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## Case Report

# Synchronous bilateral breast cancer with different histology <sup>☆</sup>

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## ABSTRACT

Synchronous bilateral breast cancer is a rare clinical entity. And due to both an improved prognosis and growing life expectancy on early detection, we have brought interest in case of patient with synchronous breast cancer. This study reports a case of synchronous bilateral breast cancer in an asymptomatic 70-year-old woman with a positive family history of breast cancer. This woman was diagnosed through radiological screenings, including mammograms, ultrasonography, and magnetic resonance imaging (MRI). On histopathologic examination of the core biopsy, the left breast mass was a Nottingham grade I invasive carcinoma of no particular type. The right breast mass was a Nottingham grade I invasive carcinoma with a mucinous component. After lumpectomies ultrasonography of the surgical specimens confirmed a small biopsy-proven invasive ductal cancer hypoechoic mass in the left breast, with an irregular margins and proven mucinous cancer mass in the right breast. The case was finally diagnosed as synchronous bilateral breast cancer of different pathologic types (ductal and mucinous).

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## Introduction

Asynchronous or metachronous second primary breast cancer in the opposite breast is possible [1]. Cancer discovered in the contralateral breast within 6 months of the first primary breast cancer is defined as synchronous bilateral breast cancer (SBBC), while cancers discovered more than 6 months after the diagnosis of the first primary cancer is defined as metachronous bilateral breast cancer [2].

Breast cancer occurs bilaterally in about 3% of all breast cancers, with synchronous tumors accounting for 0.6% and metachronous tumors accounting for 2.2% [3]. SBBC are rare, with limited treatment options available for the patients [4]. Pathologically different bilateral breast cancers account for only 1%-2% of cases [5].

Lobular carcinoma in the index breast, a family history of breast cancer, first primary diagnosed at a young age, and BRCA mutations are all known to enhance the risk of SBBC [6].

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Magnetic resonance imaging (MRI) has more sensitivity than conventional imaging methods for detecting contralateral breast cancer. In particular, MRI allows the early detection of metachronous contralateral cancer during the postoperative follow-up period. We present a case with synchronous (yet histopathologically dissimilar) bilateral breast cancer.

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## Case presentation

A 70-year-old woman was referred to our hospital after being found to have a Breast Imaging Reporting and Data System (BI-RADS) category 4 breast mass (right side) on mammography screening. She had a strong family history of breast cancer, with her mother and 2 sisters all diagnosed with breast cancer in the fourth decades of their respective lives. No palpable mass, skin changes, nipple discharge or retraction were found on clinical examination. Axillary lymph nodes were not palpable on either side. Mammography revealed a relatively well-circumscribed microlobulated hyperdense lesion in the lower central portion of the right breast along with several benign-looking lymph nodes. No microcalcifications or any significant architectural distortion was seen. Left breast mammography was unremarkable for any suspicious findings (Fig. 1A).

The ultrasonographic assessment revealed a well-defined, round-shaped, heterogeneous, microlobulated, and hypoechoic solid lesion (measuring  $1.4 \times 1.1$  cm) in the right breast at the 6 o'clock position, without any noticeable increase in vascularity on color Doppler imaging (Fig. 1B). Another suspicious lesion ( $0.7 \times 0.5$  cm), with irregular margins and posterior acoustic shadowing was detected in the left breast at the 11 o'clock position: color Doppler imaging showed increased adjacent vascularity (Fig. 1C). Lesions on both the sides were assigned to BI-RADS category 4B. No abnormal lymph nodes were found in both axillae. Core biopsy and ultrasonography-guided metal clip placements were performed for both breast masses.

Histopathology of the left breast mass revealed a Nottingham grade I invasive ductal type carcinoma and that of the right breast mass revealed a Nottingham grade I invasive carcinoma with a mucinous component (Figs. 2A and B). Both breast lesions were strongly positive for estrogen receptor expression.

Breast MRI was performed for local staging. The results showed a well-defined round mass (approximately  $1.5 \times 1.4$  cm in size) in the right breast at the 6 o'clock position (Fig. 3A). This mass with the small postbiopsy titanium clip inside, was located approximately 5.3 cm posterior to the nipple and 5 cm anterior to the chest wall without any nipple, skin, or chest wall involvement. It was highly intense on fat-saturated T2-weighted images, isointense on T1-weighted images, and had benign-appearing kinetics with gradual and persistent enhancement (type III time intensity curve) (typical MRI features of mucinous carcinoma). It showed a relatively thick and irregular rim enhancement with a central nonenhancing fluid component, likely representing the mucinous part.

In the left breast a small, speculated and hyper vascular lesion (approximately  $1.0 \times 0.7$  cm in size) was seen at the 11 o'clock position (Fig. 3B). The mass was located approximately

4 cm posterior to the nipple and 6.4 cm anterior to the chest wall and showed no evidence of nipple, skin, or chest wall involvement. Adjacent parenchymal distortion was seen without any significant perilesional edema. The lesion was mainly solid and appeared isointense on T1- and T2-weighted images and had a small postbiopsy titanium clip inside it.

No more suspicious focal lesions were observed in both the breasts. In addition, there was no evidence of any axillary or internal mammary lymphadenopathy bilaterally. Both nipples were mildly retracted but had normal thickness and enhancement (Figs. 3A and B).

After the MRI examination, presence of distant metastases was investigated for the purpose of staging. No evidence of metastatic disease was seen on computed tomography of the chest and abdomen. Nuclear medicine bone scans were negative for bony metastasis.

The patient was diagnosed with early-stage bilateral breast cancer. She was referred to a surgical team for bilateral breast-conserving surgery with sentinel lymph node biopsies. After bilateral lumpectomies, the central locations of both the tumors in the respective surgical specimens were confirmed by an ultrasound examination: the superior, inferior, middle, and lateral margins were radiologically negative for tumor involvement.

Histopathology of the left and right breast surgical specimens revealed negative resection margins. The left breast tumor was classified as histology grade pT1c, measuring  $0.8 \times 0.7$  cm. The right breast was classified as invasive mucinous carcinoma of histology grade pT1c, measuring  $1.8 \times 1.5$  cm. Fibrocystic changes were noted as additional pathologic findings. The sentinel lymph nodes on both the sides did not show metastasis (Figs. 4A and B).

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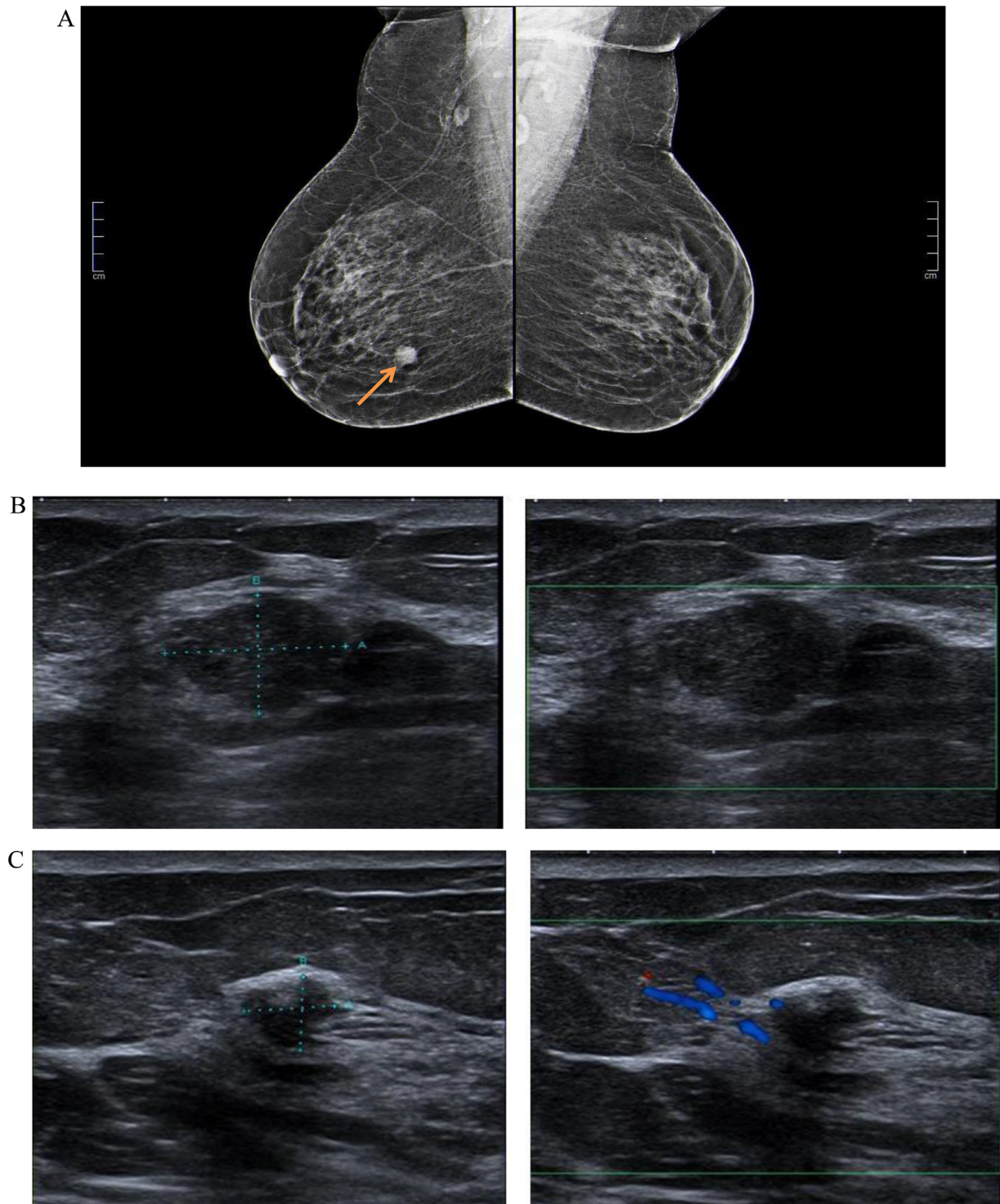
## Discussion

Contralateral breast cancer can arise as a metastatic lesion or as a synchronous or metachronous second primary [7]. Simultaneous breast carcinomas are defined as synchronous tumors that arise within 3-6 months [7]. Bilateral synchronous breast cancer is attracting more attention since its incidence is predicted to rise as a direct result of improved detection capabilities. It has been reported that bilateral whole-breast sonography can detect mammographically and clinically unrecognized masses in the contralateral breast. The contralateral breast sonography in patients with breast cancer should be approached with greater caution than in individuals without known breast cancer, and that we should hunt for any subtle suspicious findings during sonography in these patients [8].

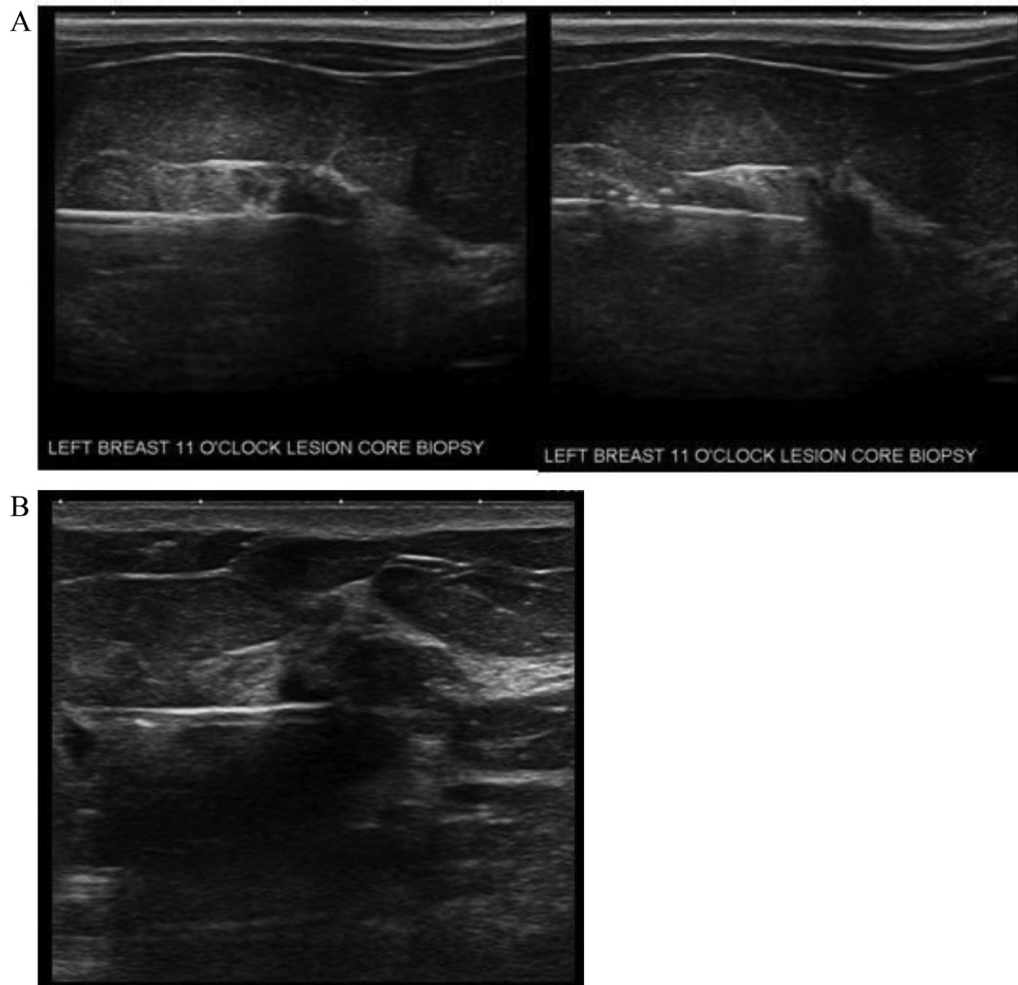
Here, we present a case of SBBC of different pathologic types in each (ductal and mucinous), diagnosed in both breasts simultaneously.

Well-known risk factors of breast cancer are age, female sex, and a positive history in a first-degree female relatives, especially in premenopausal women [9]. In our case, the patient's mother and 2 sisters were diagnosed with breast cancers in the fourth decades of their respective lives.

Swelling of the breast tissue, fixed lumps with uneven borders, skin changes such as thickness, pigmentation, dimpling,



**Fig. 1 – (A)** Left and right breast mammograms: the left breast, does not reveal the suspicious lesion detected on ultrasonography; the right breast, clearly shows the mucinous cancer (arrow). **(B)** Right breast ultrasonogram: revealed a well-defined, round-shaped, heterogeneous, microlobulated hypoechoic solid-appearing lesion in the right breast at the 6 o'clock position. **(C)** Left breast ultrasonogram: revealed another suspicious lesion with irregular outline and posterior acoustic shadowing in the left breast at the 11 o'clock position.



**Fig. 2 – (A) Ultrasound-guided (USG) core biopsy left side. (B) USG-guided core biopsy right side.**

nipple discharge, and breast or nipple pain are all symptoms of this malignancy [10]. In our case, the clinical examination revealed no such abnormalities.

Initial diagnostic modalities, such as mammography and ultrasound, may also be used for more comprehensive assessments. Doctors may also use additional supplementary modalities to supplement their initial diagnosis. Contemporary imaging modalities include mammography with tomosynthesis, breast ultrasonography, elastography, contrast-enhanced mammography, and MRI [11]. Cancers are complex clinicopathologic entities; hence, various combinations of these modalities have been tested over time to increase detection efficiency [12]. IDC no special type (NST), formerly known as IDC not otherwise specified (NOS), is the most frequent kind of invasive breast cancer, accounting for 40%-75% of all cases. It is a diagnosis of exclusion, meaning that in order to make the diagnosis, all other specific types must be ruled out. On mammography, IDC NST often manifests as a hyperdense mass with an irregular shape and spiculated margin. On ultrasonography, IDC NST typically appears as a hypoechoic irregular mass with angular margins. Irregular mass with irregular margins, iso to hypointense to parenchyma on

T2-weighted images, and rapid wash in and wash out kinetics are characteristic MRI findings in IDC NST.

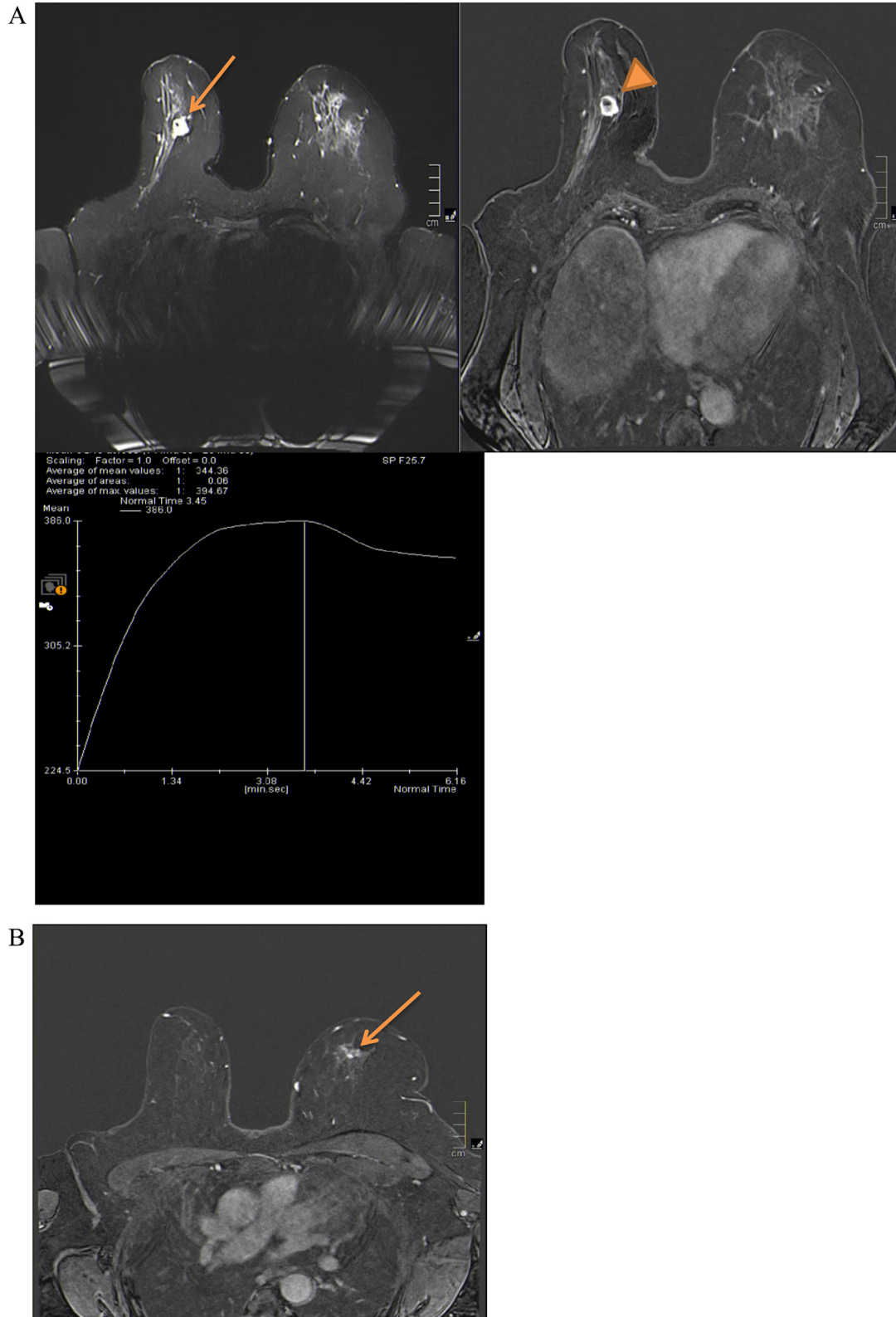
Mucinous carcinoma accounts for 1%-7% of all breast carcinomas.

The most frequent manifestation of mucinous breast cancer is a well-defined mass on mammography and a hypoechoic lesion with heterogeneous internal echo on sonography.

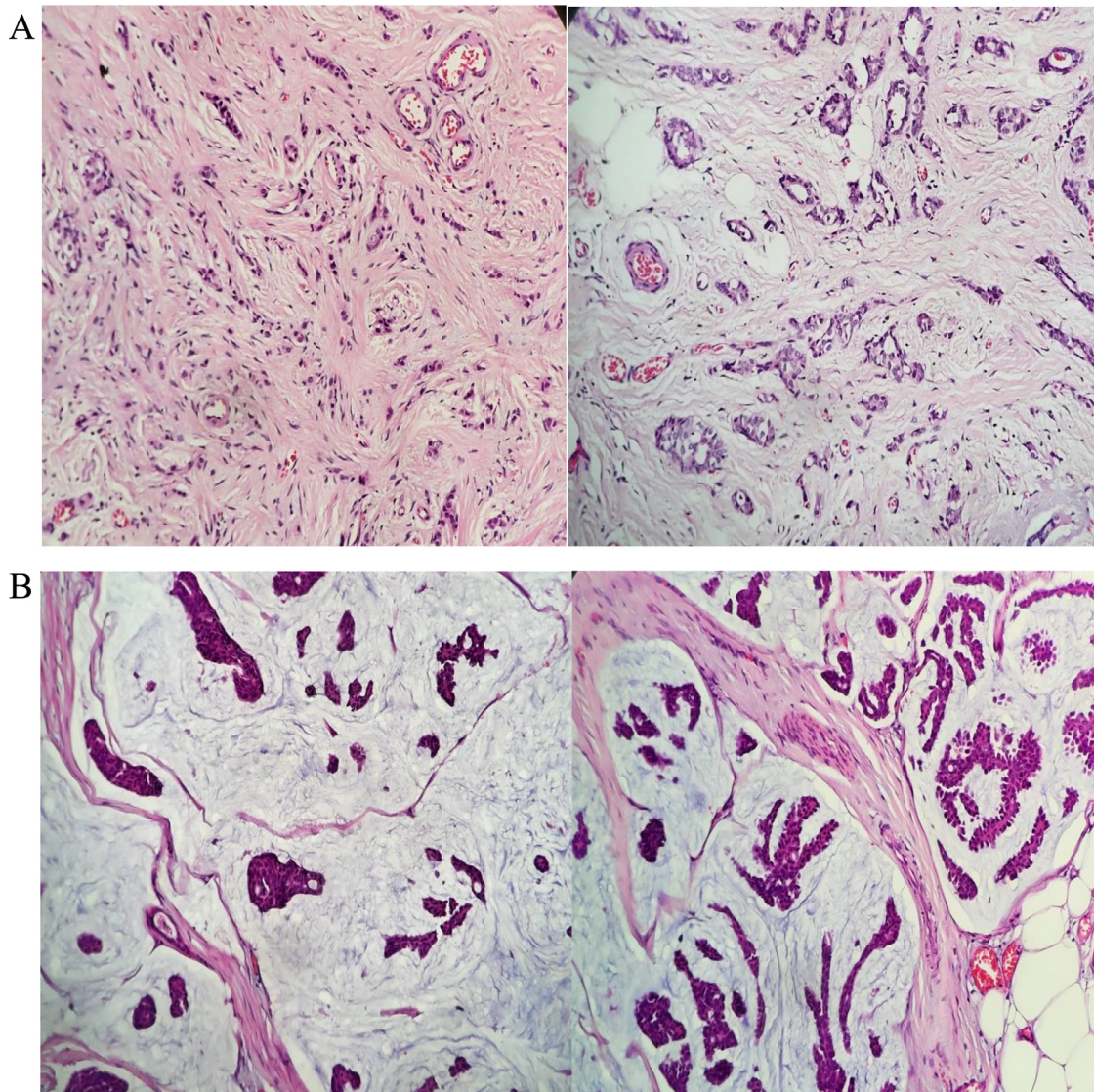
Typical MRI findings of pure mucinous cancer include a circumscribed mass with high T2-weighted signal intensity and benign-appearing kinetics with gradual and persistent enhancement [13].

In the great majority of cases, a cell or tissue biopsy is required to provide a definitive diagnosis of breast lesions. Core-needle biopsy is the most commonly used diagnostic procedure for this purpose worldwide, while fine-needle aspiration biopsy and surgical biopsy are less commonly utilized. The core biopsy was used to corroborate the histopathologic diagnosis in this case as well [14]. The Nottingham combined histologic grade (Elston–Ellis modification of the Scarff–Bloom–Richardson grading system), often known as the Nottingham grading system, is the most widely used histologic grading system for breast cancer [15].





**Fig. 3 – (A) Magnetic resonance imaging (MRI) of right breast: a well-defined round mass in the right breast at the 6 o'clock position. The lesion was highly intense on fat-saturated T2-weighted images (arrow), and showed benign-appearing kinetics with gradual and persistent enhancement (arrowhead) (typical MRI features of mucinous carcinoma). (B) MRI left breast: a small speculated hypervascular lesion seen in the left breast at the 11 o'clock position. The lesion was isointense on T1- and T2-weighted images.**



**Fig. 4 – (A) Histopathology of the left breast mass revealed a Nottingham grade I invasive ductal type carcinoma. (B) Histopathology of the right breast mass revealed a Nottingham grade I invasive carcinoma with a mucinous component.**

The histopathologic examination of core biopsy in our case revealed that the left breast mass was a Nottingham grade I invasive ductal type carcinoma, and the right breast mass was a Nottingham grade I invasive carcinoma with a mucinous component.

Hormonal receptor expressions in bilateral breast cancers have been evaluated in several studies [16–18]. In addition, some authors have found that the concordance rate of the estrogen receptor level and its positivity rate are high in synchronous cancers [16,17]. We found that both breast lesions were strongly positive for estrogen receptor expression in our case. A lumpectomy was once reserved for excision biopsy of a breast mass. However, this treatment can also be used to treat breast cancer or benign tumors that have previously been detected using needle biopsy [19,20]. In our case, ultrasonography of the surgical specimens was performed after lumpectomy which confirmed tumor clearance

of resection margins radiologically. In addition, the biopsy results indicated no metastasis to the bilateral sentinel lymph nodes.

## Conclusion

We report a rare occurrence of 2 primary malignancies of different pathologic types (ductal and mucinous) occurring synchronously in both the breasts of a patient. Radiologists must properly and carefully assess both breasts for any lesion(s) with suspicious features employing mammography, complementary ultrasonography, and core biopsy if needed to ensure the adequate, appropriate, and timely management of bilateral breast cancer.



## Patient consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

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