Case Report

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Imaging Findings of Primary Acinic Cell Carcinoma of the Breast: A Case Report

유방에서 발생한 선방세포암의 영상 소견: 증례 보고

Eui Hyun Yu, MD[1], Kyounglan Ko, MD[1]*, Joon Yeun Park, MD[2], Yoon Yang Jung, MD[3], Hyuk Jai Shin, MD[4], Hyun Jung Choi, MD[4]

Departments of [1]Radiology, [2]Nuclear Medicine, [3]Pathology, and [4]Surgery, Myongji Hospital, Hanyang University College of Medicine, Goyang, Korea

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***Corresponding author**
Kyounglan Ko, MD
Department of Radiology, Myongji Hospital, Hanyang University College of Medicine,
55 Hwasu-ro 14beon-gil, Deogyang-gu, Goyang 10475, Korea.

Tel 82-31-810-7261
Fax 82-31-810-7263
E-mail kokrncc@gmail.com

Acinic cell carcinoma is a rare malignant tumor that accounts for 2%–3% of salivary gland tumors. Acinic cell carcinoma arising from the breast is extremely rare, with only approximately 70 cases reported to date. Owing to its rarity, previous studies have primarily focused on pathological findings. Herein, we present the clinical and radiological features of acinic cell carcinoma of the breast in a 33-year-old woman.

Index terms Acinic Cell Carcinoma; Breast; Ultrasonography; Magnetic Resonance Imaging; Mammography

INTRODUCTION

Breast cancer comprises various histological subtypes, with invasive breast carcinoma of no special type being the most common, accounting for 70%–80% of all breast malignancies (1). Acinic cell carcinoma, a special histological type of breast cancer, is a rare salivary gland-type tumor (2). The occurrence of acinic cell carcinoma originating from the breast is extremely rare, with only approximately 70 cases reported to date (3). Most reported studies have focused mainly on histopathological analyses, while imaging findings have not been comprehensively reviewed. In this case report, we report the imaging features of acinic cell carcinoma obtained using mammography, ultrasonography (US), MRI, and PET/CT.

CASE REPORT

A 33-year-old woman with suspected breast cancer was referred to our hospital for further evaluation and treatment. She reported noticing a palpable mass in her

left breast a year ago, which had rapidly increased over the past 6 months. A core needle biopsy was performed at another clinic, and invasive breast cancer was diagnosed. The lesion was re-evaluated prior to surgery using various imaging modalities, including mammography, US, MRI, and PET/CT.

Mammography revealed an oval, high-density mass with indistinct margins in the upper center of the left breast. A small lymph node (LN) in the left axillary fossa was also noted (Fig. 1A). Subsequent breast US revealed a 2.4-cm oval, hypoechoic mass with indistinct margins and posterior acoustic enhancement at the 12 o'clock position in the left breast. Color Doppler US revealed increased peripheral vascularity (Fig. 1B). For staging, dynamic contrast-enhanced breast MRI (Signa Explorer 1.5T; GE Healthcare, Waukesha, WI, USA) was performed; a 2.9 × 1.8 × 2.8 cm oval mass with irregular margins was observed. The mass showed rim enhancement with an initial rapid and delayed washout enhancement pattern. A 0.6-cm LN was noted in the left axillary level I (Fig. 1C). On ^{18}F-fluorodeoxyglucose (FDG) PET/CT, the mass showed avid FDG uptake with a maximum standardized uptake value (SUVmax) of 6.04. No abnormal hypermetabolic lesions were noted in the rest of the body (Fig. 1D).

Subsequently, the patient underwent left breast-conserving surgery and axillary LN biopsy. Histopathological analysis of the resected specimen revealed infiltrating carcinoma with small acinar structures and clear resection margins. The three dissected left axillary LNs, including two sentinel LNs, were cancer-free. The final pathological diagnosis was a 2.9-cm sized acinic cell carcinoma with ductal features (pT2N0). Immunohistochemical staining was negative for estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2). Following surgery, the patient underwent adjuvant chemotherapy and radiotherapy. Four cycles of adriamycin and cyclophosphamide were administered at 2-week intervals. Radiotherapy was delivered at a dose of 4320 cGy/16 fx to the left whole breast and 900 cGy/3 fx to the tumor bed. Follow-up US, CT, and MRI performed at 6-month intervals for 2.5 years showed no local recurrence or metastasis.

This study was approved by the Institutional Review Board of our institution, which waived the requirement for informed consent (IRB No. 2023-08-009).

DISCUSSION

Primary breast acinic cell carcinoma is rare, and only a small number of cases have been reported since it was first described in 1996. According to the World Health Organization classification (2019), acinic cell carcinoma belongs to rare salivary gland-type tumors. The breast and salivary glands share similarities in embryology. Acinar cells, the major components of the salivary glands, can be present in breast lobules (3). Therefore, tumors common to the salivary glands can also arise from the mammary glands.

Acinic cell carcinoma of the salivary gland, constituting 10%–17% of all primary salivary gland malignancies, most commonly originates from the parotid glands. Serous acinar cell differentiation, containing cytoplasmic zymogen granules is a characteristic feature. The immunohistochemical profiles of acinic cell carcinomas in both the salivary and mammary glands have many similar features with frequent expression of S-100, lysozyme, amylase, and alpha-1-antichymotrypsin (4).

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Fig. 1. Imaging and pathological findings of breast acinic cell carcinoma in a 33-year-old woman.
A. Mammography shows an oval, high-density mass with indistinct margins in the upper mid portion of the left breast. A small LN in the left axillary fossa is also noted (arrow).
B. Breast ultrasonography in the transverse view shows a 2.4-cm oval, hypoechoic mass with indistinct margins and posterior acoustic enhancement. Color Doppler scan reveals increased peripheral vascularity.
C. MIP image shows an oval mass with irregular margins and heterogeneous enhancement. Axial T1WI shows homogeneous isointensity of the mass compared with the fibroglandular tissue. Axial T2WI shows a mass with heterogeneous hyperintensity and peritumoral edema. In dynamic studies, the mass demonstrates rim enhancement with an initial rapid and delayed washout enhancement pattern. A 0.6-cm LN is noted in the left axillary level I (arrow).
LN = lymph node, MIP = maximum intensity projection, WI = weighted image

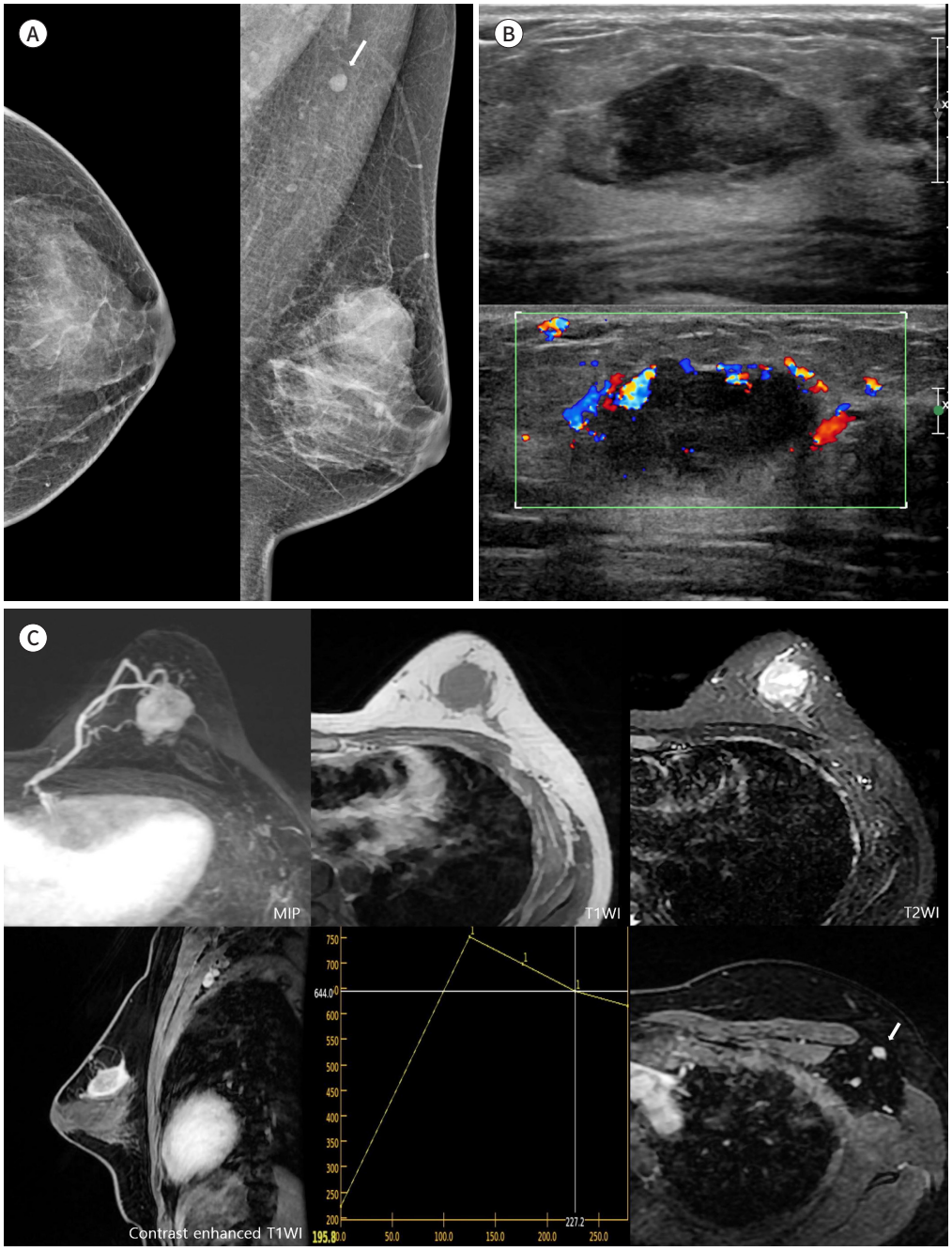
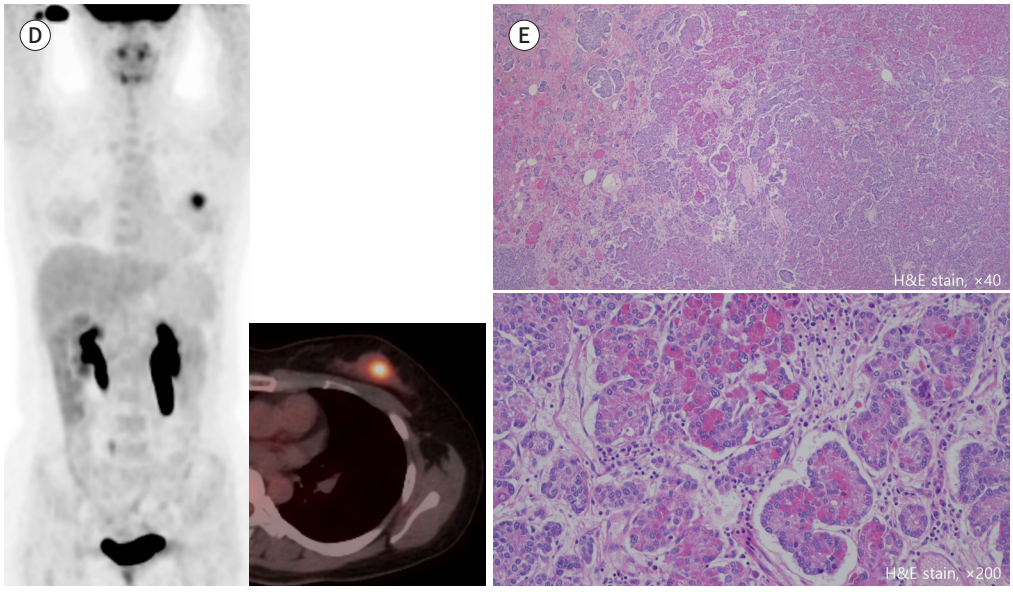


Fig. 1. Imaging and pathological findings of breast acinic cell carcinoma in a 33-year-old woman.
D. ^{18}F-FDG PET/CT shows a mass in the left breast with avid FDG uptake (SUVmax: 6.04). No other abnormal hypermetabolic lesion is seen in the rest of the body.
E. Microscopic analysis shows infiltrating carcinoma with small acinar structures (H&E stain, × 40). On a high power view, the cells have abundant cytoplasm containing eosinophilic granules, resembling the acinic cells of the salivary glands (H&E stain, × 200).
FDG = fluorodeoxyglucose, H&E = hematoxylin and eosin, SUVmax = maximum standardized uptake value



Microscopic analysis of the surgical specimen in our case revealed an infiltrating carcinoma with small acinar structures (Fig. 1E). The cells had abundant cytoplasm containing eosinophilic granules, similar to the zymogen granules in the acinic cells of the salivary glands. These eosinophilic granules, characteristic of acinic cell differentiation, have been described in microglandular adenosis lesions and acinic cell carcinomas (4). Immunohistochemical analysis demonstrated positivity for alpha-1-antitrypsin, epithelial membrane antigen, S-100, and E-cadherin, consistent with acinic cell carcinoma. Acinic cell carcinoma of the breast usually presents as triple-negative breast cancer (TNBC), with few rare cases of ER or PR expression (3). Immunohistochemical analysis of our surgical specimens also revealed the absence of ER, PR, and HER2, indicating TNBC.

The radiological appearance of acinic cell carcinoma of the breast has been variably reported as an ill-defined solid lesion; a well-defined, lobulated, solid lesion mimicking fibroadenoma; or even a radiologically hidden cancer (3). These masses were often oval in shape. The margins were indistinct in seven cases, followed by circumscribed in six cases. However, precise analysis was limited, as imaging findings were not provided in detail and were not described using the breast imaging reporting and data system (BI-RADS) lexicon.

The imaging findings in our patient were generally consistent with the previously described features of TNBC (5-8). On mammography, the tumor presented as an oval, high-density mass with indistinct margins. On ultrasound, the mass was oval in shape with indistinct margins, and had low echogenicity with posterior acoustic enhancement. Color Doppler US revealed markedly increased vascularity at the periphery of the mass. MR findings included

a single oval mass with rim enhancement and a washout kinetic curve. The mass showed homogeneous intense FDG uptake with an SUVmax of 6.04.

As acinic cell carcinoma of the breast is often seen as oval in shape with circumscribed margins, at mammography and US, benign entities mimicking TNBC such as fibroadenoma can be considered as differential diagnosis.

In the literature, the age of patients with breast acinic cell carcinoma ranged from 20 to 80 years (mean, 48.5 years) (3). Our patient was diagnosed at a relatively young age of 33 years and did not report a family history of breast cancer.

Although acinic cell carcinoma often presents as TNBC, most reported cases have demonstrated a relatively good prognosis (3). However, several case reports of recurrence or metastasis resulting in unfavorable outcomes have also been reported, including local recurrence as early as 8 months after surgery and distant metastasis occurring 96 months after diagnosis even in the absence of LN metastasis (9). Compared with recurrent or metastatic cases, the lack of LN metastasis and relatively small tumor size (< 3 cm) in our case are presumably related to a good prognosis. However, owing to its extreme rarity, no clear consensus exists concerning the treatment and follow-up plans.

In our case, the tumor was classified as grade 3 according to the modified Bloom–Richardson histological grading system, with poor tubule formation, intermediate nuclear pleomorphism, and abundant mitotic figures. Ki-67 was positive in 30% of the tumor cell, which is regarded as an intermediate expression level in breast cancer. The prognosis of breast cancer, estimated using the Nottingham Prognostic Index, was moderate with a 78% cancer-specific 10-year survival rate (10). Currently, the patient is clinically stable, with no recurrence or metastasis observed for 2.5 years. Although acinic cell carcinoma of the breast has been reported to have a good prognosis in the majority of cases, careful imaging follow-up is necessary for the high-grade TNBC of the present case.

In conclusion, we report an extremely rare case of primary acinic cell carcinoma of the breast, with imaging findings on various modalities. The pathological features, immunohistochemical findings, and prognostic factors were also reviewed. Imaging revealed an oval, high-density mass with indistinct margins on mammography; an oval hypoechoic mass with indistinct margins and posterior acoustic enhancement on US; a single oval mass with rim enhancement on MRI; and homogeneous intense FDG uptake on PET/CT, which are compatible with those of TNBC. Although very rare, radiologists should be aware of acinic cell carcinoma as a potential diagnosis when a breast mass shows imaging features of TNBC.

Author Contributions

Conceptualization, K.K.; supervision, K.K.; visualization, K.K., P.J.Y., J.Y.Y.; writing—original draft, Y.E.H.; and writing—review & editing, all authors.

Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

ORCID iDs

Eui Hyun Yu https://orcid.org/0000-0003-0841-1392
Kyounglan Ko https://orcid.org/0000-0003-0835-5300
Joon Yeun Park https://orcid.org/0000-0002-9761-2438

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Yoon Yang Jung https://orcid.org/0000-0001-9905-3900
Hyuk Jai Shin https://orcid.org/0000-0003-2728-3146
Hyun Jung Choi https://orcid.org/0009-0008-4976-4104

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유방에서 발생한 선방세포암의 영상 소견: 증례 보고

유의현[1] · 고경란[1*] · 박준연[2] · 정윤양[3] · 신혁재[4] · 최현정[4]

선방세포암은 침샘에서 발생하는 종양 중 약 2%–3%를 차지하는 드문 악성 종양이다. 유방에서 발생한 선방세포암은 매우 드물어 현재까지 약 70예 정도만 보고되었고, 대부분 병리학적 소견을 위주로 기술되었다. 이에 저자들은 33세 여성에서 발생한 유방 선방세포암의 증례와 영상의학적 소견에 대해 보고하고자 한다.

한양대학교 의과대학 명지병원 [1]영상의학과, [2]핵의학과, [3]병리과, [4]외과