

Nodular Fasciitis of the Pectoralis Muscle in a 54-Year-Old Woman

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Background	A 54-year-old woman presented with a breast mass found to be nodular fasciitis of the right pectoralis muscle.
Summary	A 54-year-old woman presented to a breast surgeon for evaluation of a painful right breast mass. Initial mammography was unrevealing. Ultrasound revealed a right pectoral mass extending into the soft tissue of the breast. Core needle biopsy specimen revealed features suggestive of low grade sarcoma. Findings on computed tomography (CT) and magnetic resonance imaging (MRI) were nonspecific and wide local excision was subsequently performed. Pathologic characteristics were consistent with nodular fasciitis. This benign proliferation of fibroblasts and myofibroblasts frequently raises concern for malignant neoplasms due to its rapid, infiltrative growth, and nonspecific imaging characteristics. Thus, it is often identified by its characteristic features on surgical pathology following excision. On rare occasions when it is managed with surveillance, nodular fasciitis frequently demonstrates spontaneous regression.
Conclusion	Nodular fasciitis is a benign growth with a tendency for spontaneous regression, which exhibits clinical features that often invoke suspicion of malignancy. Excision may be necessary for confirmation of diagnosis. However, if suspected with a high degree of certainty, active surveillance is also a reasonable option for managing nodular fasciitis.
Keywords	Nodular fasciitis, breast

DISCLOSURE:

The authors have no conflicts of interest to disclose.

To Cite: Kanner CD, Sharma D, Lewis JD. Nodular Fasciitis of the Pectoralis Muscle in a 54-Year-Old Woman. *ACS Case Reviews in Surgery*. 2019;2(3):41-43.

Case Description

A 54-year-old woman with history of subpectoral silicone breast implants placed five years prior presented to a breast surgeon for evaluation of a right breast mass that was identified after awakening with sharp pain. On examination, a firm, fixed, and tender 2–3 cm mass was identified in the upper inner right breast, without overlying skin changes or axillary lymphadenopathy.

No mass or architectural distortion was visualized on mammography. Initial ultrasound revealed an irregular and heterogeneously hypoechoic mass measuring 3.2 x 3.0 x 2.5 cm (Figure 1A). The mass appeared to originate within the pectoralis major muscle extending into the overlying soft tissues of the breast. Core needle biopsy showed a diffusely infiltrative spindle cell neoplasm with mild to moderate cytologic atypia and myxoid changes. No breast tissue was identified, and low-grade sarcoma was suspected. Immunohistochemistry was negative for cytokeratins, desmin, CD34, and S100.

Evaluation with breast MRI demonstrated a T2 hyperintense mass with rim enhancement and irregular margins (Figure 1B). The posterior margin of the mass was in contact with the implant capsule and the anterior margin extended into the overlying soft tissue of the breast. Chest computed tomography (CT) scan without contrast was performed for staging due to concern for sarcoma, with unremarkable findings.

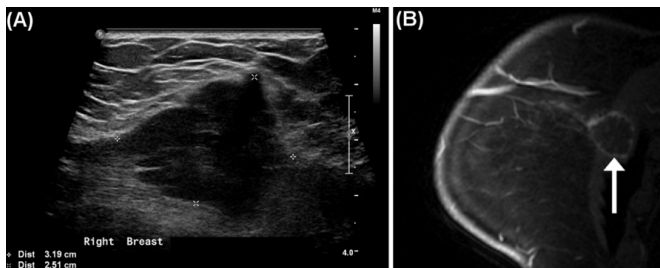


Figure 1. A: Sonogram showing a heterogeneously hypoechoic mass. **B:** Sagittal magnetic resonance imaging (MRI) reveals a predominantly T2 hyperintense mass (arrow) with rim enhancement involving the pectoralis muscle.

After discussion of the case at a multidisciplinary conference, wide local excision of the mass was planned. Plastic surgery was present for implant replacement and closure due to association of the mass with the implant capsule. Analysis of the surgical specimen revealed findings consistent with nodular fasciitis (Figure 2). Variable mitotic activity was present, without atypical forms. Immunohistochemistry revealed a strong and diffuse reaction of the fibroblasts with smooth muscle actin and was negative for cytokeratins, desmin, and CD34.

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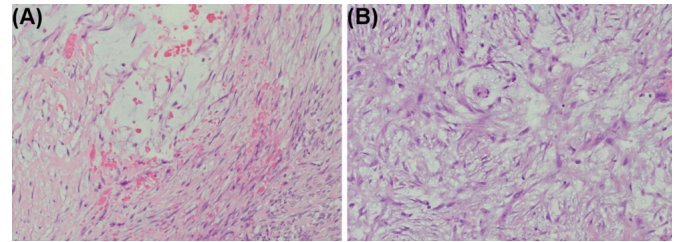


Figure 2. A: Hematoxylin and eosin shows keloid-like collagen deposition within a proliferation of spindled fibroblasts. The cells are arranged in short, interlacing fascicles. Extravasated erythrocytes are noted (20x). **B:** The cells are arranged in a tissue culture-like appearance with myxoid change (20x).

Discussion

Nodular fasciitis is a benign proliferation of fibroblasts and myofibroblasts characterized clinically by its rapid, infiltrative growth and hard consistency, which often leads to suspicion of malignancy, particularly sarcoma.¹ This proliferation is thought to be a response to local injury, consistent with its tendency towards spontaneous regression within several months when observed; however, a history of trauma is rarely reported.^{1,2} Lesions are most frequently identified in soft tissues of the trunk, neck, and extremities.¹ Intramuscular and fascial lesions have been described, including one prior report in the pectoralis major fascia and one in the pectoralis major muscle.^{3,4} No axillary lymphadenopathy or overlying skin changes were observed in cases involving the breast or pectoralis muscle, aiding clinical differentiation from malignant tumors.³⁻⁵

Ultrasound evaluation typically shows a lesion with hypoechoic features, irregular margins, no calcifications, and occasional posterior enhancement and surrounding vascularity.^{6,7} On CT imaging lesions demonstrate hypodensity or iso-density relative to muscle, thus subcutaneous lesions are more well defined than intramuscular lesions. Invasion of adjacent tissue, suggestive of malignancy, is sometimes observed.⁸ On MRI evaluation, both solid and cystic lesions have been reported, with cystic lesions showing peripheral enhancement and a hyperintense signal on T2 weighted images.⁸ These imaging features are nonspecific and, combined with clinical features suggestive of malignancy, indicate the need for tissue evaluation. Surgical excision is usually performed because biopsy specimens often do not contain representative cells needed to diagnose nodular fasciitis.^{3,9}

The histologic appearance of nodular fasciitis is typically described as spindle cells in a fascicular growth pattern with mild to moderate inflammatory infiltrate, extravasated erythrocytes, and myxoid and fibrous components.¹⁰ A tissue culture appearance of loosely arranged spindle cells with cytoplasmic processes is common.¹ Lesions are thought to become more fibrous and less myxoid over time.⁷ Limited mitotic activity and the absence of nuclear pleomorphism supports the diagnosis of nodular fasciitis over malignant tumors such as fibrosarcoma and leiomyosarcomas. Similar benign lesions such as fibromatosis do not contain the inflammatory elements or show the mitotic activity seen in nodular fasciitis.^{8,10} Immunohistochemistry is typically positive for smooth muscle actin and negative for cytokeratins, desmin, CD34, and S100.⁵

Consistent with the existing literature, this case demonstrates the difficulty of differentiating nodular fasciitis from malignant soft tissue tumors prior to observing the characteristic tissue architecture seen in surgical excision specimens. Wide local resection was pursued based on the observed rapid growth, infiltration of adjacent breast tissue seen on imaging, and concern for soft tissue sarcoma based on core needle biopsy findings. Because this clinical course is common, the natural history of the lesion is rarely observed, but a tendency towards spontaneous regression has been described.² Though most findings are nonspecific in isolation, increased familiarity with the combined clinical, radiographic, cytologic, and immunohistochemistry features of this lesion may aid in determining when to proceed with operative management.

Conclusion

Though benign, nodular fasciitis demonstrates rapid, invasive growth, with nonspecific findings on imaging and core needle biopsy, often suspicious for malignant neoplasm. This case exhibits how these lesions are often not definitively identified until excision is performed. If the benign nature of the lesion can be confirmed prior to operative management and the patient is otherwise asymptomatic, active surveillance may be appropriate.

Lessons Learned

Nodular fasciitis is a rare, benign tumor with a tendency towards spontaneous regression that is frequently excised due to features suggestive of malignancy. With increased familiarity with the features of nodular fasciitis, nonoperative management may be considered.

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