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Single Case

Hemostasis with Metallic Stent for Multiple Metastatic Pancreatic Tumors Complicated with Hemobilia

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Keywords
Hemobilia · Metastatic pancreatic tumor · Metallic stent · Hemostasis

Abstract
Introduction: Hemobilia, which refers to bleeding from the bile duct, is rare and difficult to treat. We report a case of successful hemostasis of a pancreatic tumor complicated by hemobilia. ***Case Presentation:*** A 76-year-old man was referred to our hospital with a pancreatic head tumor. Endoscopic retrograde cholangiopancreatography (ERCP) and endoscopic ultrasonography-FNA were performed, and the patient was diagnosed with pancreatic metastasis of renal cell carcinoma. After discharge, the patient noted worsening jaundice and progressive anemia and was readmitted. ERCP reveals active bleeding from the duodenal papillae. The patient was placed on a fully covered metallic stent and discharged after confirming hemostasis. ***Conclusion:*** Renal cell carcinoma is a tumor with abundant blood flow. If hemobilia occurs, bleeding from pancreatic metastatic tumors should be considered. Additionally, hemostasis using a fully covered metallic stent is useful for treating hemobilia in tumors.

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Introduction

Hemobilia, which means bleeding in the bile duct, was first reported by Sandblom et al. in 1948 [1]. Interventional radiology or surgery has been used to treat hemobilia; however, hemostatic methods using metallic stents have been reported in recent years [2, 3]. Herein, we report a rare case of hemostasis using a metallic stent for multiple metastatic pancreatic tumors complicated by hemobilia. As hemobilia from a pancreatic head tumor does not require consideration of occlusion of the bile duct bifurcation, placement of a fully covered metallic stent was considered a good indication for hemostasis. The CARE Checklist has been completed by the authors for this case report, attached as online supplementary material (for all online suppl. material, see https://doi.org/10.1159/000536221).

Case Report

The patient was a 76-year-old male who was diagnosed with right renal cell carcinoma at our hospital and underwent a laparoscopic right nephrectomy at age 69. He was treated at our hospital for 3 years after the operation and was followed up by a referral doctor thereafter. This time, he visited a referring doctor because of jaundice. A pancreatic head tumor was identified on imaging, and the patient was referred to our hospital. Physical examination on arrival showed temperature 36.4°C, heart rate 90 beats/min, jaundice was observed throughout the body, incision was found on the left side of the abdomen, and no mass was palpable. At the medical examination, he complained no abdominal pain. Laboratory data showed elevated liver enzyme and bilirubin levels, but inflammation or tumor marker levels were not elevated (Table 1). Abdominal contrast-enhanced computed tomography (CT) revealed multiple nodular lesions with contrast-enhancing effects on the pancreatic head and mild dilatation of the bile duct. In addition, several small nodular lesions with contrast-enhancing effects were observed in the pancreatic body and tail (Fig. 1a, b). Contrast-enhanced CT performed before surgery for right renal cell carcinoma and non-contrast-enhanced CT performed 6 months after surgery revealed no pancreatic tumors (Fig. 1c, d). Magnetic resonance cholangiopancreatography revealed distal bile duct stenosis and dilatation of the upstream bile duct (Fig. 2). Fluorodeoxyglucose positron emission tomography (FDG-PET) revealed no accumulation of tumors in the pancreatic head (Fig. 3).

As obstructive jaundice due to a mass in the pancreatic head was observed, endoscopic retrograde cholangiopancreatography (ERCP) was performed. Cholangiography revealed a 3 cm stenosis in the distal bile duct, and a biliary stent (ZEOTUBE™ 7Fr, 7 cm, Straight type, Zeon Medical, Tokyo, Japan) was placed (Fig. 4a, b). Endoscopic ultrasonography (EUS) revealed a 29 mm-sized, clearly demarcated mass with abundant Doppler blood flow at the head of the pancreas, and fine-needle aspiration (EZSHOT3™ FNA needle, 22gauge, Olympus Medical, Tokyo, Japan) was performed (2 times punctures, each 20 strokes, slow pull methods, no rapid-onsite evaluation) (Fig. 5a, b). In the tissue, tumor cells with clear cytoplasm proliferated in an alveolar form, and immunostaining was positive for CD10 and pax8 and negative for CK7 and CK20, indicating clear cell carcinoma (Fig. 6a, b). Jaundice and inflammation improved after treatment, and the patient was discharged from the hospital.

He was scheduled to undergo pancreatic resection later, but 52 days after discharge, he presented with worsening jaundice and anemia and was readmitted. Gastroduodenoscopy was performed to investigate anemia and active bleeding from the duodenal papillae was observed, therefore, ERCP was performed. Cholangiography revealed an irregularly shaped defect within the bile duct, and a blood clot was suspected. After temporary nasobiliary drainage was placed (Fig. 7a, b), nasobiliary drainage was replaced with a fully covered metallic stent (HANARO STENT™ 10 mm × 60 mm, laser cut, Boston Scientific Japan, Tokyo, Japan), and the patient was discharged after confirming hemostasis (Fig. 7c, d).

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Table 1. Laboratory data on admission

Hematology	
WBC, /μL	5,300
RBC, /μL	460 × 10^4
Hb, g/dL	13.4
Ht, %	42.7
Plt, /μL	23.9 × 10^4
Tumor marker	
CEA, ng/mL	3.7
CA19-9, U/mL	1.0
Biochemistry	
Alb, g/dL	4.1
BUN, mg/dL	22
Cr, mg/dL	1.0
CK, IU/L	153
AST, IU/L	410
ALT, IU/L	637
LDH, IU/L	354
ALP, IU/L	957
γ-GTP, IU/L	1,113
Amy, IU/L	194
Na, mEq/L	143
K, mEq/L	4.8
T-bil, mg/dL	7.5
CRP, mg/dL	0.51

Surgery was performed at a later date. During surgery, in addition to the head of the pancreas, small yellow nodules were observed in the body and tail of the pancreas. A spleen-preserving total pancreatectomy was performed. In the resected specimen, tumor tissue was observed not only in the pancreatic head but also in the body and tail, and the pancreatic head mass had invaded the bile duct wall and was exposed to the bile duct lumen (Fig. 8a, b). Histologically, tumor cells with clear cytoplasm proliferated in an alveolar form, and immunostaining showed that CD10 was concentrated in the cytoplasm, pax8 was positive in the nuclei, and keratin was negative. The final histological diagnosis revealed clear cell carcinoma (Fig. 8c, d).

Postoperatively, the patient developed an infection and required 2 months of treatment. The condition subsequently improved and was discharged from the hospital. Six months after his discharge, no bleeding or recurrence has been observed.

Discussion

Metastatic tumors account for 2–5% of malignant tumors of the pancreas [4]. Renal cell carcinoma is the most common primary tumor, accounting for 58.6–70% of all metastatic pancreatic tumors [5]. Since renal cell carcinoma is a tumor with abundant

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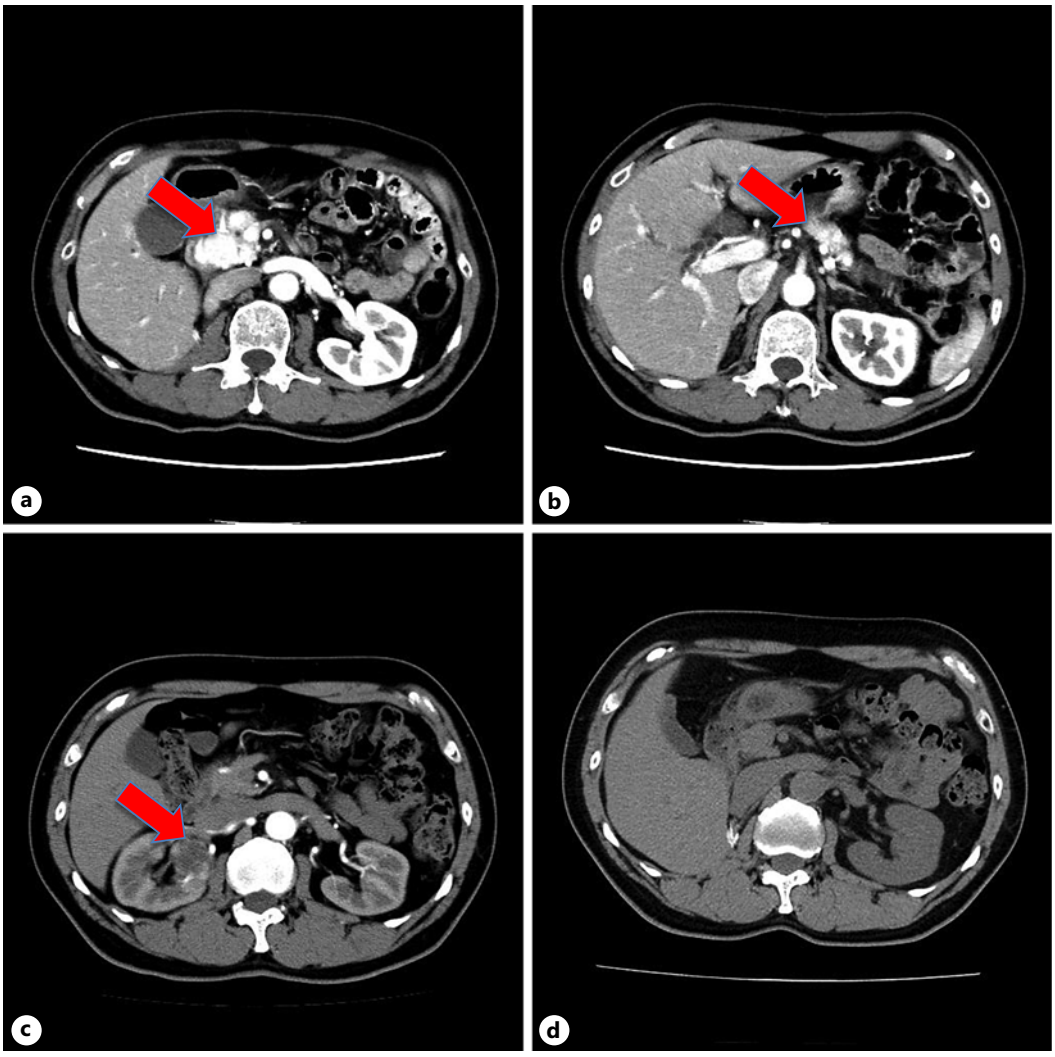

Fig. 1. a Abdominal contrast-enhanced CT revealed multiple nodular lesions with contrast-enhancing effects on the pancreatic head (arrow). **b** several small nodular lesions with contrast-enhancing effects were observed in the pancreatic body and tail (arrow). **c** Contrast-enhanced CT performed before surgery for right renal cell carcinoma (arrow). **d** Non-enhanced CT performed 6 months after surgery.

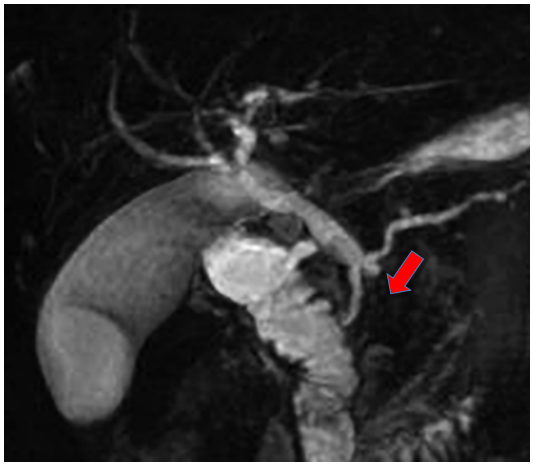

Fig. 2. MRCP revealed intrapancreatic bile duct stenosis (arrow) and mild dilatation of the distal bile duct. MRCP, magnetic resonance cholangiopancreatography.

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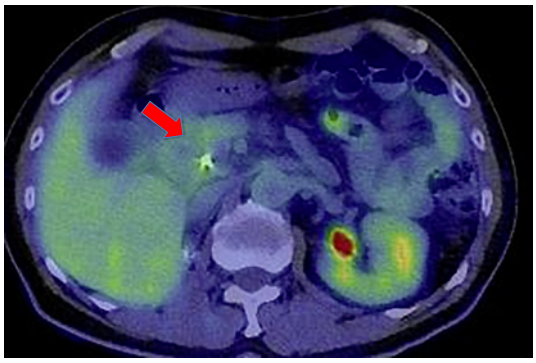

Fig. 3. FDG-PET revealed no accumulation of tumors in the pancreatic head (arrow). FDG-PET, fluorodeoxyglucose positron emission tomography.

blood flow, tumors that have metastasized to the pancreas are also characterized by morphology with abundant blood flow on imaging [6]. The organs to which renal cell carcinoma metastasizes are the lungs (45.2%), bone (29.5%), lymph nodes (21.8%), liver (20.3%), adrenal gland (8.9%), brain (8.1%), and pancreas (3.0%), and in rare cases, metastasis to gastrointestinal organs such as the stomach and gallbladder results in gastrointestinal bleeding [7]. Renal cell carcinoma often requires time from onset to metastasis, and in the case of pancreatic metastasis, the average period from nephrectomy to pancreatic metastasis is 6.9–14.6 years [8]. In this case, the tumor was detected during long-term postoperative follow-up, and surgery was performed at an appropriate time.

Metastatic tumors are generally not indicated for resection in many organs; however, according to the 2017 version of the Clinical Practice Guidelines for Kidney Cancer, the 5-year survival rate is 72.6% for resected cases and 14% for non-resected cases of metastatic tumors originating from renal cell carcinoma. As a favorable prognosis has been achieved, resection is recommended for metastatic tumors originating from renal cell carcinoma [9]. There are many reports of multiple intrapancreatic metastases from renal cell carcinoma. There are also reports in which a total pancreatectomy was performed, as in this case [10]. The 5-year survival rate after total pancreatectomy in patients with pancreatic metastasis from renal cell carcinoma is 64–78%, and the prognosis is better than that in patients with partial resection [11]. In patients with multiple metastatic pancreatic tumors, extended surgeries, including total pancreatectomy, should be considered.

Hemobilia was first reported by Sandblom et al. [1], 65% of the cases are iatrogenic, and 7% are caused by tumors. Symptoms of hemobilia include epigastric pain, jaundice, hematemesis, and melena, as in Quinke's triad, approximately 20% of all have patients have these three characteristics [12]. Malignant neoplasms that cause hemobilia account for 50% of hepatocellular carcinomas, 35% of cholangiocarcinoma, 7% of gallbladder cancers, and 7% of pancreatic cancers. To the best of our knowledge, only one case of hemobilia caused by pancreatic metastasis from renal cell carcinoma was reported in English literatures [2]. Although the causal relationship between EUS-FNA and hemobilia in this case is unclear because there was a long period of time before onset, gastrointestinal bleeding was a complication in 4.4% of all EUS-FNA cases. Only two cases of complication of hemobilia have been reported [13, 14]. Interventional radiology or surgery has been used to treat hemobilia, however, in recent years, hemostatic methods using metallic stents have been reported [3]. Because the metallic stent has a diameter of 8–10 mm, which is larger than the diameter of the bile duct, it is expected to have a hemostatic effect upon compression. In addition, by using a fully covered metallic stent, it is possible to obtain a

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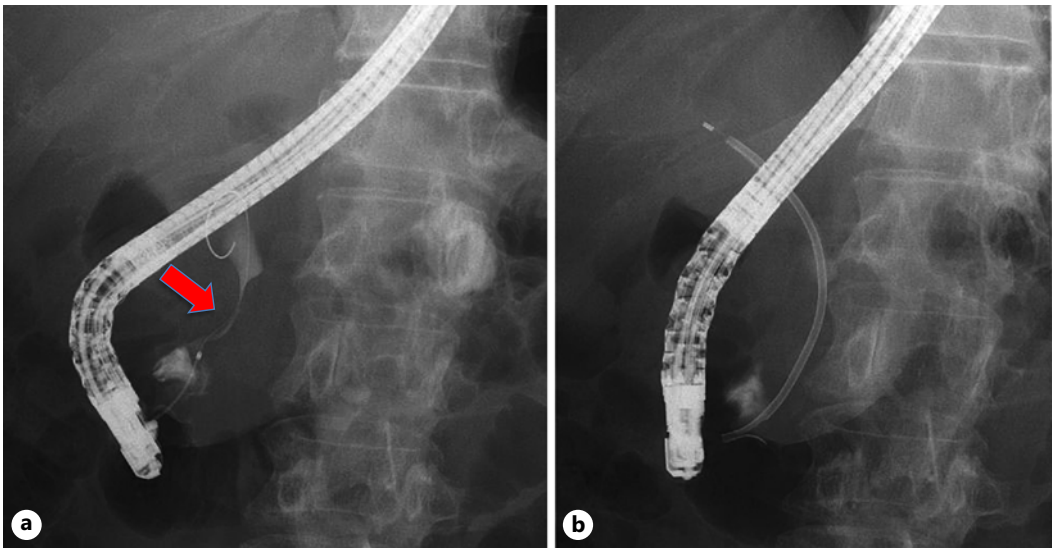

Fig. 4. a Cholangiography revealed a 3 cm stenosis in the distal bile duct (arrow). **b** Biliary stent was placed.

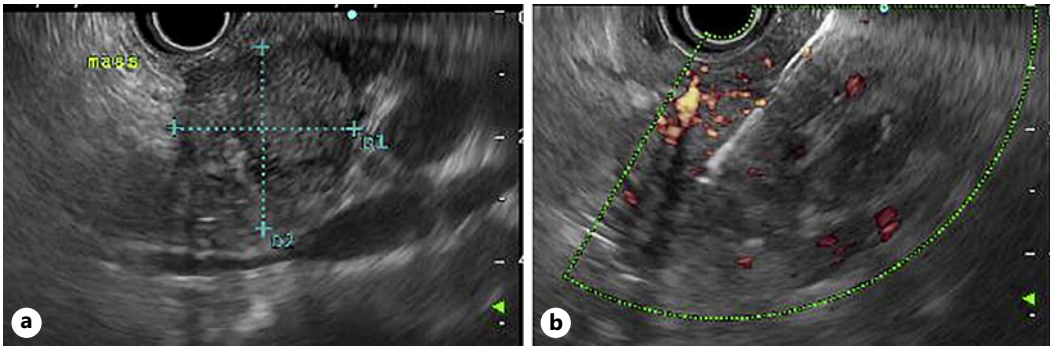

Fig. 5. a, **b** EUS revealed a 29 mm-sized, clearly demarcated mass with abundant Doppler blood flow at the head of the pancreas, and FNA was performed.

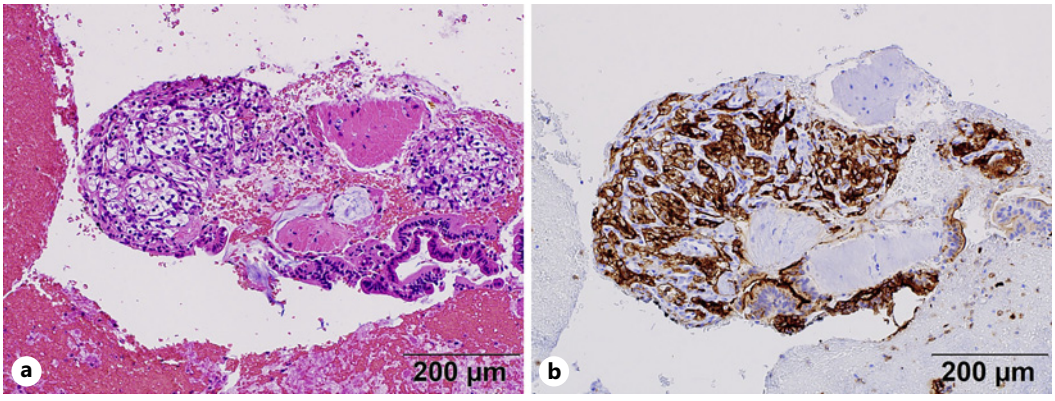

Fig. 6. a Histologically, tumor cells with clear cytoplasm proliferated in an alveolar form. **b** Immunostaining was positive for CD10.

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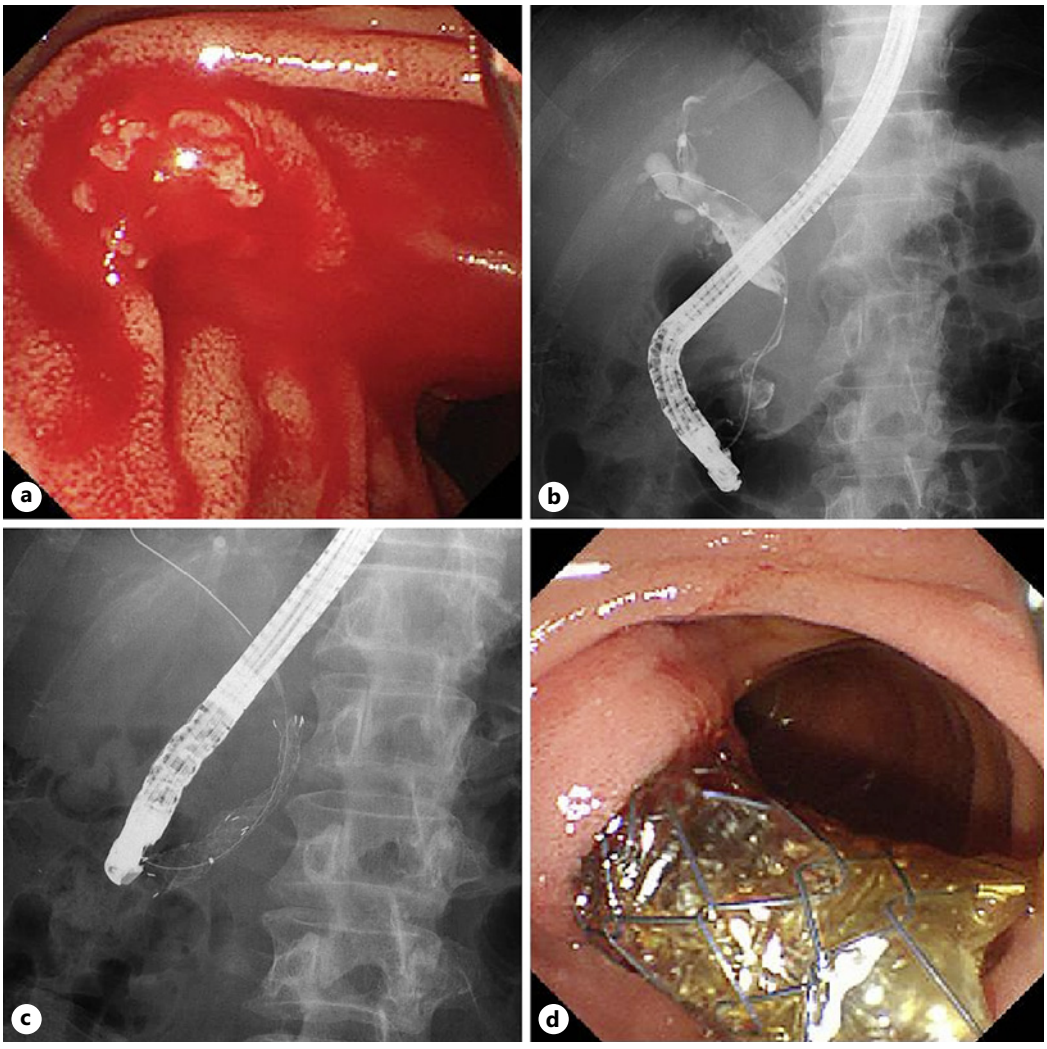

Fig. 7. **a** Active bleeding from the duodenal papilla was observed. **b** Cholangiography revealed bile outflow obstruction due to hemobilia. **c**, **d** Fully covered metallic stent was placed, and confirming hemostasis.

hemostatic effect by covering the gaps between the stents. Metallic stents are broadly divided into braided type and laser cut type, with the braided type having a higher ability to expand in the radial direction. However, with the braided type, a high degree of shortening by axial force occurs during the procedure, and axial force makes accurate placement difficult, so the laser cut type has been widely used in recent years [15]. Hemostasis with a metallic stent for hemobilia in malignant tumors has been reported in 8 cases, including our case. Biliary bleeding from the distal bile duct was reported in 4 cases, and hemostasis was achieved with a covered metallic stent in all cases [2, 15, 16] (Table 2). In addition, it has been reported that self-expandable stents have a hemostatic effect on intraluminal bleeding from surrounding tissues such as esophageal bleeding due to their strong compression action [17]. There is also a report that bleeding from duodenal ampullary adenocarcinoma could be stopped by indirect pressure by placing a bile duct metallic stent [18]. Our case is the first in which surgery was performed after treatment for a metastatic pancreatic tumor. The tumor invasion into the bile duct wall and the hemostatic effect of the

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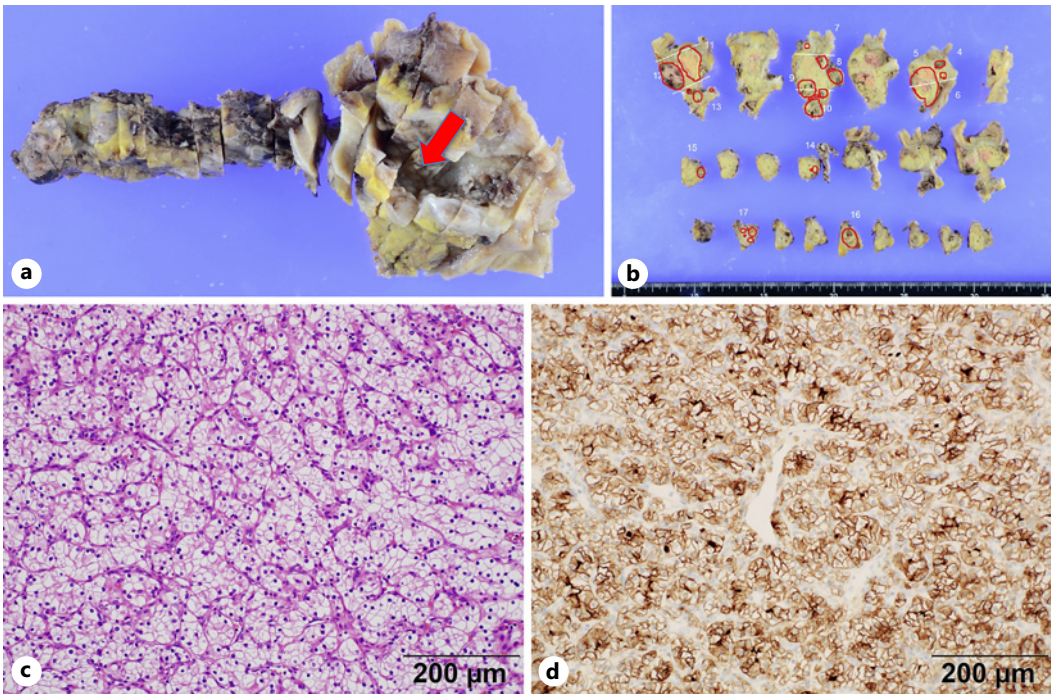

Fig. 8. a Pancreatic head mass had invaded the bile duct wall and was exposed to the bile duct lumen (arrow). **b** Tumor tissue was observed not only in the pancreatic head but also in the body and tail. **c** Histologically, tumor cells with clear cytoplasm proliferating in an alveolar form. **d** Immunostaining was positive for CD10.

Table 2. Cases of hemostasis with metallic stent for distal hemobilia

Author	Age/sex	Tumor type	Metallic stent type	Hemostasis	Surgery
Baressi et al. [15] (2015)	67 M	Pancreatic cancer	Fully covered	Success	None
Zhang et al. [16] (2018)	90 F	Gallbladder cancer	Fully covered	Success	None
Yamawaki et al. [2] (2021)	86 M	Metastatic pancreatic tumor	Partially covered	Success	None
Our case 2023	76 M	Metastatic pancreatic tumor	Fully covered	Success	Done

metallic stent were also confirmed in the resected specimen. Since hemobilia from a pancreatic head tumor does not require consideration of obstruction of the bile duct bifurcation, we think that placement of a fully covered metallic stent is a good indication for hemostasis, as in this case.

Conclusion

Renal cell carcinoma is a tumor with abundant blood flow. If hemobilia occurs, bleeding from pancreatic metastatic tumors should be considered. Additionally, hemostasis using a fully covered metallic stent is useful for treating hemobilia in tumors.

Statement of Ethics

This article does not contain any studies with human participants performed by any of the authors. The research was conducted ethically in accordance with the World Medical Association Declaration of Helsinki. Written informed consent was obtained from the patient for publication of the details of their medical case and any accompanying images. Ethical approval is not required for this study in accordance with local or national guidelines.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

Hiroyuki Ito, Masashi Yokota, Hisamichi Yoshii, and Hideki Izumi contributed to the patient's medical treatment. Hiroyuki Ito is the primary investigator and contributed to conceptualization, data collection, and drafting of the manuscript. Yuji Omura, Tomonori Makuuchi, Tsubomi Chou, Ayano Ito, Ryutaro Fujimoto, Shingo Tsuda, Junko Nagata, Shunji Hirose, Tomoko Sugiyama, Takuma Tajiri, Takayoshi Suzuki reviewed the manuscript. All authors have read and approved the final version of the manuscript.

Data Availability Statement

All data generated or analyzed during this study are included in this article. Further inquiries can be directed to the corresponding author.

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