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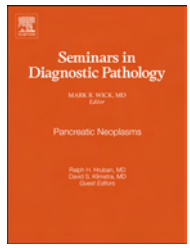

Benign soft tissue lesions that may mimic malignancy

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ABSTRACT

Soft tissue lesions which mimic malignancy (pseudosarcomas), represent a significant diagnostic challenge for pathologists. Many features often associated with malignancy including rapid and infiltrative growth, increased cellularity and mitotic activity, and nuclear pleomorphism are present in benign and reactive conditions. This review highlights repair reactions including nodular fasciitis, proliferative fasciitis/myositis, intravascular papillary endothelial hyperplasia, and fat necrosis; lipoma and spindle cell/pleomorphic lipoma; fibroepithelial stromal (pseudosarcomatoid) polyp; phosphaturic mesenchymal tumor; and myxoma. While not inclusive of every pseudoneoplastic soft tissue lesion, this review emphasizes important diagnostic pitfalls and stresses the value of clinical, pathologic, and radiologic correlation.

Introduction

Imitations of malignancy are abundant in the arena of soft tissue pathology and can represent a significant diagnostic challenge for clinicians, radiologists, and pathologists alike. Not only may benign conditions mimic malignancy, but focal areas of malignant entities may also mimic benignancy. Clinically these pseudoneoplastic lesions may simulate a sarcoma as a mass forming lesion, in some cases with aggressive local behavior and rapid growth, which is worrisome to the patient and clinician. Histologically, benign soft tissue neoplasms may have microscopic features overlapping with malignant soft tissue tumors, namely increased cellularity, nuclear pleomorphism, spindle cell growth, and infiltrative growth. Further complicating the pathologists' diagnosis is the lack of familiarity with soft tissue neoplasms due to their infrequency at most institutions. Important additional factors are the heterogeneous cellularity of both benign and malignant soft tissue tumors, particularly in diminutive needle core biopsies. Knowledge of these diagnostic pitfalls and excellent clinical, pathologic, and radiologic correlation is essential in obtaining appropriate diagnosis.

This list of pseudoneoplastic soft tissue lesions is certainly not complete. The entities included are those that we have observed to cause trouble at our own institution and at St. Elsewhere.

Repair reactions

Repair reactions in soft tissue are common as frequent minor trauma, bruising, or contusions, result in hemorrhage, inflammation, and subsequent repair. The repair reaction includes simultaneous macrophage infiltration for removal of erythrocyte fragments and necrotic debris followed by proliferation of fibroblasts and myofibroblasts (Fig. 1).

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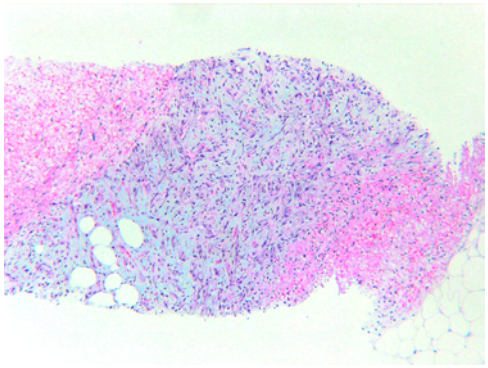

Fig. 1 – Core biopsy of a hematoma of the leg, which was biopsied because it formed a mass. Areas of necrosis and resolving hemorrhage flank a myofibroblast proliferation. The myofibroblast and capillary proliferation, if biopsied without the adjacent hemorrhage, could mimic a spindled tumor. Mitoses are present, but the random arrangement of the feathered myofibroblasts are indicative of a repair reaction. (H&E; original magnification, 100 × .)

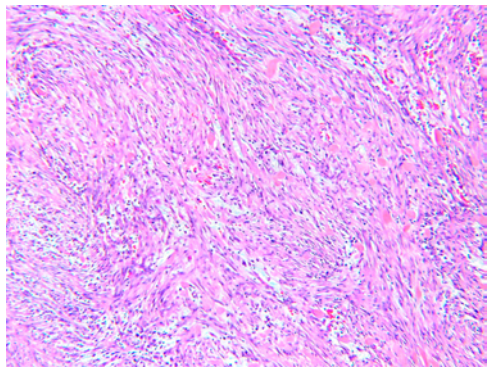

Fig. 2 – Nodular fasciitis has arcing and curved short fascicles of myofibroblasts on which are sprinkled inflammatory cells and erythrocytes. Spaces between fascicles contain free inflammatory cells. Increasing amounts of collagen appears as the lesion ages. Blood vessels are numerous. (H&E; original magnification, 100 × .)

Nodular fasciitis (NF)

Nodular fasciitis has long been categorized as a repair reaction along with proliferative fasciitis, ischemic fasciitis, and myositis ossificans. It is an infamous pseudoneoplastic lesion, likely the most often benign lesion misdiagnosed as sarcoma, given its concerning clinical presentation, and disconcerting histology.[1] Of cases, 51% within a single series were misdiagnosed initially, with 21% diagnosed as malignant lesions treated with unnecessary radical surgery.[2]

Nodular fasciitis arises as a 3 ± 1 cm nodule (size matters) in the subcutis of the upper half of the body, often following trauma. It is rarely larger than 4 cm and infrequently occurs outside the subcutis, including internal organs. They often have a 2 - 4 week history of rapid growth alarming the patient, clinician, and pathologist. Although it may occur at any age, it typically presents in the 3rd to 5th decade and has no sex predilection.[1,3,4] Imaging typically consists of a well-defined homogenous iso- to low-density mass on computed tomography.[5] The presumed reactive nature of NF has been recently challenged since 44 of 48 cases examined were discovered to possess gene rearrangements of the USP6 locus. It has been proposed that NF represents a tumor with a genetic rearrangement or a "transient neoplasia."[6,7] NF does recur and those recurrences should spur serious reconsideration of the diagnosis. Reported incidence of recurrence has been as high as 9.3%.[8]

Microscopically, the tumor has a mixture of randomly arranged plump myofibroblasts with vesicular nuclei and a single prominent nucleolus simulating the growth at the bottom of a tissue culture flask. Interspersed inflammatory cells, extravasated erythrocytes, histiocytes, and multinucleate histiocytes are also present. Although numerous mitotic figures are present, there is minimal pleomorphism. As the lesion ages, it progresses through myxoid, cellular, and fibrous phases adding collagen, sometimes in a keloidal pattern.[9,10]

Biopsy interpretation of NF can be treacherous, as the myxoid and fibrous phases may be over interpreted as malignant lesions. This is especially true if sampled by the sinister core biopsy. Clues which may help to avoid this diagnostic pitfall include extravasated erythrocytes and inflammatory cells, the feathered outlines of myofibroblasts, haphazard arrangement, and the perimeter outline of the nodule; however, some of these features obviously are not present in the treacherous core biopsy. Mitoses are expected to be present and the very rare atypical mitosis can be found in this lesion once or twice in a pathologist's lifetime (Figs. 2–4).

The diagnosis of NF must be made with knowledge of the size of the lesion and clinical context. At the Medical University of South Carolina, a diagnosis of NF (especially when the biopsy is a tiny needle core) is always followed by the comment "The microscopic appearance of nodular fasciitis overlaps with that of some low grade sarcomas. Reported recurrence rates have been as high as 9.3%. If this lesion recurs it should be promptly re-excised for possible reclassification."

Proliferative fasciitis/myositis (PF)

Proliferative fasciitis and proliferative myositis are fascinating similar reactions occurring in the subcutis and muscle,

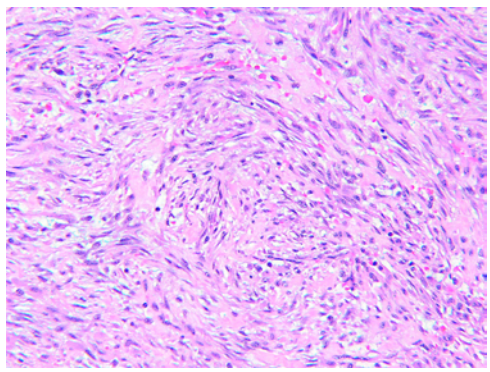

Fig. 3 – Higher magnification of nodular fasciitis shows the arcing and whorled myofibroblasts arranged in small short fascicles. The inflammatory cells and erythrocytes are randomly sprinkled in the tumor. Necrosis is seldom found, but larger areas of myxoid change can be present. (H&E; original magnification, 200 × .)