Breast Cancer Adjacent to Nodular Fasciitis: A Case Report

Ryuji Takahashi1,2,*, Ayaka Ishii1,2, Roka Namoto Matsubayashi1,2, Shino Nakagawa1,2, Momoko Akashi1,2, Kana Tsutsumi1,2, Shino Harada1,2, Seiya Momosaki2,3 and Yoshito Akagi4

1Department of Breast Care Center, National Hospital Organization Kyushu Medical Center, Fukuoka, Japan
2Clinical Research Institute, National Hospital Organization Kyushu Medical Center, Fukuoka, Japan
3Department of Pathology, National Hospital Organization Kyushu Medical Center, Fukuoka, Japan
4Department of Surgery, Kurume University School of Medicine, Kurume, Japan

*Corresponding author: Ryuji Takahashi, Department of Breast Care Center, National Hospital Organization Kyushu Medical Center, 1-8-1 Jigyohama Chuou-ku, Fukuoka, Japan, E-mail: ryuji@kyumed.jp

Abstract

Nodular fasciitis is a benign proliferative lesion that is generally found in the soft tissue of the upper extremity and trunk. It has rarely been reported in the breast and that of the breast is indistinguishable from breast cancer. A 77-year-old woman visited our department to biopsy the swollen axillary lymph node. Contemporary, a breast tumor was found in her left breast. Mammography showed a high density mass with microlobulated margin. On ultrasonography, there was an irregular hypoechoic mass which was adjacent to a heterogeneous hyperechoic lesion. Needle biopsied tissues showed a proliferation of spindle-shaped cells and suggested nodular fasciitis. On Magnetic Resonance Imaging (MRI), a lobulated mass was detected in the left breast. The mass showed iso signal intensity (SI) to mammary gland on T1-weighted images, while it showed intermingled high and low SI on T2-weighted images. Dynamic contrast-enhanced MRI showed rapid early enhancement followed by wash-out, but persistent enhancement was partly shown. Surgical excision of the breast tumor was performed in the present case. Pathologically, there was an invasive ductal carcinoma adjacent to nodular fasciitis. By immunohistochemistry, these tumor cells showed diffusely positive for estrogen and progesterone receptors and negative for human epidermal growth factor receptor 2 (HER2). We propose that estrogen-related changes regarding mammary gland proliferation might play an important role in the etiopathogenesis of nodular fasciitis.

Keywords

Nodular fasciitis, Breast MRI, Breast cancer

List of Abbreviations

MRI: magnetic resonance imaging, SI: Signal intensity, HER2: human epidermal growth factor receptor 2, H.E: Eosin & Hematoxylin.

Introduction

Nodular fasciitis is a benign proliferation of myo fibroblasts usually found in the soft tissue of the upper extremities or the lower extremities, the head and thorax [1,2]. It has rarely been reported in the breast and has been advocated that indistinguishable from breast cancer. The history of trauma is elicited in approximately 5-15 percent of patients [2]. Herein we report a patient with breast cancer adjacent to nodular fasciitis in the breast.

A 77-year-old woman visited our department to biopsy the axillary lymph node, because malignant lymphoma was clinically suggested. Her left breast had been bruised and a breast tumor was palpable in the left lateral lesion. Mammography showed a high density mass with microlobulated margin in the retromammary space (Figure 1a and Figure 1b). On ultrasonography, there was an irregular hypoechoic mass (15×9 mm in size) with an adjacent heterogeneous hyperechoic lesion (8×8 mm in size) (Figure 2a). Increased peri-tumoral vascular flow and hardness of the tumor measured by elastography suggested an invasive breast cancer which invaded the adipose tissues (Figure 2b and Figure 2c). Needle biopsied tissues showed a proliferation of spindle-shaped cells without cellular atypia and suggested nodular fasciitis (Figure 3a). On magnetic resonance imaging (MRI), a lobulated mass was detected (15×15×14 mm in size) in the left breast. The mass showed iso signal intensity (SI) to mammary gland on T1-weighted images, while it showed intermingled high and low SI on T2-weighted images (Figure 4a and Figure 4b). Dynamic contrast-enhanced MRI showed rapid early enhancement followed by wash-out, but steady persistent enhancement was partly shown (Figure 4c and Figure 4d). Although no malignant finding was shown in the tissue samples obtained by needle biopsy, malignant breast tumor including breast cancer was suggested by these imaging findings. Therefore, surgical excision of the breast tumor and axillary lymph node biopsy were performed. Pathologically, there was an invasive ductal carcinoma adjacent to nodular fasciitis (Figure 3b). Malignant epithelial cells proliferated mainly in the ducts arranged in solid-sheets, and focally invaded the adipose tissue (Figure 5a). The tumor cells also proliferated in the central part of the nodular fasciitis (Figure 5b). By immunohistochemistry, these tumor cells showed diffusely positive for estrogen and progesterone receptors and negative for human epidermal growth factor receptor 2 (HER2). No additional treatment but palliative care for advanced malignant lymphoma was administrated in the present case. She died after six months following surgery due to disease progression of malignant lymphoma.
Figure 1: Mammography

Mammography showed a high density mass with microlobulated margin in the retromammary space (a: Mediolateral oblique view, b: Craniocaudal view).

Figure 2: Ultrasonography

a: On ultrasonography, there was an irregular hypoechoic mass (15×9 mm in size) with an adjacent heterogeneous hyperechoic lesion (8×8 mm in size). b, c: Increased per-tumoral vascular flow and hardness of the tumor measured by elastography suggested an invasive breast cancer which invaded the adipose tissue (b: Color Doppler mode, c: Elastography).
we had taken tissue samples only from the hypoechoic mass, so we should also have taken them from the hyperechoic lesion. Based on the correlation of pathological and ultrasonographic findings, the hyperechoic lesion reflected the invasive cancer while the hypoechoic lesion reflected the nodular fasciitis. Eventually, surgical excision was performed and then we diagnosed invasive ductal carcinoma adjacent to nodular fasciitis in the breast. To our knowledge, this is the first report of nodular fasciitis in the breast adjacent to breast cancer.

Histologically, nodular fasciitis is characterized by plump, immature spindle fibroblasts and myofibroblasts arranged in short irregular bundles [26]. Its benign nature has been well described in the literature, and it has been recently categorized as one of the benign mesenchymal tumors of the breast by the World Health Organization [27]. The histological differential diagnosis includes spindle-shaped cell tumors such as fibromatosis, myofibroblastoma, solitary fibrous tumor, phyllodes tumor, spindle cell carcinoma, fibrous histiocytoma, and various types of soft-tissue sarcomas. Nodular fasciitis can be distinguished from them based on cellularity, nuclear features, collagen content, and growth pattern [18]. Excisional, core needle, or vacuum-assisted biopsy is useful for histological diagnosis, and spontaneous regression and disappearance of the tumor was observed in the 5 cases (Case #4, #13, #23, #24, and #25 on Table 1) [6,15,24,25]. In addition, local recurrence following surgical excision rarely occurred (Case #13, #17 on Table 1) [15,18]. These characteristics of nodular fasciitis in the breast suggest that accurate histological diagnosis could avoid overtreatment. Although contrast-enhanced MRI could be helpful to discriminate nodular fasciitis from malignancy, only a few reports described MRI imaging in the breast [20,25]. Rapid early and persistent, or high contrast enhancement was shown on dynamic contrast-enhanced MRI. The present case showed rapid early enhancement followed by wash-out, but steady persistent enhancement was partly shown (c: T1-weighted dynamic images (early phase), d: diffusion-weighted images with dynamic curves).

**Discussion**

Nodular fasciitis in the breast is very rare and only 25 cases have been reported worldwide to date (Table 1) [3-25]. The median age of the patients was 41 years (range 15-84 years) and the majority of them were female. The median tumor size was 1.5 cm (range 0.5-5.6 cm), it seems not so large. Mammography and ultrasonography tend to reveal malignant tumor, thus immediate excision was performed in the most cases. Unexpectedly, invasive ductal carcinoma was complicated with nodular fasciitis in the present case. Regrettably, we had taken tissue samples only from the hypoechoic mass, so we should also have taken them from the hyperechoic lesion. Based on the correlation of pathological and ultrasonographic findings, the hyperechoic lesion reflected the invasive cancer while the hypoechoic lesion reflected the nodular fasciitis. Eventually, surgical excision was performed and then we diagnosed invasive ductal carcinoma adjacent to nodular fasciitis in the breast. To our knowledge, this is the first report of nodular fasciitis in the breast adjacent to breast cancer.

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Table 1: Reported cases of nodular fasciitis in the breast

<table>
<thead>
<tr>
<th>No.</th>
<th>Author</th>
<th>Year</th>
<th>Sex</th>
<th>Age</th>
<th>Size (cm)</th>
<th>Mammography</th>
<th>Ultrasonography</th>
<th>Treatment</th>
</tr>
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<tr>
<td>1</td>
<td>Baba et al. [3]</td>
<td>1978</td>
<td>Female</td>
<td>59</td>
<td>–</td>
<td>–</td>
<td>–</td>
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<td>3</td>
<td>Torngren et al. [5]</td>
<td>1991</td>
<td>Female</td>
<td>52</td>
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<tr>
<td>4</td>
<td>Stanley et al. [6]</td>
<td>1993</td>
<td>–</td>
<td>1.5</td>
<td>–</td>
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<td>Observed</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Benson et al. [7]</td>
<td>1994</td>
<td>–</td>
<td>44</td>
<td>1.5</td>
<td>Unspecified</td>
<td>Unspecified</td>
<td>Excised</td>
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<tr>
<td>6</td>
<td>Black et al. [8]</td>
<td>1994</td>
<td>Female</td>
<td>84</td>
<td>3.4</td>
<td>High density mass with micro-lobulated margin</td>
<td>–</td>
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<td>7</td>
<td>Green et al. [9]</td>
<td>1997</td>
<td>–</td>
<td>61</td>
<td>2.5</td>
<td>Unspecified</td>
<td>Unspecified</td>
<td>Excised</td>
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<tr>
<td>8</td>
<td>Kontogeorgos et al. [10]</td>
<td>1998</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
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<tr>
<td>10</td>
<td>Dahlstrom et al. [12]</td>
<td>2001</td>
<td>Female</td>
<td>38</td>
<td>1.2</td>
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<td>Excised</td>
</tr>
<tr>
<td>11</td>
<td>Polat et al. [13]</td>
<td>2002</td>
<td>Female</td>
<td>66</td>
<td>–</td>
<td>High dense mass with circumscribed mass</td>
<td>Hypoechoic lesion</td>
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<tr>
<td>12</td>
<td>Tulbah et al. [14]</td>
<td>2003</td>
<td>Female</td>
<td>18</td>
<td>–</td>
<td>Not performed</td>
<td>Not performed</td>
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<td>Brown and Carty [15]</td>
<td>2005</td>
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<td>Observed</td>
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<td>2006</td>
<td>Female</td>
<td>75</td>
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<td>–</td>
<td>–</td>
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<td>2006</td>
<td>Female</td>
<td>52</td>
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<td>–</td>
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<tr>
<td>16</td>
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<td>2007</td>
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<td>41</td>
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<td>17</td>
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<td>2007</td>
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<td>40</td>
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<tr>
<td>18</td>
<td>Ozben et al. [19]</td>
<td>2009</td>
<td>Female</td>
<td>18</td>
<td>0.8</td>
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<td>2012</td>
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<td>25</td>
<td>0.5</td>
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<td>Hypoechoic lesion with irregular margin</td>
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<tr>
<td>20</td>
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<td>2013</td>
<td>Male</td>
<td>17</td>
<td>1.5</td>
<td>Not performed</td>
<td>Not performed</td>
<td>–</td>
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<tr>
<td>21</td>
<td>Son et al. [22]</td>
<td>2013</td>
<td>Female</td>
<td>41</td>
<td>1.1</td>
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<td>Hypoechoic lesion with irregular margin</td>
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<tr>
<td>22</td>
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<td>2014</td>
<td>Female</td>
<td>35</td>
<td>1.3</td>
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<td>Hypoechoic lesion with irregular margin</td>
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<tr>
<td>23</td>
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<td>2014</td>
<td>Female</td>
<td>68</td>
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<td>Multiloculated complex cystic mass</td>
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<td>43</td>
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<td>25</td>
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<td>32</td>
<td>2.0</td>
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<td>Hypoechoic round lesion with indistinct margin</td>
<td>Observed</td>
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References