

# Mucinous carcinoma of the breast detected incidentally during screening mammography: a case report

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## ABSTRACT

Mucinous carcinoma of the breast is a rare histological subtype of invasive breast carcinoma characterized by abundant extracellular mucin production and generally favorable biological behavior. However, because it may present as a circumscribed or partially lobulated lesion on imaging, it can mimic benign breast masses and create a diagnostic challenge. We report the case of a 52-year-old asymptomatic postmenopausal woman in whom a left retroareolar breast lesion was detected incidentally during routine screening mammography. Initial mammography revealed a 15 mm partially irregular lobulated mass categorized as BI-RADS 4. Subsequent ultrasonography and breast magnetic resonance imaging confirmed the lesion, and interval enlargement resulted in a BI-RADS 5 assessment. Excisional biopsy demonstrated a well-circumscribed 2.3-cm gelatinous tumor. Microscopically, more than 90% of the lesion consisted of extracellular mucin pools containing neoplastic epithelial cells arranged in adenoid and cribriform-like structures, consistent with pure mucinous carcinoma. Immunohistochemically, the tumor showed strong, diffuse estrogen receptor and progesterone receptor positivity (95% each), HER2/c-erbB-2 negativity (score 0), MUC2 positivity, and a low Ki-67 proliferation index (<5%), supporting a luminal A-like immunophenotype. Based on the available pathological tumor size, the tumor was categorized as pT2. Regional nodal status could not be pathologically assessed because a sentinel lymph node biopsy was not performed (pNX). The patient underwent surgical excision followed by adjuvant chemotherapy and radiotherapy, and was scheduled for endocrine therapy. No evidence of recurrence or disease progression was observed during 12 months of follow-up. This case highlights the importance of screening mammography in the detection of clinically occult mucinous carcinoma and underscores the value of radiologic-pathologic correlation in lesions with deceptively benign imaging features.

**Keywords:** mucinous carcinoma, breast, screening mammography, histopathology, immunohistochemistry

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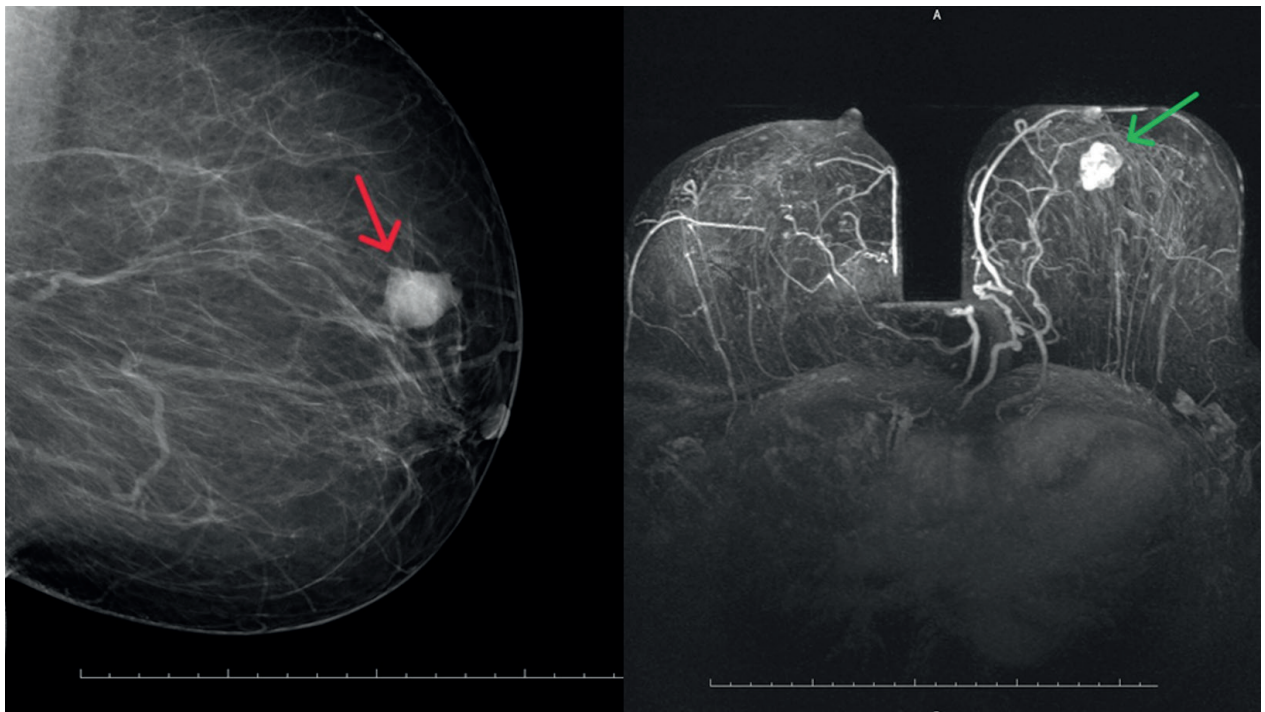
## INTRODUCTION

Mucinous carcinoma of the breast is a rare histological subtype of invasive breast carcinoma characterized by prominent extracellular mucin production and accounts for approximately 1% to 6% of all breast malignancies (1,2). It occurs predominantly in postmenopausal women and is generally associated with a more favorable prognosis than invasive breast carcinoma of no special type (3,4). Histologically, mucinous carcinoma is classified as pure or mixed, with pure mucinous carcinoma defined by a mucinous component constituting at least 90% of the tumor (5). This distinction is clinically important because pure mucinous carcinoma is associated with a lower rate of axillary lymph node involvement and less aggressive biological behavior than mixed mucinous carcinoma (6,7). Radiologically, however, these tumors may appear as circumscribed, oval, or lobulated masses and may therefore mimic benign lesions, leading to potential diagnostic underestimation (1,8,9).

In this report, we present a case of pure mucinous carcinoma detected incidentally during routine screening mammography in a 52-year-old asymptomatic woman and discuss its clinicopathological and radiologic features in light of the current literature.

## CASE REPORT

A 52-year-old woman with no active complaints presented to the Cancer Early Diagnosis, Screening and Training Center (KETEM) for routine breast cancer screening. Bilateral mammography revealed a suspicious lesion. A partially irregular lobulated mass measuring 15 mm was detected in the retroareolar region of the left breast and categorized as BI-RADS 4. The patient was referred to our hospital for further evaluation. Ultrasonography and repeat mammography confirmed the lesion, and additional breast magnetic resonance imaging (MRI) was requested (Figure 1). Breast MRI demonstrated a solid lesion in the left

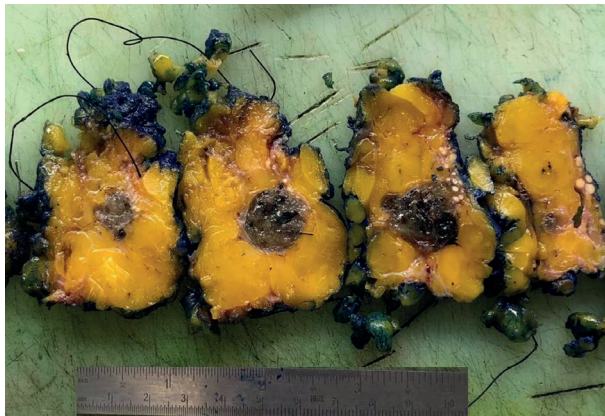


**Figure 1. (a)** Mammography showing a mass in the left retroareolar region (red arrow). **(b)** Dynamic contrast-enhanced breast MRI showing an irregular enhancing lesion in the left breast (green arrow).

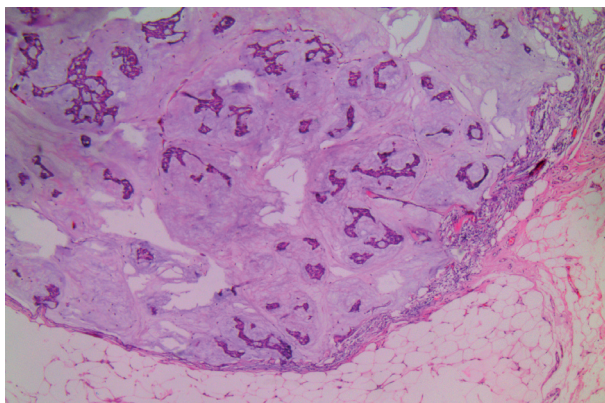
breast with interval enlargement during follow-up, and the lesion was categorized as BI-RADS 5. After informed consent was obtained, an excisional biopsy was performed.

On gross examination, the excised breast tissue measured 8 × 6 × 3.7 cm. Within the specimen, a well-circumscribed lesion measuring 2.3 × 2 × 2 cm was identified. The cut surface was gelatinous and showed focal hemorrhagic areas (Figure 2).

Microscopically, the lesion was composed of tumor cells with mild-to-moderate nuclear atypia arranged in epithelial clusters, adenoid and cribriform-like



**Figure 2.** Gross appearance of the tumor showing a well-circumscribed gelatinous lesion with focal hemorrhagic areas.



**Figure 3.** Tumor cells arranged in adenoid and cribriform-like structures floating within abundant extracellular mucin pools (H&E, ×40).

structures within abundant extracellular mucin pools (Figure 3). Occasional mitotic figures were noted. Peritumoral ductal dilatation and periductal lymphocytic inflammation were present. No lymphovascular invasion, necrosis, or microcalcification was identified.

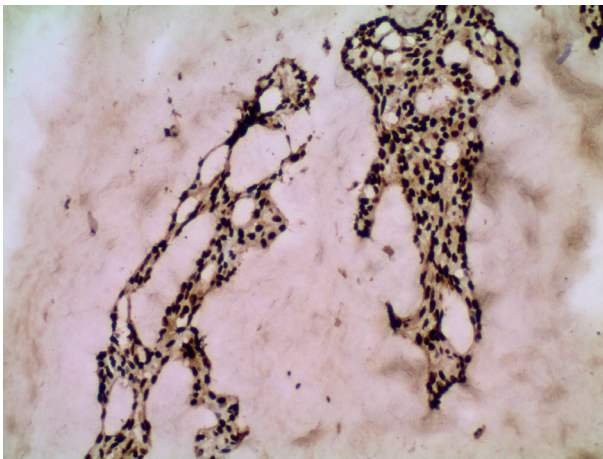
Immunohistochemically, the tumor cells showed strong and diffuse nuclear positivity for estrogen receptor (ER) and progesterone receptor (PR), each in 95% of tumor cells. MUC2 was positive, and E-cadherin expression was retained, although weakly. HER2/c-erbB-2 was negative (score 0). CDX2 and p63 were negative (Figure 4, Figure 5 and Figure 6). The Ki-67 proliferation index was below 5%. Histochemical staining with Alcian blue highlighted the mucinous areas (Figure 7).

Because more than 90% of the tumor consisted of extracellular mucin, the lesion was classified as pure mucinous carcinoma. The ER/PR-positive, HER2/c-erbB-2-negative, low-proliferative profile supported a luminal A-like immunophenotype. Based on the available pathological tumor size of 2.3 cm, the tumor was categorized as pT2. Because sentinel lymph node biopsy was not performed, the regional nodal status could not be pathologically assessed (pNX). The patient was referred to oncology, received four cycles of chemotherapy followed by radiotherapy, and was scheduled for aromatase inhibitor therapy. During 12 months of follow-up, no evidence of recurrence or disease progression was observed.

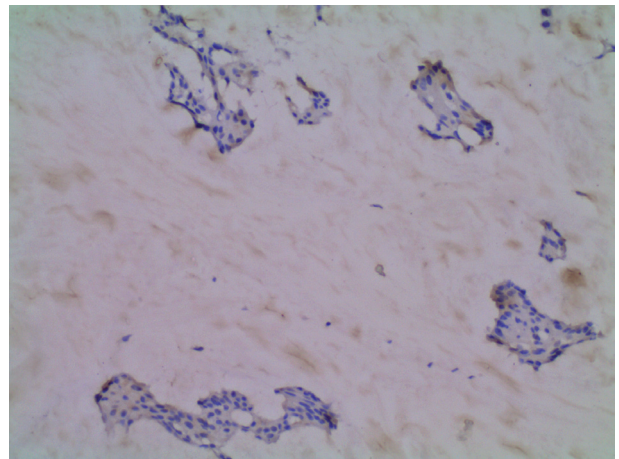
## DISCUSSION

Mucinous carcinoma of the breast is an uncommon special subtype of invasive breast carcinoma that predominantly affects postmenopausal women and generally has a more favorable prognosis than invasive breast carcinoma of no special type (1,3,4). This favorable biological behavior is particularly associated with the pure subtype, which shows a lower rate of nodal metastasis and a lower proliferative index than mixed mucinous carcinoma (6,7).

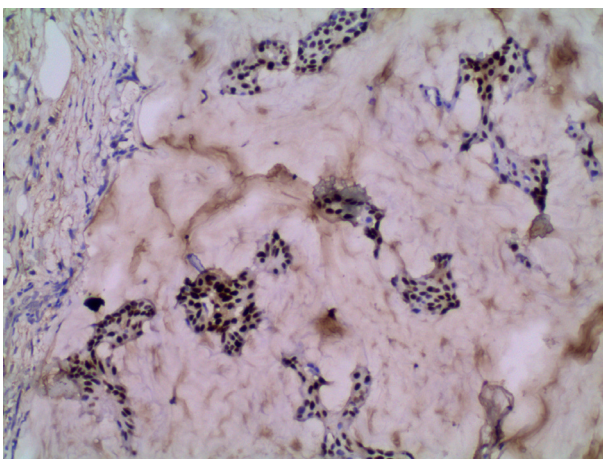
One of the main diagnostic challenges in mucinous carcinoma is its imaging appearance. Unlike many invasive breast carcinomas, mucinous carcinomas may



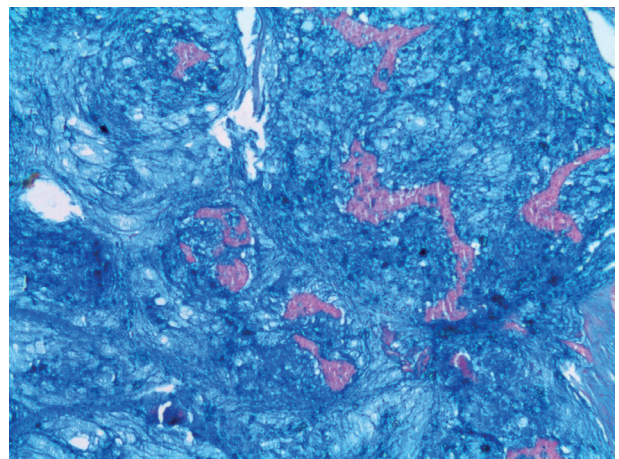
**Figure 4.** Diffuse nuclear estrogen receptor positivity in tumor cells (ER, ×200).



**Figure 6.** Absence of HER2/c-erbB-2 expression in tumor cells (HER2/c-erbB-2, score 0, ×200).



**Figure 5.** Diffuse nuclear progesterone receptor positivity in tumor cells (PR, ×200).



**Figure 7.** Extracellular mucin highlighted by Alcian blue staining (Alcian blue, ×100).

present as circumscribed, oval, or lobulated masses and may therefore mimic benign lesions (8,9). This issue is especially relevant in asymptomatic patients undergoing screening examinations. In the present case, the patient had no breast-related symptoms, and the lesion was detected incidentally during routine screening mammography, emphasizing the role of screening programs in identifying clinically occult breast malignancies at an early stage.

From a pathological perspective, classification into pure and mixed mucinous carcinoma is essential. Pure mucinous carcinoma is defined by a mucinous

component comprising at least 90% of the tumor (1,5). In the current case, more than 90% of the lesion consisted of extracellular mucin pools containing floating epithelial structures, supporting a diagnosis of pure mucinous carcinoma. The gelatinous gross appearance and abundant extracellular mucin on microscopy were also characteristic. The differential diagnosis of mucin-rich breast lesions includes mucocoele-like lesions, solid papillary carcinoma with mucin production, mucinous ductal carcinoma in situ, invasive lobular carcinoma with extracellular mucin, and metastatic mucinous carcinomas from extramammary sites; therefore, careful clinicoradiologic correlation

remains essential (5). Recent case reports have also emphasized that, despite variable clinical and radiological presentations, definitive diagnosis relies on the recognition of abundant extracellular mucin and confirmation by appropriate histopathological and immunohistochemical evaluation (10).

The immunophenotype observed in this patient was also typical. Pure mucinous carcinomas are usually hormone receptor-positive and HER2/c-erbB-2-negative and frequently show a luminal A-like profile with a low proliferative index (4,7). In our case, diffuse ER/PR positivity, HER2/c-erbB-2 negativity, and a Ki-67 index below 5% were fully concordant with this pattern and supported the relatively favorable biological behavior generally attributed to pure mucinous carcinoma.

With respect to staging, the tumor measured 2.3 cm on pathological examination, corresponding to pT2. Because sentinel lymph node biopsy was not performed, the regional nodal status could not be pathologically assessed and was therefore designated pNX. At 12 months of follow-up, there was no clinical or radiological evidence of recurrence or disease progression.

Treatment of mucinous carcinoma is individualized according to tumor size, nodal status, receptor profile, and multidisciplinary assessment (1,4,7). Surgery remains the cornerstone of treatment, while endocrine therapy is particularly relevant in hormone receptor-positive tumors. In the present case, the patient underwent excision followed by chemotherapy, radiotherapy, and planned aromatase inhibitor therapy. Overall, this case contributes to the literature by documenting an asymptomatic, screen-detected pure mucinous carcinoma and by emphasizing the diagnostic value of radiologic-pathologic correlation in lesions with deceptively benign imaging features.

## CONCLUSION

Pure mucinous carcinoma of the breast is a rare invasive carcinoma that may remain clinically silent and may radiologically resemble a benign lesion despite harboring malignancy. This case underscores the importance of screening mammography in the

early detection of asymptomatic breast cancer and highlights the central role of histopathological and immunohistochemical evaluation in establishing the correct diagnosis. Careful radiologic-pathologic correlation, accurate recognition of the pure subtype, and appropriate reporting of tumor extent and follow-up findings improve both patient management and the scientific value of case reports involving this uncommon breast carcinoma subtype. In the present case, the absence of recurrence or disease progression during 12 months of follow-up further supports the favorable short-term clinical course of pure mucinous carcinoma.

## Ethical approval

This case report was conducted in accordance with institutional ethical guidelines. Written informed consent was obtained from the patient.

## Author contribution

Concept: NTK, GÜK, SED; Design: NTK, GÜK, SED; Data Collection or Processing: NTK, GÜK, SED; Analysis or Interpretation: NTK, GÜK, SED; Literature Search: NTK, GÜK; Writing: NTK, GÜK. All authors reviewed the results and approved the final version of the article.

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## Conflict of interest

The authors declare that there is no conflict of interest.

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