

# Solitary duodenum metastasis from breast cancer with 8 years' latency

## A case report

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### Abstract

**Rationale:** Advanced breast cancer frequently metastasizes to the lungs, liver, and bones. Metastatic involvement of the duodenal bulb is extremely rare and difficult to detect by endoscopy.

**Patient concerns:** A 51-year-old menopausal woman presented with abdominal fullness and obstructive symptoms, and was diagnosed with adenocarcinoma in the duodenal bulb. The patient had undergone modified radical mastectomy of the left breast for infiltrating ductal carcinoma (IDC) 8 years previously.

**Diagnosis:** Metastatic infiltration of the duodenal bulb originating from IDC was proven histologically and immunohistochemically.

**Interventions:** She received chemotherapy with docetaxel and capecitabine followed by hormone maintenance therapy with letrozole after operation.

**Outcomes:** After treatment, the patient recovered well. She is currently being followed up.

**Lessons:** Patients with known breast cancer history with the IDC histological type and presenting with nonspecific abdominal symptoms or signs, such as abdominal fullness, nausea, and vomiting, should undergo endoscopy with histopathological examination in order to detect possible gastrointestinal metastasis of the primary breast tumor. This report intends to alert people to heed this type of breast cancer metastasis and not treat it as a primary gastrointestinal tumor.

**Abbreviations:** ER = estrogen receptor, HER2 = human epidermal growth factor receptor 2, IDC = infiltrating ductal carcinoma, ILC = infiltrating lobular carcinoma, PR = progesterone receptor.

**Keywords:** breast cancer, duodenal cancer, invasive ductal carcinoma, metastasis

## 1. Introduction

Breast cancer is the most frequent type of malignancy and the second leading cause of death in women worldwide. The most common sites for metastatic spread are the local and distant lymph nodes, liver, lungs, brain, pleura, and bone.<sup>[1]</sup> Gastrointestinal involvement is rare, only accounting for about 10% of all breast metastases.<sup>[2]</sup> Although infiltrating ductal carcinoma (IDC) is the predominant type of breast cancer, infiltrating lobular carcinoma (ILC) has a higher tendency to metastasize to the gastrointestinal

tract, whereas IDC is inclined to metastasize to the lung, liver, and bone.<sup>[3]</sup> The most common organs of gastrointestinal metastasis are the colon, rectum, and stomach, while the esophagus and small intestine, including the duodenum, are rarely implicated.<sup>[4]</sup> Therefore, these metastatic sites in the gastrointestinal tract are easily overlooked and misdiagnosed. After searching the literature in PubMed and Medline, we could find only a few cases of solitary duodenal metastasis of IDC that have been reported. Herein, we report an unusual case of a 51-year-old woman, previously diagnosed with IDC, presenting with duodenal bulb metastasis 8 years after modified radical mastectomy.

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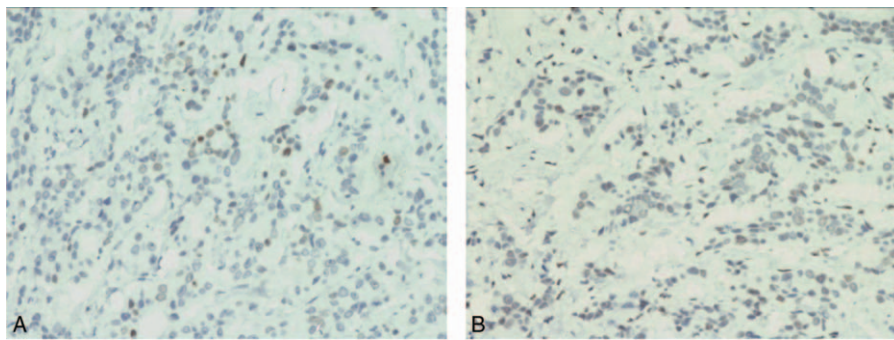
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## 2. Case report

In August 2016, a 51-year-old menopausal woman was admitted to our hospital (First Affiliated Hospital of Yangtze University, Jingzhou, Hubei), presenting with postprandial abdominal fullness (apparent for >3 months) accompanied by recurrent nausea and vomiting. There was no family history of breast cancer or other tumors, nor was there any sign of exposure to epidemiologic risk factors. Her relevant past history included IDC of the left breast, for which she underwent left mastectomy in March 2008. Before the mastectomy, the assessment had included aspiration biopsy cytology, which revealed hyperplasia of the left mammary glands accompanied by atypical hyperplasia of the ductal epithelium. Then, lumpectomy and intraoperative pathologic examination were performed immediately, which showed breast malignancy. A review of the histology from her



**Figure 1.** Immunohistochemical study of the primary breast cancer by biopsy showing the tumor cells strongly positive for estrogen receptor (A) and progesterone receptor (B) (original magnification  $\times 400$ ).

postoperative biopsy indicated IDC of the left breast (pT2N0M0, stage IIA according to the Union for International Cancer Control classification). The tumor was 25 mm in maximum diameter. Nineteen lymph nodes isolated from the left axillary cavity showed no evidence of metastases. Immunohistochemical analysis discovered that the tumor cells were positive for estrogen receptor (ER+) and progesterone receptor (PR++) (Fig. 1), and negative for human epidermal growth factor receptor 2 (HER2). After surgery, 6 cycles of systemic adjuvant chemotherapy with classic CMF (cyclophosphamide, methotrexate, and 5-fluorouracil) were administered, followed by the oral administration of tamoxifen (10 mg) twice daily for 5 years.

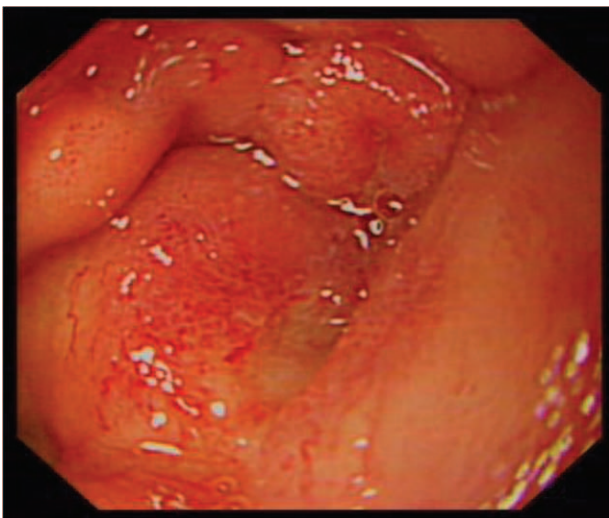
The patient was in good condition, and the follow-up was negative until August 2016, when she presented with postprandial abdominal fullness, recurrent nausea, and vomiting. Considering the patient's obvious obstructive symptoms of the upper gastrointestinal tract, we immediately ordered esophago-gastroduodenoscopy, which showed gastric retention, mucosal congestion, and edema in the gastric antrum and duodenum (Fig. 2). Subsequently, an ulcer of the duodenal bulb was discovered. With the assumption of the malignant nature of the lesion, 2 sections were sent for biopsy. The pathological examination demonstrated adenocarcinoma of the duodenal

bulb. In order to alleviate the gastric retention and duodenal obstruction, the patient underwent resection of the gastrointestinal tumor in our department. Immunohistochemical analysis demonstrated the tumor was positive for ER, PR, and GATA-binding protein 3; other indicators, such as HER2, caudal-related homeobox 2, cytokeratin 7, and cytokeratin 20 were negative (Fig. 3). These results suggested that the duodenal tumor was positive for mammary markers and negative for gastrointestinal markers. Combined with the immunohistochemistry results, it was strongly indicated that the adenocarcinoma of the duodenum originated from a primary cancer of the breast ducts, not the gastrointestinal tract. Moreover, the results of hematoxylin eosin staining of the primary breast cancer and duodenal adenocarcinoma (Fig. 4) showed similar morphological features, which further confirmed the conclusion. After operation, the patient received 4 cycles of docetaxel and capecitabine chemotherapy (docetaxel, 75 mg/m<sup>2</sup> intravenously, day 1; capecitabine, 1000 mg/m<sup>2</sup> orally twice daily, days 1–14) as adjuvant treatment. She was then administered the aromatase inhibitor letrozole as hormonal therapy. The patient is currently being followed up.

### 3. Discussion

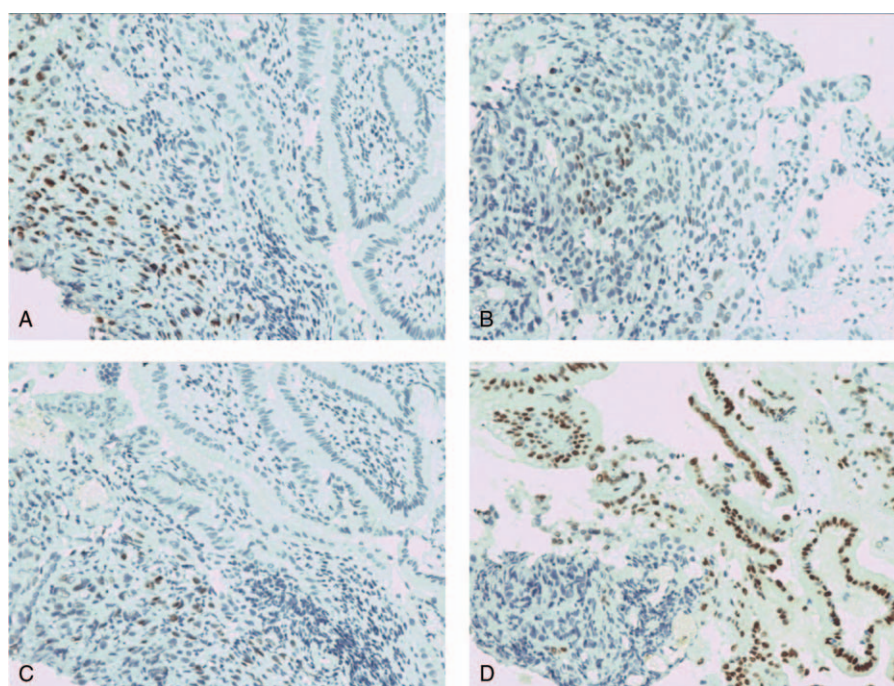
Gastrointestinal tract metastasis is relatively common. However, the metastasis of breast IDC to the duodenum is very rare, and only a few cases have been reported in the English literature. Moreover, the vast majority of the reported cases were ILCs. Although IDC is the most common type of breast cancer (75–85%), IDC metastasizing to the duodenum without any suspicious findings is extremely rare. In view of the differences between the metastatic patterns of IDC and ILC,<sup>[5]</sup> the cells of the latter are more likely to extravasate and metastasize to the gastrointestinal tract.<sup>[6,7]</sup> At present, studies on primary IDC developing in ectopic duodenal tissue are rare, and the exact mechanism is unclear.

Disorders in the duodenal bulb are easily found when there are symptoms of duodenal obstruction and gastric retention. However, such nonspecific signs may lead to misdiagnosis, as some physicians may mistake a metastatic tumor for a primary gastrointestinal tumor. The clinical signs and symptoms of metastatic duodenal malignancy have no identifiable features when compared with primary duodenal malignancy, leading to certain difficulties in diagnosis. Although endoscopy is an indispensable means of diagnostic examination, it is difficult in some cases when the metastatic cells are in the submucosa. A biopsy can be negative and the operation will reveal the

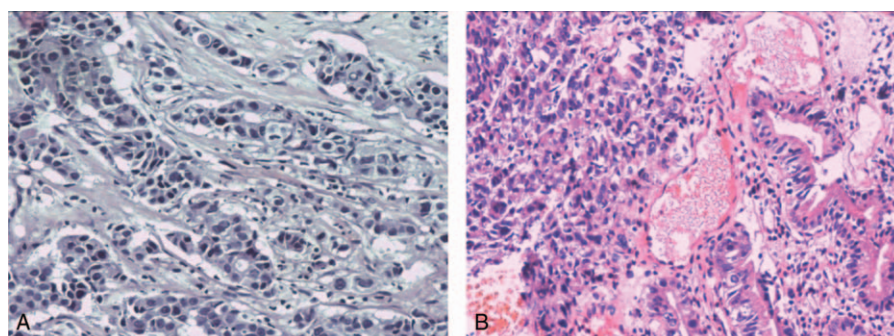


**Figure 2.** Endoscopic examination showing an ulcerative lesion in the duodenal bulb with no active bleeding.





**Figure 3.** Immunohistochemical analysis showing the duodenal tumor cells positive for estrogen receptor (A), progesterone receptor (B), and GATA-binding protein 3 (C), but negative for caudal-related homeobox 2 (D) (original magnification  $\times 400$ ).



**Figure 4.** Hematoxylin and eosin staining showing similar histological morphology in the primary breast cancer (A) and the metastatic duodenal adenocarcinoma (B) (original magnification  $\times 400$ ).

histological nature of the lesion. Immunohistochemistry is the most secure means of differentiating between metastatic and primary gastrointestinal tumors. We originally assumed that the lesion was a primary cancer of the duodenum. However, the strong immunopositivity of ER, PR, and GATA-3 indicated that the duodenal malignancy could be a breast cancer metastasis. The results of endoscopy were consistent with the results of pathological examination. The metastatic duodenal tumor and the primary breast tumor showed similar morphological features and similar histopathological findings.

Metastatic cancer, especially gastrointestinal metastasis, often indicates poor prognosis and unfavorable life quality. Physicians should be keenly aware of the possibility of gastrointestinal metastasis from the breast, especially in patients with a past history of breast cancer. In this case, the patient has survived for a long time after being diagnosed with primary IDC of the breast, and, until now, there were no other abnormal indications other than the gastrointestinal symptoms. Because we considered the possibility of metastasis of the breast tumor, we were able to

properly treat our patient. Only in this way can we prevent neglect and misdiagnosis of duodenal metastasis. It can help us establish a definitive diagnosis and evaluate the prognosis, as well as make reasonable treatment plans.

#### 4. Conclusion

Isolated duodenal involvement as a delayed site of distant metastasis of primary IDC of the breast is exceedingly rare. The most common site of duodenal metastases is the periampullary region, followed by the duodenal bulb. An accurate incidence of duodenal metastasis is hard to find, as most cases are asymptomatic until late in the disease. The symptoms and signs presented in the literature thus far include abdominal pain, upper gastrointestinal bleeding, melena, peritonitis, and obstruction. These nonspecific abdominal symptoms make metastasis to the duodenum even harder to diagnose. The time interval between primary breast cancer initiation and metastatic spread to the duodenal bulb is about 2 to 13 years, and the radiologic imaging is unremarkable,

making diagnosis extremely difficult. Endoscopic evaluation and biopsy are necessary for definitive diagnosis.

Duodenal metastasis is associated with dismal prognosis. If the patient is in good condition and the metastasis is solitary, like this reported case, surgical options such as duodenal metastasectomy might relieve gastrointestinal obstructive symptoms and offer a survival advantage. If there are multiple metastases or other serious complications, the therapeutic options should be symptomatic and palliative care,<sup>[1]</sup> especially for patients in poor physical condition. Moreover, for most metastases of ILC, conservative treatment is appropriate.<sup>[8]</sup>

In summary, we report a rare case of IDC of the breast with isolated metastasis involving the duodenum. For patients with a visual complaint such as nausea and vomiting, the possibility of a metastatic malignancy should be considered.

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