

# A highly aggressive invasive ductal carcinoma from a complex cystic breast mass and BI-RADS assessment

## A case report

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### Abstract

**Rationale:** The term cystic breast lesions is a sonographic diagnosis, which can be categorized as simple, complicated or complex. The complex cysts are deemed as having a low risk of breast cancer. The highly aggressive invasive ductal carcinomas among complex cysts, in particular, are infrequent reported.

**Patient concerns:** A 56-year-old female with a breast complex cyst who, after fine-needle aspiration, complained about oozing with fluid as well as skin ulceration that did not heal.

**Diagnoses:** An advanced HER-2-enriched invasive ductal carcinoma was diagnosed.

**Interventions:** The patient received neoadjuvant chemotherapy of anti-HER-2 target drug, palliative surgery and following postoperative chemotherapy.

**Outcomes:** The patient was in good general condition at 6 months follow-up after surgery.

**Lessons:** Meticulous ultrasound evaluation of Breast Imaging Reporting and Data System (BI-RADS) category is crucial and indispensable when a complex cyst is found. The radiologist and clinician should be fully awake to its possibility of malignancy, especially fast-growing one in post-menopausal women. Excision biopsy may be preferred for diagnosis.

**Abbreviations:** BI-RADS = Breast Imaging Reporting and Data System, CNB = core-needle biopsy, FNA = fine-needle aspiration.

**Keywords:** BI-RADS category, complex cystic breast mass, excision biopsy, invasive ductal carcinoma, ultrasonography

## 1. Introduction

Ultrasonography plays an increasingly important role in the evaluation of breast abnormalities, with the incessant improvement of ultrasonic resolution.<sup>[1]</sup> Owing to the properties of supersonic wave, it has prominent sensitivity and detection rare for cystic lumps. Cystic breast lesions can be categorized as simple, complicated or complex. And the complex breast cyst has a great variety of pathologic types, including benign, atypical, and malignant lesions.<sup>[2]</sup> While the complex cyst was estimated to be reported in approximately 5% of breast ultrasound

examinations, as well as the malignancy rate of 0.3% among breast neoplasms,<sup>[1,3]</sup> it still has have a substantial probability of being malignant (23% and 31% in 2 series).<sup>[2]</sup> Moreover, the complex cyst can be sensitively detected by ultrasound, yet frequently received little risk assessment or even be misdiagnosed.<sup>[1]</sup> Therefore, meticulous ultrasound evaluation of Breast Imaging Reporting and Data System (BI-RADS) category is indispensable when a complex cyst is found,<sup>[4]</sup> so that the clinician can give the patient timely treatment. Here, we describe a case of complex cyst which was diagnosed as advanced invasive ductal carcinoma. The patient underwent neoadjuvant chemotherapy and palliative surgery followed by chemotherapy. Moreover, we make a summing up of experience and lessons of this case. Written informed consent was obtained from the patient. This case report was approved by the West China Hospital of Sichuan University Research Ethics Board.

## 2. Case report

A 56-year-old postmenopausal woman presented at our institution with a palpable lump in her right breast, and ultrasonography indicated a 34 mm simple cyst with locally unsmoothed cyst wall which was placed into BI-RADS 3 (Fig. 1). Fine-needle aspiration (FNA) of the mass showed apocrine metaplasia cells, foam cells, and ductal hyperplasia cells, prompting a diagnosis of cyst. Three months later, the patient returned to our department with complaints of skin ulceration and oozing with fluid at the site where she had been punctured by fine-needle aspiration. Ultrasonography showed the previous lesion measuring 44 mm,

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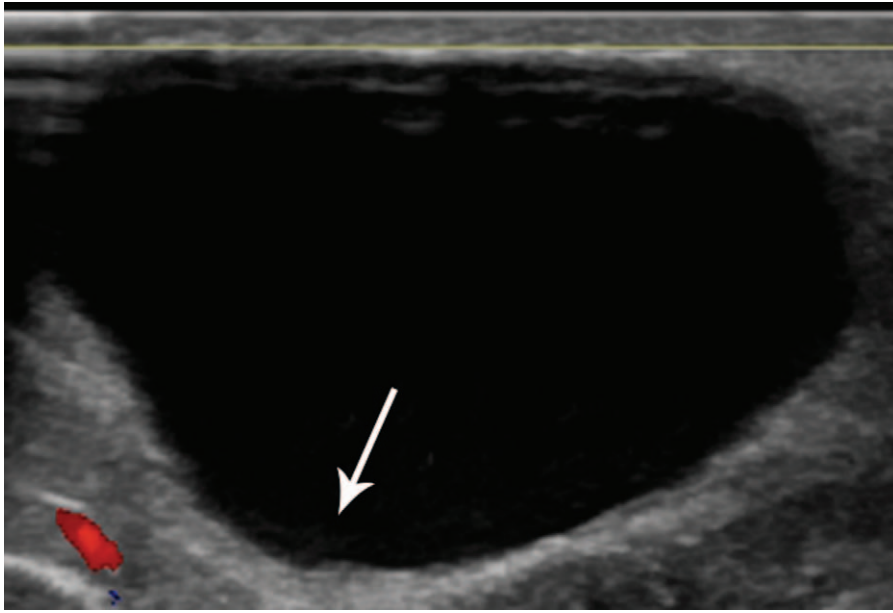
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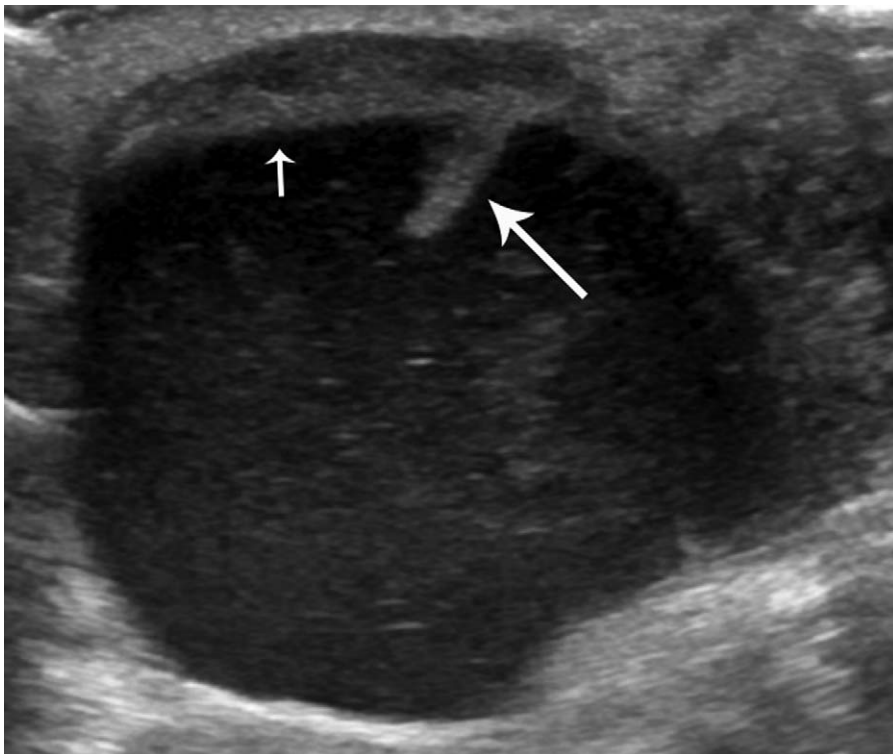
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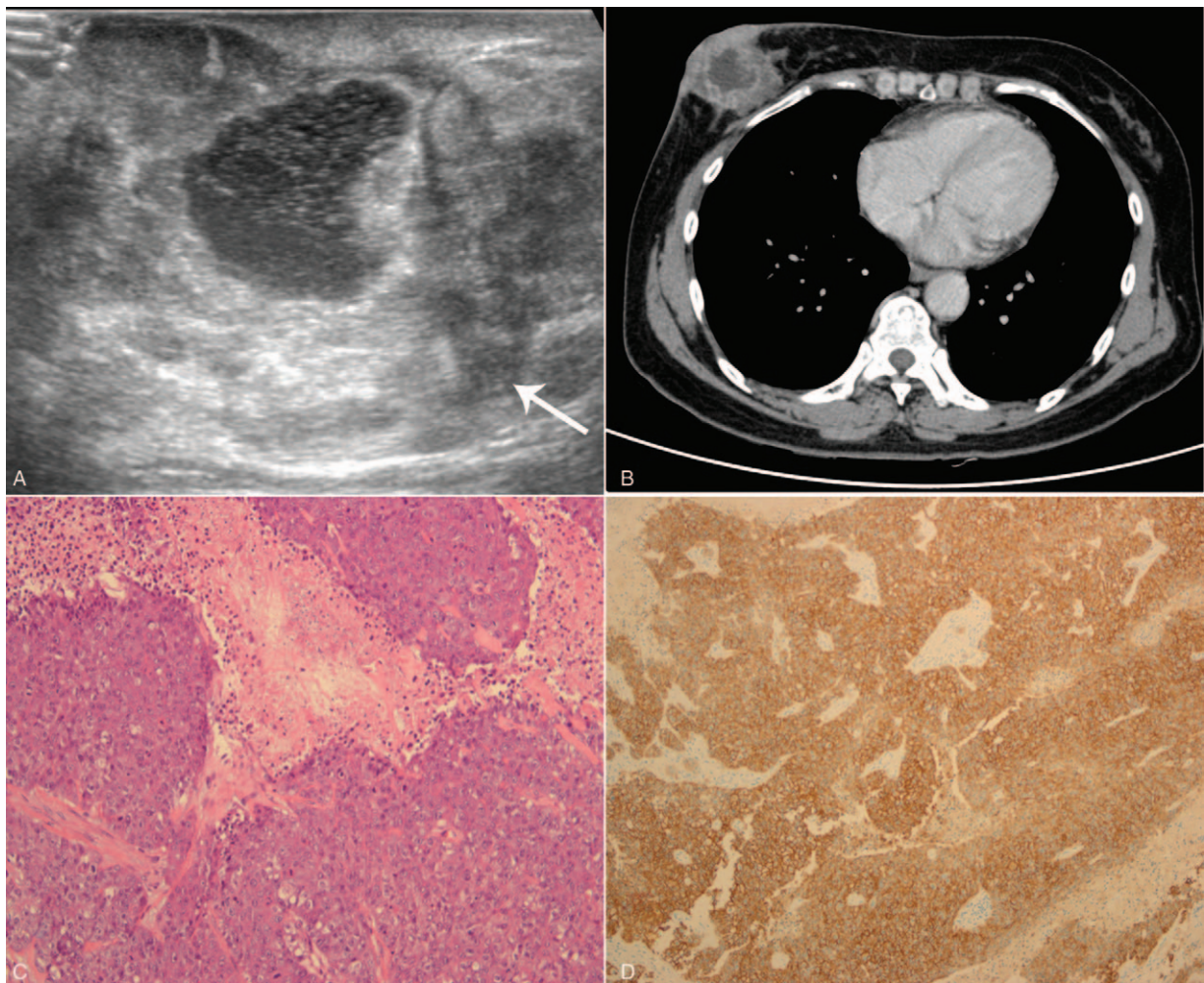
**Figure 1.** B-mode ultrasound revealed a simple cyst with locally unsmoothed cyst wall (arrow).

with a thick wall and an internal septum, turning into a complex cyst (BI-RADS 4b) (Fig. 2). Subsequently, a core needle biopsy was suggested to the patient, but she refused because she feared the wound would deteriorate. She only chose the wound to be thoroughly cleaned up. At 3 months follow-up, the wound still was not healed. And ultrasonography demonstrated that the complex cyst had enlarged into a 58 mm mixed cystic-solid mass

with ill-defined borders and irregular shape. It contained at least 50% inner solid component which had anomalously grown up in an irregular shape (BI-RADS 4c) (Fig. 3A). Contrast-enhanced computed tomography indicated an irregular mass with partial cystic region (Fig. 3B). Core-needle biopsy (CNB) was performed and pathology confirmed an invasive ductal carcinoma (Fig. 3C). Immunohistochemistry of tumor tissue was negative for estrogen



**Figure 2.** B-mode ultrasound showed a complex cystic mass (Type I) with a thick wall (short arrow) and an internal septum (long arrow).

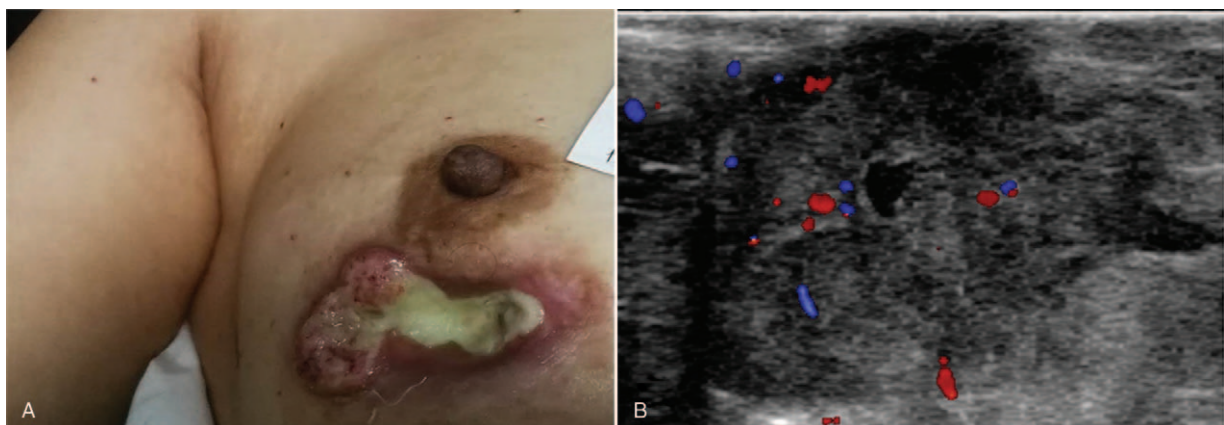


**Figure 3.** A: Ultrasound examination showed a mixed cystic-solid mass (Type IV) with irregularly shaped solid component (>50%). B: Contrast-enhanced CT indicated an irregular mass with partial cystic region. C: HE-staining of pathology (200X): invasive ductal carcinoma. D: HER-2 inspection of immunohistochemistry (100X): HER-2 (3+).

and progesterone receptors, positive for HER-2 (3+), and the Ki-67 score was 80% (Fig. 3D).

The patient was diagnosed with advanced HER-2-enriched breast cancer (cT4bN0M0 stage IIIb). On the recommendation of

the multi-disciplinary care team, the patient received neoadjuvant chemotherapy of anti-HER-2 target drug. During the 8 cycles of neoadjuvant chemotherapy, the wound became more serious (Fig. 4A). Ultrasonography showed that the lesion had turned



**Figure 4.** A: skin ulceration and oozing with fluid. B: Ultrasound examination showed a nearly solid lesion with blood flow signal in the solid component.



gradually into a nearly solid mass with the maximum diameter decreased to 30 mm (Fig. 4B). And an aberrant lymph node was found in the right axilla which was suspected as metastasis. According to response evaluation criteria in solid tumors (RECIST), it indicated progressive disease. Then, the patient underwent palliative surgery. Postoperative pathology confirmed the cancer had invaded the skin and axillary lymph nodes. Miller-Payne pathological response grading was grade 2. Subsequently, postoperative chemotherapy followed the surgery after 1 month. Now, she was in good general condition at the last follow-up 6 months after surgery.

### 3. Discussion

Among published literature, we found 4 researches about breast complex cysts.<sup>[1,3,5,6]</sup> Berg et al<sup>[7]</sup> categorized complex cystic breast masses into 4 types on the basis of their US features: Type I masses have a thick wall, thick internal septum, or both. Type II masses involve one or more intracystic solid masses. Type III masses are mixed cystic-solid masses with at least 50% cystic components. Type IV masses are mixed cystic-solid masses with at least 50% solid components. The BI-RADS is a standardized system of reporting breast pathology as seen on imaging techniques. Hsu et al<sup>[8]</sup> placed Type I, II, and III into BI-RADS 4b with a positive predictive value of 14% to 16% for malignancy. Type IV was placed into BI-RADS 4c with a positive predictive value of 41% for malignancy. Although reported malignancy rate of the complex breast cyst was low among breast neoplasms, yet it has a substantial chance of being malignant among cystic breast masses.<sup>[1,2]</sup> In addition, we found 2 cases of invasive ductal carcinomas among complex breast cysts. The case of Song et al<sup>[4]</sup> showed a Type I complex cyst which grew slowly over 1 year period. And the case of Roque et al<sup>[9]</sup> was also a Type I complex cyst which evolved from a simple cyst after 2 months of FNA. Similarly, our case achieved a transition from a simple cyst into a complex cyst as well. Differently, our case grew rapidly in a short-term, ulcerated and oozed with liquid after FNA, which implied it was a highly aggressive one.

Our patient suffered ulceration and oozing with fluid following FNA, which probably because of implantation metastasis through the FNA needle passage. In a similar way, CNB exposes the patient to similar risk of implantation metastasis either. Some reported literature suggested that CNB was a diagnostically accurate alternative to excisional biopsy, and they were both recommended for complex cystic masses biopsy.<sup>[8]</sup> However, our unsuccessful case alerts us that excisional biopsy should be preferred when a complex cyst was found, especially for the fast-growing ones to avoid the implantation metastasis. And FNA is often inconclusive and not recommended for its high false negative rate.<sup>[9,10,11]</sup>

Through our case, we can see that the 4 types of complex breast cysts may be the different growth stages in a continuous

evolution. And the maximal diameter of complex cysts could be a good predictor of malignancy. Masses smaller than 3 mm tended to be benign, while those larger than 13 to 20 mm were associated with malignancy.<sup>[6,8]</sup> Furthermore, benign cysts usually occur in women in their 40s; they seldom affect older, postmenopausal women. All breast cystic lesions in post-menopausal woman, especially those not on hormone replacement therapy, should be monitored as suspicious.<sup>[5]</sup> Therefore, it is important for the radiologist to take the risk assessment of complex cysts on lesion features, size and the age of patients. Appropriate BI-RADS evaluation can help the clinician to make a timely diagnosis, avoid missing the optimal operation opportunity and improve prognosis.

### Author contributions

**Conceptualization:** Yixuan Li, Yulan Peng.

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**Funding acquisition:** Yulan Peng.

**Investigation:** Yixuan Li

**Resources:** Yulan Peng

**Writing – original draft:** Yixuan Li.

**Writing – review and editing:** Yulan Peng.

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