CASE REPORT

Development of Severe Acute Pancreatitis Following Uncovered Metallic Stent Placement: A Rare Case Report

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Abstract:
Self-expandable metallic stents (SEMSs) are widely used for malignant biliary stricture (MBS). Acute pancreatitis is an early complication following SEMS placement. In the present case, the patient developed severe acute pancreatitis after SEMS placement for MBS because of metastatic lymph nodes. Endoscopic retrograde cholangiopancreatography, endoscopic sphincterotomy and an endoscopic nasobiliary drainage tube placement were performed. After seven days, an uncovered SEMS was placed; however, severe acute pancreatitis occurred, and the SEMS was drawn out emergently. In SEMS placement for patients with MBS caused by non-pancreatic cancer, SEMS should be selected carefully while considering each patient’s case.

Key words: severe acute pancreatitis, extrahepatic bile duct obstruction, malignant biliary stricture, self-expandable metallic stent

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Introduction

Self-expandable metallic stents (SEMSs) have been widely used for malignant biliary stricture. Acute pancreatitis is an early complication that can follow SEMS placement in between 0% and 24% of cases (1-11). However, there are few reports on severe acute pancreatitis onset after SEMS placement (12).

We herein report a rare case of severe acute pancreatitis after SEMS placement for malignant distal bile duct stricture and discuss the development of acute pancreatitis after metallic stent placement.

Case Report

A man in his 70s who was receiving chemotherapy for advanced squamous cell carcinoma of the lung complained of jaundice. Hepatobiliary enzymes and bilirubin levels were markedly elevated, and the patient was referred to our department.

Computed tomography (CT) revealed multiple liver metastases, hepatomegaly, multiple swollen abdominal lymph nodes, and extrahepatic bile duct dilatation (Fig. 1). Magnetic resonance cholangiopancreatography showed intrapancreatic and extrahepatic bile duct dilatation, distal bile duct obstruction, and smooth main pancreatic duct without dilatation (Fig. 2). Endoscopic retrograde cholangiopancreatography (ERCP) revealed distal bile duct stricture due to metastatic lymph node (Fig. 3a). After endoscopic sphincterotomy (EST) with a small incision, an endoscopic nasobiliary drainage (ENBD) tube was placed (Fig. 3c, e), and the yellowing effect was confirmed. After 7 days, ERCP was performed a second time, and an uncovered SEMS (10 mm in diameter and 8 cm in length; Bonastent⡴, Sewoon Medical, Cheonai, Korea) was placed without any additional procedures, including contrast medium injection and guidewire insertion into the pancreatic duct, a biopsy, and intraductal ultrasonography (Fig. 3e, f). These ERCP-related procedures were performed by a well-experienced endoscopist in 11 minutes.

A marked increase in pancreatic enzymes was observed.

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3,800-4,000 mL infusion, 1,500 mg of gabexate mesylate, and 13.5 g of tazobactam piperacillin hydrate intravenous administration daily continuously. Following the removal of the SEMS, the pancreatic enzyme levels dropped dramatically, and the CRP levels declined steadily. The recovery of severe acute pancreatitis was confirmed by laboratory data and CT at 21 days after the first ERCP procedure; a fourth ERCP procedure was subsequently performed, and another tube stent was placed. The patient was discharged 29 days after the first ERCP procedure without pancreatitis onset.

**Discussion**

Acute pancreatitis is an early complication that can occur after SEMS placement for malignant biliary stricture. In endoscopic SEMS placement, acute pancreatitis has been reported to occur in 0-14% of cases in the past decade (1-10). Although the frequency varies among reports, acute pancreatitis occurs with a certain probability. However, there are few reports of severe acute pancreatitis following SEMS placement (12).

In our institution, SEMS placement was performed for 559 patients with malignant biliary stricture over the 12-year period between 2008 and 2019. Of the 559 patients, acute pancreatitis occurred in 14 patients (2.5%). These 14 patients underwent EST and biliary drainage using ENBD and/or tube stent at the first ERCP procedure and SEMS placement at the second or third ERCP procedure. Of these patients, urgent ERCP and SEMS removal were performed in 3 (0.54%), including the present case, due to the rapid increase in pancreatic enzyme levels observed, which was considered to have been caused by SEMS placement. Of these three patients, two had partially covered SEMS, and 1 had an uncovered SEMS; both were braided-type SEMS. Among these 3 patients, severe acute pancreatitis only developed in the current case (0.18%).

Acute pancreatitis after metallic stent placement is considered to occur as a consequence of SEMS obstructing the pancreatic duct orifice of the papilla of Vater, which blocks pancreatic juice outflow and consequently induces acute...
pancreatitis. The use of EST can help avoid pancreatic duct obstruction to some extent. Indeed, Sugawara et al. reported that 24% of patients with acute pancreatitis were observed after percutaneous transhepatic biliary SEMS placement across the papilla without EST (11). However, EST has been reported to be unrelated to the development of pancreatitis following SEMS placement (8, 9). In previous reports, the etiology of biliary stricture was limited to pancreatic cancer.

Figure 3. ERCP findings. a: Endoscopic cholangiography reveals lower-to-middle bile duct stricture. b: The papilla of Vater was of normal size and shape. c: An endoscopic nasobiliary tube was placed. d: Endoscopic sphincterotomy with a middle incision was performed. e, f: An endoscopic metallic stent was placed after 7 days using an uncovered braded type metallic stent (10 mm in diameter and 8 cm in length). ERCP: endoscopic retrograde cholangiopancreatography.

Figure 4. Computed tomography showing severe acute pancreatitis findings. a: The swollen pancreas and spread of inflammation to the abdominal cavity and retroperitoneum (arrows). b: The inflammation spread toward the inferior pole of the left kidney (arrow).
and simultaneous parenchyma damage and the development resulting in a sudden increase in pancreatic ductal pressure chyma over the pancreatic duct due to SEMS placement, re-

phy (9). In the current case, we suspected that the large me-
mobilization of the main pancreatic duct and no pancreatic atro-

creatic cancer (n=169; 28%) and in >50% of the patients

tment was reported in a small number of patients with pan-

of acute pancreatitis following fully covered SEMS place-

was reported in 1.3% of patients (6). A relatively high rate

of malignant biliary stricture, 76-77% of the total patients

tis may represent a viable option.

When the risk of acute pancreatitis is considered high, par-

cluded SEMS and fully covered SEMS (1, 2); however, there are no marked differences in

cases with covered SEMSs than in those with uncovered SEMSs (1, 2); however, there are no marked differences in

the rates of acute pancreatitis development between partially covered and uncovered SEMSs (3, 4). This may be related to the underlying disease, the presence or absence of dilata-
tation of the main pancreatic duct, and/or atrophy of the pan-
creatic parenchyma (2, 5, 11). In patients with pancreatic duct obstruction, such as pancreatic head cancer, we empiri-
cally understand that acute pancreatitis is unlikely to occur, even if the pancreatic duct orifice is blocked because of chronic obstructive pancreatitis. In a randomized comparative study of covered versus uncovered SEMSs in cases of malignant bile duct stricture, 76-77% of the total patients had pancreatic cancer; the incidence of acute pancreatitis was reported as 1.5% and 2.0%, respectively (4).

Acute pancreatitis after fully covered SEMS placement has been reported in 9.3% of patients (n=602), while the presence of a moderate to high degree of acute pancreatitis was reported in 1.3% of patients (6). A relatively high rate of acute pancreatitis following fully covered SEMS placement was reported in a small number of patients with pan-
creatic cancer (n=169; 28%) and in >50% of the patients with a non-dilated pancreatic duct (n=349; 58%).

Acute pancreatitis is likely to occur in patients with no dilation of the main pancreatic duct and no pancreatic atro-

phy (9). In the current case, we suspected that the large me-
tastatic lymph node had compressed the pancreatic paren-
chyma over the pancreatic duct due to SEMS placement, re-
sulting in a sudden increase in pancreatic ductal pressure and simultaneous parenchyma damage and the development of acute pancreatitis. Generally, the mechanisms underlying aggravation of acute pancreatitis have been thought to be local inflammation, increased cytokine production that leads to systemic cytokine overflow, and the production of other mediators that induce systemic inflammatory syndrome. Sys-
temic inflammation induces multiple organ failure and/or disseminated intravascular coagulation. However, the exact cause and mechanism of the progression of acute pancreati-
tis to severe acute pancreatitis were unknown in the present case.

In the context of acute pancreatitis during SEMS placement for malignant bile duct stricture due to non-pancreatic cancer, whether or not there are differences between partially covered/uncovered SEMS and fully covered SEMS is unclear. Further studies are needed to clarify this issue. When the risk of acute pancreatitis is considered high, par-

cularly in patients with bile duct stricture due to non-

pancreatic cancer, a stent with a smaller radial force and/or smaller stent diameter may be an option, as previously de-
scribed (9). In addition, a braided stent that can be endo-

scopically removed in the unlikely event of acute pancreati-
tis may represent a viable option.

In conclusion, we herein report a rare case of severe acute pancreatitis after uncovered SEMS placement for malignant bile duct stricture due to metastatic lymph node from lung cancer. A SEMS with a smaller diameter and/or lower axial force may have been ideal. In cases of SEMS placement for patients with malignant biliary stricture due to non-

pancreatic cancer, it is necessary to perform EST and select a stent after careful consideration of the patient-specific fac-
tors.

The authors state that they have no Conflict of Interest (COI).

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