatively frequent presenting symptom with etiologies that range from the benign to the aggressive. Evaluation begins with a clinical history and physical examination, followed by imaging when the etiology is not readily apparent. Certain lesions such as lipomas have characteristic imaging features based upon which confident classification can be made by MRI. However, most lesions are not easily distinguished from one another and biopsy is necessary to exclude malignancy. The clinical features such as pain or redness, as well as patient demographics may narrow the differential diagnosis.

Nodular Fasciitis: Nodular fasciitis is a benign soft tissue lesion that is primarily inflammatory in nature and is likely the most common tumor-like lesion misdiagnosed as a sarcoma. Histological examination reveals evidence of rapid growth and increased mitotic activity. The upper extremity is the most common site of involvement, along with the head and neck in younger patients. The presentation of a painful forearm mass in a relatively young patient makes nodular fasciitis a leading consideration in this case.

Radiographs are typically noncontributory (as in this case) and additional imaging is necessary for characterization. Ultrasound is also nonspecific with the common appearance being that of a hypoechoic mass. Hyperemia may also be encountered as evidence of inflammation (obtained in the workup of this mass but not shown). MRI typically demonstrates a nodular mass that is isointense to muscle on T1-weighted images and hyperintense on T2-weighted images. Avid or peripheral enhancement is common. The presence of a linear fascial tail may be an important distinguishing feature in identifying the lesion and is well demonstrated in this case. Biopsy or excision is necessary to exclude a malignant lesion and lesions rarely recur. Recurrence should prompt a reevaluation of the lesion to confirm the diagnosis.

Unlike radical excision approaches that are appropriate for sarcomas, a wide margin is not necessary and adjacent structures such as nerves may be spared.

Malignant Fibrous Histiocytoma: Malignant fibrous histiocytoma (MFH) is described as a pleomorphic sarcoma with multiple subtypes described by the World Health Organization (WHO) nomenclature. MFH is the most common soft tissue sarcoma of advanced age, though lesions have been described in younger patients as well. An important fact to consider is that the majority are deep lesions with only 5-10% being described in the subcutaneous tissue. Whenever an aggressive-appearing soft tissue mass is encountered, the diagnosis of MFH must be considered. Imaging features are nonspecific with variable appearances described on all MRI imaging sequences. The presence of a spontaneous hematoma may further confuse the imaging workup and in such cases it is critical to identify any solid nodular enhancing components of the tumor.

Fibromatosis: Fibromatoses arise from fascia or aponeuroses and are typically slow growing nodular lesions. Several common sites of involvement are well described in the literature and include the plantar and palmar regions of the extremities. Both superficial and deep types have been described. Fibromatoses demonstrate intermediate to low signal intensity on all MR imaging sequences. Chronic lesions demonstrate more collagen content and this characteristic likely accounts for the low signal intensity on MR imaging sequences. Regions of the lesion that are more cellular demonstrate relatively increased signal intensity on fluid sensitive sequences and are sites of probable recurrence after attempted resection. Surgical resection is the
primary treatment; however, recurrence is common. Following lesions closely with MRI before resection may demonstrate maturation of the fibromatosis (as evidenced by more collagenous regions with low signal intensity on MRI) and thus help to direct surgical intervention when the lesion is less cellular and less likely to recur.  

Diagnosis
Nodular Fasciitis

Summary
Soft tissue masses are relatively common with a confident diagnosis possible in cases of lipoma and in a few select other lesions. Frequently however, benign and malignant lesions overlap in terms of presentation and imaging appearance. In such cases, biopsy and/or excision are necessary to exclude the presence of an aggressive lesion or malignant tumor. Knowledge of the more commonly encountered lesions is necessary to help guide treatment. In this case, the rapid onset of a painful nodule suggests a reactive or inflammatory lesion rather than a typically slow-growing fibromatosis or malignant fibrous histiocytoma. The age of the patient and location are also important clues to the ultimate diagnosis. Finally, the fascial tail demonstrated in this case helps to narrow the differential diagnosis as well. Excision confirmed the diagnosis and no further treatment was required.

References