Case Report

J Korean Soc Radiol 2024;85(6):1221-1228
https://doi.org/10.3348/jksr.2024.0065
eISSN 2951-0805

JOURNAL of THE KOREAN SOCIETY of RADIOLOGY

Autoimmune Mastitis in a Patient with Behcet's Syndrome: A Case Report with Rapid Changes in Radiologic Features and Characteristic Pathologic Findings

베체트병 환자에서의 자가면역성 유선염: 영상의학적 소견의 변화 및 병리학적 특징

Yun Hwa Chang, MD[1], Suk Jin Park, MD[1]*, Joo Heon Kim, MD[2]

Departments of [1]Radiology and [2]Pathology, Eulji University Hospital, Daejeon, Korea

Received May 7, 2024
Revised June 9, 2024
Accepted July 2, 2024
Published Online October 26, 2024

***Corresponding author**
Suk Jin Park, MD
Department of Radiology,
Eulji University Hospital,
95 Dunsanseo-ro, Seo-gu,
Daejeon 35233, Korea.

Tel 82-42-611-3564
Fax 82-42-259-1162
E-mail embryojiny@gmail.com

Breast manifestations of autoimmune diseases are rare but may present as localized disease or as part of a systemic disease. The most common clinical presentations of autoimmune mastitis are palpable masses and mastalgia, but patients can also be asymptomatic. Its radiological features are nonspecific and varied; it usually appears as an irregular hypoechoic mass or ill-defined hypoechoic nonmass lesion that mimics malignancy, with or without duct ectasia on breast ultrasonography. On breast MRI, segmental or regional nonmass enhancement is observed. However, due to its nonspecific and rapid changes in its clinical and radiological features, its diagnosis is often challenging and delayed. Herein, we present a rare case of mastitis with mammary duct ectasia in a patient with Behcet's syndrome and its rapid changes in imaging features on serial radiologic studies. Furthermore, we review the literature focusing on the radiologic and histopathologic characteristics of autoimmune mastitis.

Index terms Mastitis; Behcet Syndrome; Autoimmune Diseases; Ultrasonography; Magnetic Resonance Imaging; Mammography

JOURNAL of THE KOREAN SOCIETY of RADIOLOGY

INTRODUCTION

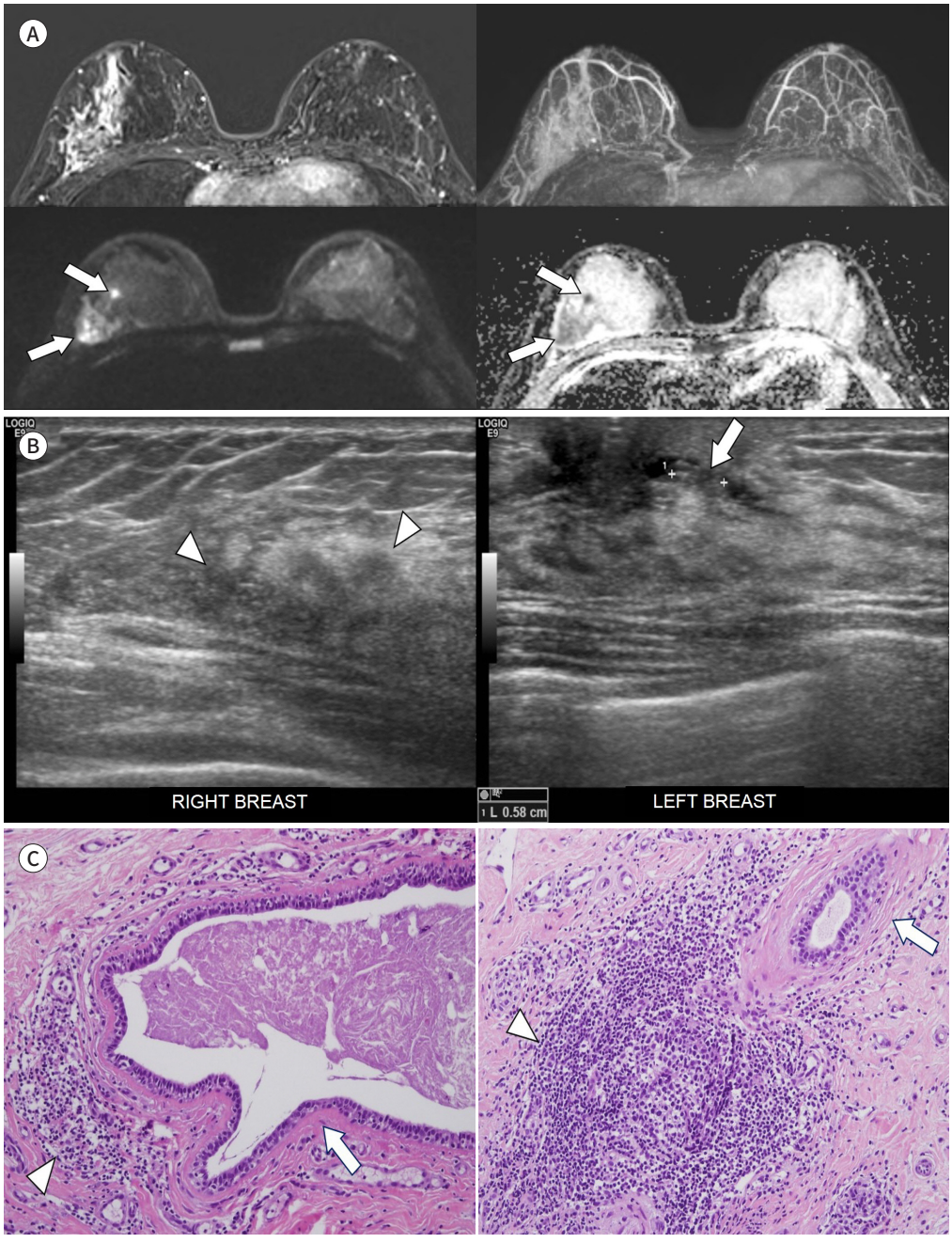
Mammary involvement in autoimmune diseases is rare but can present as localized disease or as part of a systemic disease. It is an uncommon diagnosis reached by excluding other common breast conditions with similar clinical manifestations (1). However, because autoimmune mastitis clinically presents with nonspecific symptoms and mimics imaging findings of breast carcinoma or infections, it is often challenging to diagnose autoimmune mastitis (2). Herein, we present a rare case of mastitis with mammary duct ectasia (MDE) in a patient with Behcet's syndrome and its rapid changes in imaging features on serial radiologic studies. We also review the literature focusing on the radiologic and histopathologic characteristics of autoimmune mastitis.

CASE REPORT

A 34-year-old woman visited our institution because of left mastalgia starting three months ago. Physical examination revealed nodularity of both breasts but no signs of infection, such as redness, warmth, or swelling. The patient had no history of trauma or breastfeeding. She had a medical history of recurrent oral and genital ulcers, was treated for uveitis, tested positive for HLA-B27 in 2017; thus, she was diagnosed with Behcet's syndrome according to the International Study Group criteria (3). She reported that she had not been taking any medication since 2017.

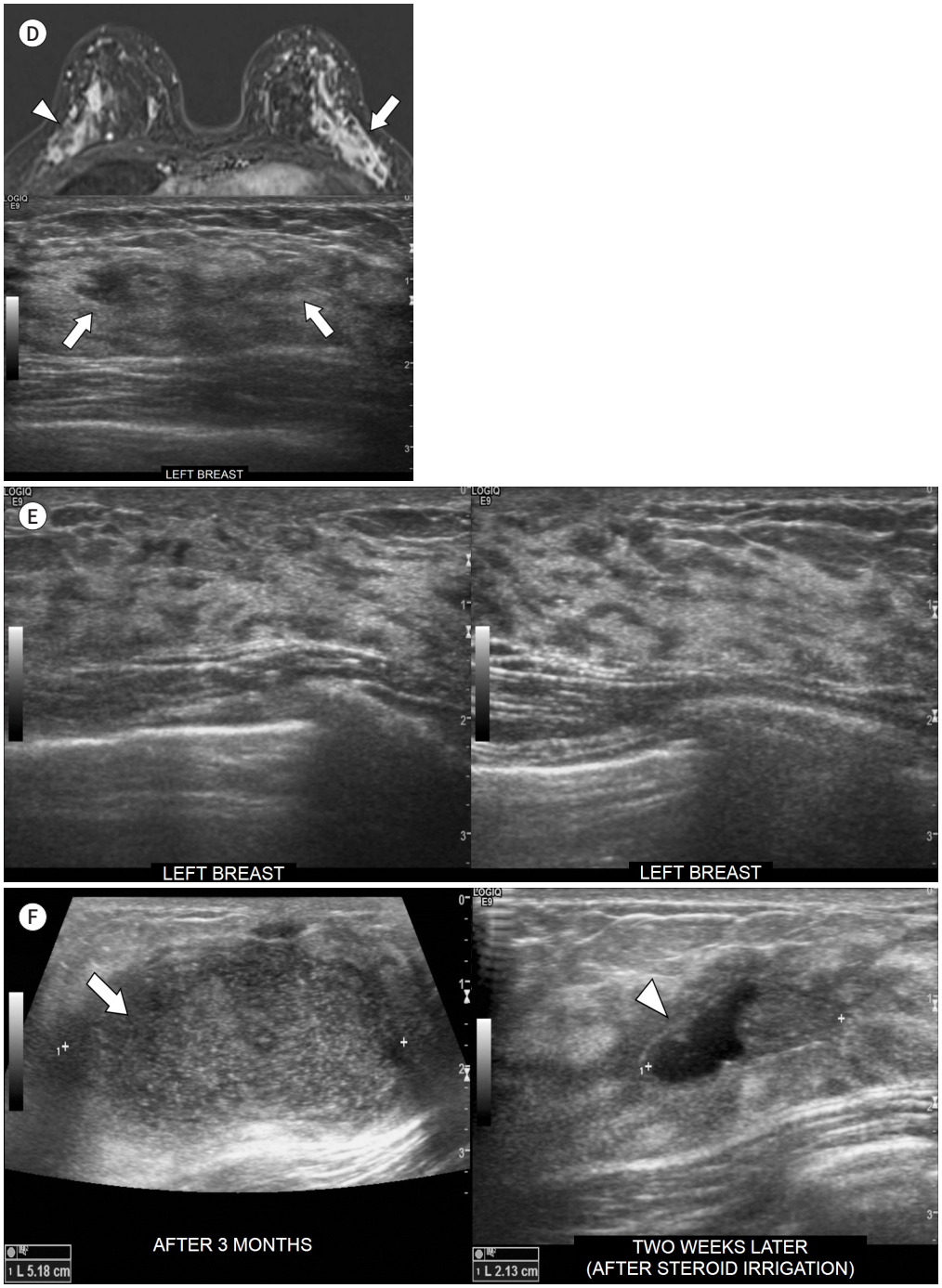
Initial mammography revealed extremely dense breasts without suspicious masses or microcalcifications in both breasts. Breast ultrasonography (US) was performed for further evaluation; however, no abnormalities were noted. Five months later, the patient revisited the outpatient clinic with right mastalgia. During a short period of time, she reported experiencing alternating mastalgia in both breasts and milkish nipple discharge. Her clinical symptoms were atypical; her pain was severe, sometimes accompanied by skin redness, and followed a wax-and-wane pattern, regardless of the hormonal cycle. However, despite her severe pain, no abnormal findings were detected on the initial mammography and US. The patient also had a family history of breast cancer and further evaluation of her condition was necessary. Therefore, the clinician decided to perform breast MRI to determine the cause of mastalgia. Breast MRI showed wedge-shaped, segmental, nonmass enhancement in the right outer breast with a pattern of ductal distribution (Fig. 1A). Mild restricted diffusion was also noted at the periphery of right outer breast in the 8 o'clock direction (Fig. 1A, arrows). Additional breast US was performed, and in the corresponding area of the right outer breast in the 8 to 10 o'clock direction, an ill-defined low echoic nonmass lesion was observed (Fig. 1B, arrowheads). Moreover, ductal dilatation with intraductal echogenic lesions were detected in the left subareolar area (Fig. 1B, arrow). Considering her medical history of Behcet's syndrome and clinical symptoms of mastalgia in both breasts, we highly suspected that all lesions could be associated with systemic inflammatory conditions. However, based on the suspicious radiologic features on MRI, histopathological studies were essential to rule out malignancy. Hence, the lesions were assessed as Breast Imaging-Reporting and Data System category 4B, and US-guided core needle biopsy was performed on the left subareolar lesion and the non-

Fig. 1. A 34-year-old woman with Behcet's syndrome presenting bilateral mastalgia.
A. Breast MRI shows a segmental nonmass enhancement in right outer breast (upper). Mild restricted diffusion is shown at the periphery of right outer breast (lower, arrows).
B. Breast US shows an ill-defined, low echoic nonmass lesion (arrowheads) in the corresponding area of right outer breast on MRI (left). Duct dilatation with intraductal echogenic lesion (arrow) is also present in left subareolar area (right).
C. Specimen from US-guided core-needle biopsy of right breast shows dilatation of the mammary duct with periductal inflammation (left) (arrowheads). Ductal ectasia with lymphoid hyperplasia in interlobular stroma (right) is present, while the basement membrane of the mammary duct is preserved (arrows) (left; ×100, right; ×200, hematoxylin and eosin stain).
US = ultrasonography



JOURNAL of THE KOREAN SOCIETY of RADIOLOGY

Fig. 1. A 34-year-old woman with Behcet's syndrome presenting bilateral mastalgia.
D. Follow-up breast MRI after three months shows a newly developed segmental nonmass enhancement in the left outer breast (upper, arrow), similar to the previous right outer breast lesion. The extent of the right outer breast lesion is decreased (upper, arrowhead). Follow-up US shows newly developed diffuse hypoechoic nonmass lesion in the corresponding left outer breast area (lower, arrows).
E. Breast US no longer presents previously noted left subareolar lesion, which was pathologically confirmed as mammary duct ectasia with periductal inflammation by core-needle biopsy.
F. Breast US after three months shows a loculated abscess with internal floating dirty echoes in the right outer breast area (arrow). Following steroid irrigation, the size of the abscess is decreased significantly on US after two weeks (arrowhead).
US = ultrasonography



mass lesion in the right outer breast.

Histopathological examination revealed mammary duct dilatation with periductal inflammation and fibrosis, suggesting MDE (Fig. 1C, left). Ductal ectasia with lymphoid hyperplasia in the interlobular stroma was observed (Fig. 1C, right), whereas the basement membrane of the mammary duct was preserved (Fig. 1C, arrows). Therefore, with the clinical-radiologic-pathologic correlation based on her medical history of Behcet's syndrome and clinical presentation, the patient was diagnosed with autoimmune mastitis. The patient was referred to the rheumatology department and treated with steroids, antibiotics, and nonsteroidal anti-inflammatory drugs.

On the 3-month follow-up breast MRI, segmental nonmass enhancement in the left outer breast (Fig. 1D, arrows), similar to the right outer breast lesion, appeared, while the extent of the right outer breast lesion decreased (Fig. 1D, arrowhead). Follow-up US also revealed a newly developed, diffuse, hypoechoic, nonmass lesion in the corresponding left outer breast area (Fig. 1D). Interestingly, the previously noted left subareolar lesion was no longer visible on US (Fig. 1E). The patient presented with a wax-and-wane pattern of clinical symptoms and radiologic features. The patient continued treatment with medication. However, three months later, the patient reported painful lumps in both breasts, and additional US revealed several cystic lesions with internal floating dirty echoes, suggesting loculated abscesses (Fig. 1F, arrow). Pus aspiration with high-dose steroid injection and irrigation was performed once for further study and treatment. Gram-staining, acid-fast bacteria staining, and routine culture were performed, but no bacterial growth was observed. Two weeks after steroid irrigation, follow-up US revealed a significant decrease in the extent of the abscess (Fig. 1F, arrowhead). This further supports our diagnosis of autoimmune mastitis in the patient with Behcet's syndrome.

This case report was approved by our Institutional Review Board, which waived the requirement for informed consent (IRB No. 2024-01-004).

DISCUSSION

Breast manifestations of autoimmune diseases are rare but may present in various autoimmune diseases, including Sjogren's syndrome, systemic erythematosus lupus, and Behcet's syndrome (4-6). The clinical presentation of autoimmune mastitis varies; some patients experience a palpable mass, nipple discharge, or mastalgia due to recurrent inflammation, while others are asymptomatic (1). It can often be misdiagnosed or underdiagnosed because of its nonspecific clinical and radiological features if a comprehensive evaluation is absent. Thus, a radiologist's awareness of autoimmune mastitis and the clinical-radiologic-pathologic correlation is crucial for early diagnosis to properly manage patients and avoid repeated or unnecessary biopsies.

Histologically, autoimmune mastitis is described in four main patterns: 1) lymphocytic infiltrates, 2) ductal ectasia, 3) granulomatous mastitis, and 4) vasculitis (1). Our case of autoimmune mastitis was associated with Behcet's syndrome and pathologically confirmed as MDE. MDE usually occurs as a result of milk accumulation in the mammary ducts, which is generally observed in older patients. However, the mechanism of duct ectasia is considered to be different in autoimmune mastitis; due to recurrent periductal inflammation, periductal inflammatory infiltrates accumulate and subsequently result in destruction of the basement

membrane of the mammary ducts. This consequently results in ductal dilatation, followed by fibrosis of the duct walls at the end stage (1, 7).

The radiologic features of autoimmune mastitis are nonspecific but often mimic those of breast carcinoma; they usually appear as irregular hypoechoic masses or ill-defined hypoechoic nonmass lesions on breast US (8). MDE, characterized by dilated ducts larger than 2 mm on US, may also present with or without intraductal echogenic debris due to preceding periductal inflammation (1, 9). Mammography may demonstrate no radiological abnormality; however, if present, focal asymmetry, an indistinct mass, or a diffuse increase in breast density due to subcutaneous edema can be observed (8). Nonmass enhancement in segmental or regional patterns is commonly described as one of the characteristic radiologic features of inflammatory breast lesions (8, 10). Segmental nonmass enhancement on MRI especially mimics malignancy, such as ductal carcinoma in situ. Moreover, the presence of heterogeneously enhancing masses with or without restricted diffusion makes the diagnosis difficult. Thus, differential diagnosis is challenging. A wide spectrum of differential diagnoses, including breast carcinoma and other infectious or inflammatory conditions such as granulomatous lobular mastitis (GLM), should be considered. The presence of severe inflammation and abscess cavities may be suggestive of GLM; however, this cannot be confirmed by radiological studies alone. Histologically, lobulocentric non-necrotizing granulomas associated with epithelioid histiocytes should be confirmed as GLM (1, 10). Thus, core-needle biopsy with histopathological examination is essential to rule out breast carcinoma and other infectious conditions to diagnose this clinical disease.

Here, we present a rare case of autoimmune mastitis diagnosed by clinical-radiologic-pathologic correlation with MDE and serial imaging features in a young female with Behcet's syndrome. To the best of our knowledge, this is the first report of mastitis in a patient with Behcet's syndrome that describes rapid changes in imaging features on multiple radiological modalities. Interestingly, our patient showed rapid and reversible changes in the breast lesions in serial radiological studies over a follow-up period of 10 months. Serial breast US and MRI showed a wax-and-wane pattern of duct ectasia and regional nonmass lesions with enhancement. Nonetheless, it is difficult to generalize the course of autoimmune mastitis based solely on these imaging findings because its radiological features are nonspecific and varied, and duct ectasia and nonmass enhancement are also commonly observed in young females without underlying systemic diseases. However, it is noteworthy that these imaging features can be reversed in autoimmune mastitis if properly treated.

In the present case, ductal ectasia with periductal inflammatory infiltrates was observed, whereas the basement membrane of the mammary duct was preserved in the histopathological study. A hypothetical mechanism for this finding is that periductal inflammatory infiltrates and myxoid stroma with periductal edematous changes can be reversible histopathologic findings triggered by recurrent inflammation, which may appear as ill-defined nonmass lesions on radiological examinations. If treated properly, such lesions may disappear during follow-up, as in our case. However, if recurrent chronic inflammation continues, irreversible fibrotic changes ultimately occur in the duct walls.

It is important for radiologists to acknowledge the imaging findings and consider the possibility of autoimmune mastitis, especially in young females presenting with mastalgia with-

out any physical signs of infection or history of breastfeeding. In addition, a comprehensive evaluation of the patient's medical history and clinical symptoms is essential, and follow-up radiological examinations are recommended for patients with known autoimmune diseases. Clinical-radiologic-pathologic correlations will allow the proper management of patients with autoimmune mastitis.

Author Contributions

Conceptualization, C.Y.H., P.S.J.; data curation, all authors; P.S.J., K.J.H.; supervision, P.S.J., K.J.H.; writing—original draft, C.Y.H.; and writing—review & editing, all authors.

Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

ORCID iDs

Yun Hwa Chang https://orcid.org/0000-0003-2521-8420
Suk Jin Park https://orcid.org/0000-0003-3682-4004
Joo Heon Kim https://orcid.org/0000-0001-7592-0985

Funding

None

REFERENCES

1. Goulabchand R, Hafidi A, Van de Perre P, Millet I, Maria ATJ, Morel J, et al. Mastitis in autoimmune diseases: review of the literature, diagnostic pathway, and pathophysiological key players. *J Clin Med* 2020;9:958
2. Leong PW, Chotai NC, Kulkarni S. Imaging features of inflammatory breast disorders: a pictorial essay. *Korean J Radiol* 2018;19:5-14
3. Kiafar M, Faezi ST, Kasaeian A, Baghdadi A, Kakaei S, Mousavi SA, et al. Diagnosis of Behçet's disease: clinical characteristics, diagnostic criteria, and differential diagnoses. *BMC Rheumatol* 2021;5:2
4. Goulabchand R, Hafidi A, Millet I, Morel J, Lukas C, Humbert S, et al. Mastitis associated with Sjögren's syndrome: a series of nine cases. *Immunol Res* 2017;65:218-229
5. Soleto MJ, Marcos L. Behçet's disease involving the breast. *Eur Radiol* 2002;12(Suppl 3):S98-S100
6. Warne RR, Taylor D, Segal A, Irish A. Lupus mastitis: a mimicker of breast carcinoma. *BMJ Case Rep* 2011;2011:bcr1120115066
7. D'Alfonso TM, Ginter PS, Shin SJ. A review of inflammatory processes of the breast with a focus on diagnosis in core biopsy samples. *J Pathol Transl Med* 2015;49:279-287
8. Limninart N, Harvey JA, Schultz KJ, Mills AM, Noland MMB, Schroen AT, et al. "What do you mean it's not cancer?" A review of autoimmune and systemic inflammatory diseases involving the breast. *J Breast Imaging* 2021;3:612-625
9. Gunawardena RP, Gunawardena D, Metcalf C, Taylor D, Wylie L. Inflammatory breast disease: a pictorial essay with radiological-pathological correlation. *J Med Imaging Radiat Oncol* 2017;61:70-76
10. Pluguez-Turull CW, Nanyes JE, Quintero CJ, Alizai H, Mais DD, Kist KA, et al. Idiopathic granulomatous mastitis: manifestations at multimodality imaging and pitfalls. *Radiographics* 2018;38:330-356

JOURNAL of THE KOREAN SOCIETY of RADIOLOGY

베체트병 환자에서의 자가면역성 유선염: 영상의학적 소견의 변화 및 병리학적 특징

장윤화[1] · 박숙진[1*] · 김주헌[2]

자가면역질환의 유방 발현은 매우 드물지만 국소 질환이나 전신 질환의 일부로 나타날 수 있다. 자가면역성 유선염의 가장 흔한 임상 증상은 만져지는 종괴와 유방통이지만 증상이 없을 수도 있다. 영상검사에서도 비특이적이고 다양한 소견을 보일 수 있는데, 유방초음파에서 경계가 불규칙한 저에코성 종괴 또는 불분명한 저에코성 비종괴 병변으로 흔하게 보이며 이는 악성종양과 유사한 특징을 가진다. 자기공명영상에서는 분절 비종괴 조영증강의 형태로 보일 수 있다. 하지만 이러한 다양한 임상양상과 비특이적인 영상소견 때문에 진단이 어렵고 지연되는 경우가 많다. 이에 유방통으로 내원한 베체트증후군 환자에서 진단된 자가면역성 유선염의 증례를 보고하고, 1년 미만의 기간 동안 빠르게 변하는 영상의학적 소견을 살펴보고자 한다.

을지대학교병원 [1]영상의학과, [2]병리과