

# Endoscopic drainage with a metallic stent for obstructive jaundice caused by bile duct metastasis of breast Cancer: A case report

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## Abstract

A 66-year-old breast ductal carcinoma patient developed obstructive jaundice, presenting with epigastric discomfort and dark-colored urine. Contrast-enhanced computed tomography and endoscopic retrograde cholangiopancreatography revealed bile duct stenosis. Brushing cytology and tissue biopsy confirmed bile duct metastasis, and a self-expandable metallic stent was placed/replaced endoscopically, extending the patient's life.

## Endoscopic drainage with a metallic stent for obstructive jaundice caused by bile duct metastasis of breast Cancer: A case report

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The data that support the findings of this report are available from the corresponding author, KY, upon reasonable request.

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This report was conducted according to the principles of the Declaration of Helsinki.

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### **Permission To Reproduce Material From Other Sources:**

There is no material from other sources in this report.

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There is no clinical trial registration in this report.

### **Abstract**

A 66-year-old breast ductal carcinoma patient developed obstructive jaundice, presenting with epigastric discomfort and dark-colored urine. Contrast-enhanced computed tomography and endoscopic retrograde cholangiopancreatography revealed bile duct stenosis. Brushing cytology and tissue biopsy confirmed bile duct metastasis, and a self-expandable metallic stent was placed/replaced endoscopically, extending the patient's life.

**Key words :** breast cancer, bile duct metastasis, stenosis, SEMS

### **Key Clinical Message**

Bile duct metastasis of breast cancer is rare. It often causes obstructive jaundice which makes the patient interrupt state of treatment. Endoscopic drainage for obstructive jaundice is effective and less invasive treatment option also in this case.

### **Introduction**

Obstructive jaundice caused by malignant tumor is commonly encountered in daily practice in the gastrointestinal field. Hepato-biliary-pancreatic cancers, such as liver cancer, cholangiocarcinoma, or pancreatic cancer, are among the most common causes of obstructive jaundice, whereas bile duct metastasis of breast cancer is extremely rare. Herein, we present our experience of a case of obstructive jaundice caused by bile duct metastasis of breast cancer, in which various endoscopic drainage procedures were performed. We believe that this is a valuable case due to the rarity of this presentation, and have therefore reported it with a discussion of the literature.

### **Case History**

The patient was a 66-year-old woman who had been receiving chemotherapy comprising pertuzumab, trastuzumab, and docetaxel for invasive ductal breast cancer with liver and brain metastases, since 2016. She became aware of epigastric discomfort in October 2019; in early December of the same year, she began passing dark-colored urine and visited our hospital. Blood tests revealed elevated hepatobiliary enzymes, while contrast-enhanced computed tomography (CECT) scan of the abdomen showed wall thickening of the middle to distal bile duct and dilated intrahepatic bile ducts. No mass was evident around the bile duct wall (Fig. 1). Obstructive jaundice due to malignant lesion in the bile duct was suspected and the patient was admitted to our hospital for further investigation and treatment.

### **Differential diagnosis, investigations and treatment**

On physical examination, the skin was icteric, and the abdomen was soft, flat, and without any tenderness.

Blood tests revealed elevated hepatobiliary enzymes (total bilirubin, 6.0 mg/dL; aspartate transaminase, 449 IU/L; alanine transaminase, 624 IU/L; alkaline phosphatase, 1560 IU/L; gamma-glutamyl transferase, 1163 IU/L); inflammatory markers were within normal range (white blood cell, 4600 / $\mu$ L; C-reactive protein, 0.9 mg/dL); tumor markers were negative (carcinoembryonic antigen, 2.0 ng/mL, carbohydrate antigen 19-9, 2.6 U/mL); and there was no elevation of immunoglobulin G4 (12.1 mg/dL).

Magnetic resonance imaging (MRI) performed on the 3rd day of admission revealed a mass-like lesion around the head of the pancreas that was hyperintense on diffusion-weighted imaging (Fig. 2).

On the 5th day of admission, endoscopic retrograde cholangiopancreatography (ERCP) was performed. Cholangiography revealed severe stenosis in an area of the middle to distal bile duct (Fig. 3). Endoscopic sphincterotomy was performed, and intraductal ultrasonography revealed homogeneous circumferential thickening (iso-hyperechoic) of the bile duct wall at the site of stenosis (Fig. 4). Brushing cytology and tissue biopsy of the stenotic area were performed, and a plastic stent (straight type, 7 Fr  $\times$  90 mm) was placed for drainage. Histopathological findings of the biopsy specimen were suggestive of adenocarcinoma, and immunostaining of the same specimen revealed CK7, GATA3, HER2, and mammaglobin positivity, with CDK2, CK20, PAX8, TTF1, and CA125 negativity, leading to the diagnosis of bile duct metastasis of breast cancer (Fig. 5).

### Outcome and follow-up

ERCP-related complications were not observed, and the patient was discharged on the 9th day of admission, with good progress.

In January 2020, the plastic stent in the bile duct was replaced with a self-expandable metallic stent (SEMS) (WallFlex<sup>TM</sup> Biliary RX UNCOVERED 10 $\times$ 80 mm) (Fig. 6). Cholecystitis developed as a complication, which was resolved with percutaneous transhepatic gallbladder aspiration and antibacterial therapy.

After this treatment, the patient continued chemotherapy as an outpatient but was readmitted in July 2020 due to worsening jaundice. A CECT scan of the abdomen showed soft tissue shadows inside the SEMS, suggesting the possibility of tumor invasion into the SEMS. ERCP was performed, and a plastic stent was therefore placed into the SEMS (Fig. 7). Jaundice improved, and the patient was discharged with no complications.

In August of the same year, the patient was readmitted to the hospital for worsening jaundice. ERCP was performed, and the plastic stent, which was suspected to be obstructed, was removed. After the stenosis was dilated with an 8.5 Fr dilation catheter, an alternative plastic stent was placed into the SEMS.

In September of the same year, the jaundice worsened again, and the patient was readmitted for further treatment. ERCP was performed and the plastic stent placed in the SEMS was removed. Severe stenosis was observed in the SEMS due to tumor invasion, and an additional SEMS (HANAROSTNT<sup>®</sup> Benefit Biliary covered 8 mm  $\times$  80 mm) was placed in the stent-in-stent configuration (Fig. 8).

Thereafter, outpatient chemotherapy was continued. Stent occlusion did not re-occur, and jaundice did not worsen. However, in December of the same year, her general condition deteriorated due to multiple liver metastases of breast cancer. The patient received palliative treatment and died 358 days after the initial hospitalization.

### Discussion

Breast cancer is the cancer with the highest incident rate in women according to the Global Cancer Statistics in 2020<sup>1</sup>. Breast cancer often metastasizes to other organs, particularly the lungs, bones, liver, and brain, and, very rarely, the bile duct. Thus far, 16 cases of bile duct metastasis of breast cancer have been reported in detail. These case reports were obtained through a search of PubMed for articles published from 1946 to 2021, using the search terms “breast cancer” and “biliary metastasis”. In addition to these, Japanese case reports were obtained through a search of the Japana Centra Revuo Medicina Web for articles published from 1977 to 2021, using the Japanese equivalents of the search terms mentioned above<sup>2-13</sup>. The details of

these case reports are presented in Table 1. The average age of the patients was 56 years (42–70 years). Most cases were examined for subjective symptoms, such as jaundice (11/16), abdominal pain (3/16), and pruritus (3/16), and only one case was asymptomatic. The mean time to metastasis to the bile duct was 7.4 years (2–21 years), and most of the cases further showed metastasis to other organs such as the gallbladder, liver, and bones. Many of the reported cases required multiple examinations for diagnosis. In reports before the 1990s, most cases were diagnosed by histology of resected specimens after surgery; however, recently, some cases were diagnosed by ERCP.

Regarding treatment for objective jaundice by bile duct stenosis, only five cases were treated by endoscopic drainage (Table 2)<sup>2,3,5,6</sup>. On cholangiography, all the reported cases with available images showed severe diffuse stenosis confined to a relatively long segment of the bile duct. In four of these cases, tissue biopsy or brushing cytology at the stenotic area was performed, all of which led to a definitive diagnosis. Conversely, Coletta et al., reported a case of bile duct metastasis of breast cancer, in which endoscopic cytological examination of the stenotic area was negative; histologic examination of the resected specimen after surgery revealed tumor cells on the outer side of the bile duct, but not on the bile duct endothelium<sup>7</sup>. In such cases, it is difficult to make a definitive diagnosis based on endoscopic bile duct biopsy or brushing cytology alone; therefore, a comprehensive approach based on clinical history and findings on other imaging modalities are required. Our case is the first to describe the duration of stent patency, and in which stent stenosis due to tumor invasion was observed repeatedly within a short period. There was a previous case report of gastric metastasis of breast cancer, in which an SEMS was placed for pyloric stenosis, and obstruction due to tumor invasion was observed barely 3 months later<sup>14</sup>. This indicates that in the case of breast cancer metastasis, in-stent invasion may occur earlier. Furthermore it may be useful to place SEMS in the early stages after diagnosing biliary metastasis, as it is superior to plastic stent from the viewpoint of stent patency. Regarding complications, cholecystitis occurred in two of reported cases after endoscopic stenting; however, other serious adverse complications were not reported. Prognosis varied from case to case, depending on the degree of progress of breast cancer and metastases.

In summary, we encountered a rare case of bile duct breast cancer metastasis, in which obstructive jaundice was effectively managed by endoscopic drainage. Endoscopic bile duct stenting is less invasive than surgical operation, making it an effective treatment option.

### Authorship List:

KY: participated in the management of this patient, wrote the manuscript. MY, YH: participated in the management of this patient. YS, TS, YS: helped in writing the manuscript. HM: advised on pathological results. SF, HS: helped in writing and supervised the manuscript.

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### Conflict of Interest Statement

The authors declared no conflict of interest.

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## Figure legends

Figure. 1

CECT scan of the abdomen showed thickening of the walls of the middle to distal bile ducts (arrow) and dilated intrahepatic bile ducts. No mass was evident around the bile duct wall.

CECT, contrast-enhanced computed tomography

Figure. 2

MRI showed a mass-like lesion around the head of the pancreas that was hyperintense on diffusion-weighted imaging (arrow).

MRI, magnetic resonance imaging

Figure. 3

ERCP showed severe stenosis in a relatively long area of the middle to distal bile ducts.

ERCP, endoscopic retrograde cholangiopancreatography

Figure. 4

Intraductal ultrasonography showed a homogeneous circumferential thickening (iso-to hyperechoic) of the bile duct wall at the site of the stenosis was observed.

Figure. 5

Findings on histopathological examination of the biopsy specimen were suggestive of adenocarcinoma(5-1), and immunostaining of the same specimen showed GATA3(5-2), HER2(5-3), and mammaglobin(5-4) positivity.

Figure. 6

A plastic stent in the bile duct was replaced with a SEMS.

SEMS, self-expandable metallic stent

Figure. 7

A plastic stent was placed into the SEMS because tumor invasion was suspected.

SEMS, self-expandable metallic stent

Figure. 8

An additional SEMS was placed in the form of a stent-in-stent because of severe stenosis in the SEMS due to tumor invasion.

SEMS, self-expandable metallic stent

















