


Imaging findings for malignancy-mimicking nodular fasciitis of the breast and a review of previous imaging studies

Youn Mi Son^{1,2}, Ji Hae Nahm³, Hee Jung Moon¹, Min Jung Kim¹ and Eun-Kyung Kim¹

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Abstract

We report a case of nodular fasciitis of the breast mimicking malignant tumor. A 41-year-old female patient with a palpable mass in the upper center of the left breast present for 1 week visited our hospital. A mammogram showed an oval isodense with a partially indistinct margin. Ultrasonography demonstrated a hypoechoic mass, 8 × 11 mm in size. Breast cancer could not be excluded based on mammographic and ultrasonographic (US) findings. A core needle biopsy and excisional biopsy were performed. Histopathologic examination revealed a diagnosis of nodular fasciitis of the breast. The mammographic and US findings of nodular fasciitis in the breast is reviewed.

Keywords

Breast, breast neoplasm, nodular fasciitis, ultrasonography, mammography, biopsy

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Introduction

Nodular fasciitis is a benign fibroblastic proliferation of cells characterized by sudden appearance and rapid growth. The lesion is usually found in the soft tissue of the upper extremity and trunk in middle-aged individuals. It has been rarely described in the breast (1–7). Clinically, it presents as a palpable mass, which may mimic malignancy. We report the imaging findings and a brief literature review of nodular fasciitis of the breast.

Case report

A 41-year-old woman visited our hospital with the chief complaint of a palpable mass in her left breast, which she had noticed 1 week prior. There was no history of trauma or family history of breast cancer. A mammogram showed a 10-mm oval isodense mass in the upper center of the left breast with a partially indistinct margin (Fig. 1), which was newly developed in comparison with her last mammogram 6 years ago. Ultrasonography revealed an 8 × 11 mm, irregular,

hypoechoic, microlobulated mass with echogenic halo (Fig. 2) at the 12 o'clock position of the left breast. This finding was suspicious of malignancy; therefore, she underwent an ultrasound-guided core needle biopsy.

Histologically the lesion had an ill-defined proliferation of short spindle cells admixed with occasional giant cells. Nodular fasciitis or spindle cell carcinoma was ruled out.

¹Department of Radiology, Research Institute of Radiological Science, Severance Hospital, Yonsei University College of Medicine, Seoul, Republic of Korea

²Department of Radiology, Gumi CHA Hospital, College of Medicine, Pochon CHA University, Gyeongbuk, Republic of Korea

³Department of Pathology, Severance Hospital, Yonsei University College of Medicine, Seoul, Republic of Korea

Corresponding author:

Min Jung Kim, Department of Radiology, Research Institute of Radiological Science, Severance Hospital, Yonsei University College of Medicine, 250 Seongsanno, Seodaemun-gu, Seoul 120-752, Republic of Korea.

Email: mines@yuhs.ac

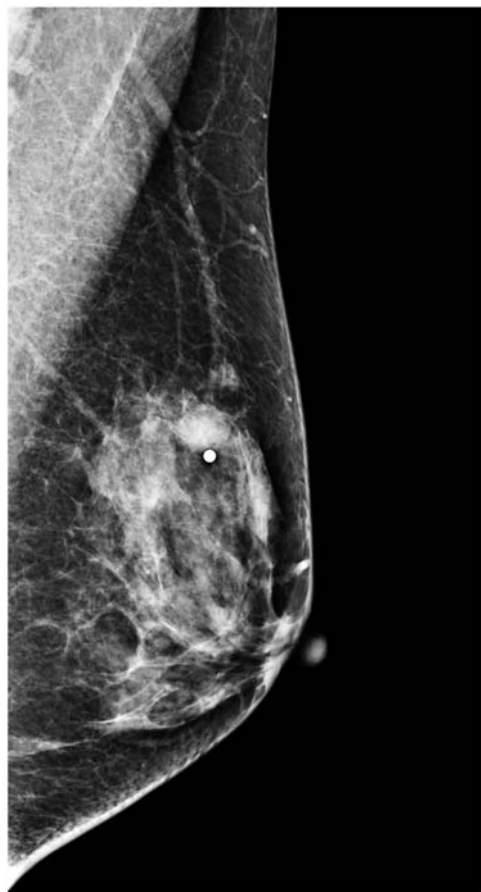


Fig. 1. A 41-year-old woman with nodular fasciitis of the breast. (a) The mediolateraloblique view of mammography showed a 10-mm-diameter oval isodense mass with partially indistinct margin in the upper center of her left breast (with a BB-marker).

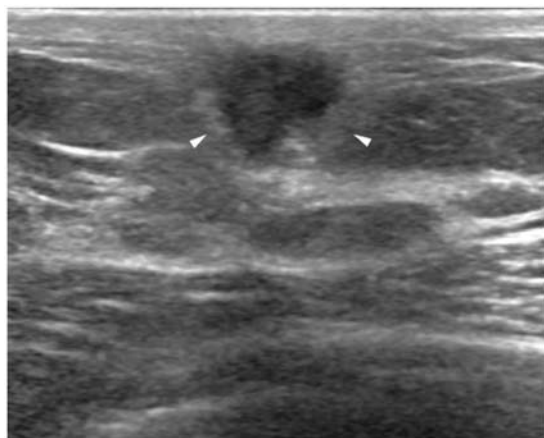


Fig. 2. Ultrasonography at the 12 o'clock position of the left breast revealed an 8 × 11 mm, irregular, non-parallel, hypoechoic mass with microlobulated margin and echogenic halo (arrowheads). The superficial margin of the mass touches the skin line and the deep margin is located on the fibroglandular tissue.

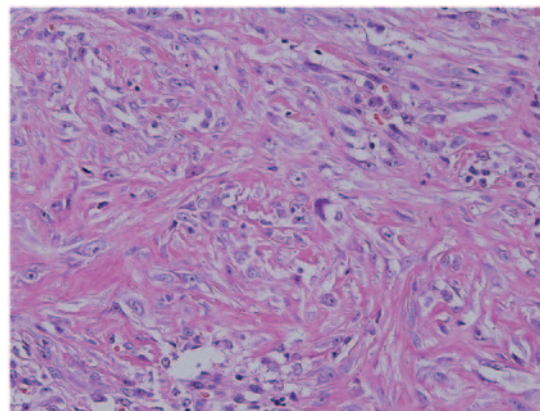


Fig. 3. Photomicrograph showed the features of nodular fasciitis with nodular proliferation of spindle to oval cells and giant cells admixed with collagenous stroma (H&E, ×200).

Excisional biopsy was done for further evaluation. Histopathology of excisional biopsy showed nodular proliferations of short spindle cells and occasional giant cells with dense collagenous stroma and surrounding chronic inflammatory cells, consistent with nodular fasciitis (Fig. 3).

Discussion

Nodular fasciitis is a benign fibroblastic proliferative and reactive process of the soft tissues related to fascia. The most common site of nodular fasciitis is the subcutaneous tissue of the upper extremity. It can occur virtually anywhere in the body (8), but reports of its occurrence in the breast are rare. The most consistent characteristic of the lesion is a solitary, frequently painful and tender mass, leading to early presentation with the history typically being weeks instead of months. Cases occurring in the breast may have findings on mammography and ultrasound consistent with malignancy (3). To our knowledge, 19 reports of nodular fasciitis in the breast have been published, and only six case reports have presented imaging findings (1–6). A history of trauma may precede these reactive lesions, but the cause remains unknown. Nodular fasciitis can be divided into subcutaneous, intramuscular, and fascial types depending upon its relationship to anatomic location (9). Lesions in nodular fasciitis could be separated into three types based on a range of histological features: myxoid, cellular, and fibrous. The different types are roughly correlated with the duration of the nodule (10). Nodular fasciitis in the breast needs to be distinguished from benign and malignant breast tumor with non-specific findings, suspicious for malignancy (4,7) and the histological differential diagnosis of nodular fasciitis includes spindle cell tumors such as fibromatosis, myofibroblastoma, spindle cell lipoma,

Table 1. Previous reports of nodular fasciitis of the breast.

Report	Sex	Age (years)	Size (cm)	Duration	Mammography	US
Baba et al. (1)	F	59	2.5	2 days	Round, speculated, hyperdense mass	Irregular, microlobulated, hypoechoic mass with non-parallel orientation. The presence of echogenic halo is not evident
Dahlstrom et al. (2)	F	38	1	10 days	Irregular, speculated, isodense mass	Oval, parallel, hypoechoic lesion with a microlobulated margin. The presence of echogenic halo is not evident
Porter et al. (3)	F	75, 52	Not available	Not available	Round, circumscribed, hyperdense mass	Oval, circumscribed, hypoechoic mass with posterior acoustic enhancement
Squillaci et al. (4)	M	40	4.1	2 months	Oval, indistinct, hyperdense mass	Round, isoechoic, non-parallel mass with microlobulated margin and focally echogenic halo
Hayashi et al. (5)	F	41	1	A few days	Irregular, speculated, hyperdense mass	Irregular, microlobulated, hypoechoic mass with non-parallel orientation with echogenic halo
Iwatani et al. (6)	F	25	0.9	4 months	Irregular, spiculated, hyperdense mass	Irregular, non-parallel, microlobulated, isoechoic lesion with echogenic halo
Son et al.	F	41	1.1	1 week	Oval, partially indistinct, isodense mass	Irregular, non-parallel, hypoechoic mass with microlobulated margin and echogenic halo

CNB, core needle biopsy; FNA, fine needle aspiration.

solitary fibrous tumor, phyllodes tumor, spindle cell metaplastic carcinoma, spindle cell melanoma, fibrosarcoma, and leiomyosarcoma. They can be differentiated based on cellularity, nuclear features, collagen content, and growth pattern (4). Sometimes, immunohistochemistry staining such as S-100, CD34 and cytokeratin can be helpful for the differential diagnosis (4).

On mammography, the imaging features of nodular fasciitis are variable with both well-circumscribed lesions and spiculated masses described in the literature (Table 1). We tried to evaluate the characteristic features of the imaging findings of nodular fasciitis from previous reports according to the BI-RADS lexicon (1–6). Among seven pathologically proven nodular fasciitis cases, including our case, only one report presented a circumscribed margin and four presented a spiculated margin (57.1%, 4 of 7). The majority of cases of nodular fasciitis were hyperdense (71.4%, 5 of 7). The most common ultrasound appearance was non-parallel orientation and microlobulated margin in 71.4% of cases (5 of 7). In 57.1% of cases, an echogenic halo was revealed. According to these findings, the

ultrasound images might be classified as BI-RADS 4 or 5, and biopsy is necessary for diagnosis. However, in a minority of cases, nodular fasciitis with well-defined margins are more suggestive of a benign lesion (Table 1).

These differences in radiographic appearance may indicate that when the lesion becomes more mature, it becomes more fibrotic. Also, the US imaging findings may depend on the histologic characteristics of nodular fasciitis (2,3,9,11). The histologic type in our case was mixed cellular with a fibrous component. The mammogram showed a partially circumscribed and partially indistinct mass. On ultrasound, the lesion was irregular, non-parallel, and hypoechoic with a microlobulated margin and echogenic halo. These suspicious imaging features of nodular fasciitis show an alarming similarity to breast malignancy.

The treatment of nodular fasciitis is excisional biopsy because of the difficulties in distinguishing between nodular fasciitis and sarcoma by radiological appearance (2,4,9). Some authors are of the opinion that conservative management may be considered for

suspected nodular fasciitis lesions because spontaneous resolution has been reported (11). Recurrence of nodular fasciitis after surgical removal is rare (11,12). Conservative management may be appropriate in cases with benign results from core needle biopsy and typical clinical history. However there are many spindle cell tumors to differentiate with nodular fasciitis. If the pathologic diagnosis is not conclusive, surgical biopsy should be considered.

In conclusion, nodular fasciitis is a rare breast lesion that can be confused with both benign and malignant tumors. Nodular fasciitis shows hyperdensity and a spiculated margin on mammograms, and hypoechogenicity with a non-circumscribed margin, echogenic halo, or non-parallel orientation on US imaging findings. Pathological examination by core needle biopsy is usually required for diagnosis. Radiologists should be aware of the clinical behavior, imaging features, and histopathologic features of nodular fasciitis to avoid a misdiagnosis.

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