Dilatation of the Bile and Pancreatic Ducts due to Compression by an Unruptured Abdominal Aortic Aneurysm (AAA): A Case Ameliorated by an Endovascular Stent Grafting

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Abstract

An 88-year-old woman was referred to our hospital due to abdominal discomfort. Imaging modalities showed an abdominal aortic aneurysm (AAA) compressing the duodenum, the distal common bile duct and the head of the pancreas concurrent with distension of the proximal bile and main pancreatic ducts in the body and tail of the pancreas. After admission, the patient underwent endovascular stent grafting to treat the AAA. The size of the aneurysm decreased and the dilatation of the bile and pancreatic ducts became less prominent. AAA should therefore be considered as a possible diagnosis in patients with findings of dilatation of the bile ducts in the absence of stones or tumors in the pancreaticobiliary system. This is the first reported case of a patient treated for both AAA and dilatation of the bile and pancreatic ducts with endovascular stent grafting via the femoral artery.

Key words: dilatation of bile and pancreatic ducts, abdominal aortic aneurysm (AAA), endovascular stent grafting

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Introduction

Abdominal aortic aneurysms (AAAs) are often asymptomatic and are not discovered until the time of rupture. Expanding AAAs have been reported to produce compression of several vital abdominal structures, including the urinary tract (1), bowel (2-4) and vascular trunks (5). The most common gastrointestinal complication of AAA is rupture into the duodenum with massive hemorrhage and shock (2, 6, 7). On the other hand, expanding or ruptured AAAs rarely cause bile duct compression (2, 6-14). This report describes our experience with an unusual case of marked dilatation of the bile and pancreatic ducts due to compression by an unruptured AAA. To the best of our knowledge, this is the first reported case of a patient safely and effectively treated for both AAA and dilatation of the bile and pancreatic ducts with endovascular stent grafting via the femoral artery without undergoing abdominal aortic aneurysmectomy.

Case Report

An 88-year-old woman was referred to our hospital for evaluation of vague and non-specific upper abdominal discomfort. She had a surgical history of cholecystectomy 30 years previously and was taking only amlodipine besilate (5 mg/day) for systemic hypertension. Systematic questioning revealed no discernible risk factors for the development of primary biliary (or liver) or pancreatic disease and the patient had never been jaundiced. At the initial visit, the patient had a blood pressure of 132/71 mmHg and heart rate of 78 beats/min. Blood tests revealed no abnormal changes in liver enzymes, prothrombin time or the levels of total serum bilirubin, albumin, serum amylase and hemoglobin (Table). A physical examination revealed a pulsatile mass in the...
upper abdomen; however, neither the liver nor the spleen was palpable. The patient was not icteric. All peripheral arterial pulses were present.

An abdominal ultrasound study showed significant dilatation of the intra-hepatic bile duct, the common hepatic duct and the main pancreatic duct (MPD) in the body and tail of the pancreas. In addition, the patient had an AAA measuring 7.5 cm long with a maximum diameter of 5.3 cm. A contrast computed tomography (CT) scan demonstrated the presence of an infrarenal AAA compressing the duodenum, the distal common bile duct (CBD) (Fig. 1a) and the head of the pancreas (Fig. 1b). A considerable mural thrombus was present. At magnet resonance cholangiopancreatography, no filling defects were identified within the CBD itself. However, the distal CBD and the MPD in the head of the pancreas were smoothly narrow and deviated laterally by the AAA, and distension of the proximal bile duct and the MPD in the body and tail of the pancreas were apparent (Fig. 2). Taking into account these findings and the proximity of the aneurysm to the duodenum and the distal CBD, we decided not to perform endoscopic retrograde cholangiopancreatography to insert a biliary stent at that time. The patient was diagnosed with dilatation of the bile and pancreatic ducts resulting from compression of the region of the pancreas head by an AAA developing from the abdominal aorta below the renal artery. We regarded the AAA as an indication for endovascular stent grafting after consultation with the patient, her family and the vascular surgeon.

For two months after her initial visit, the patient’s blood tests showed no abnormal changes in liver enzymes or the levels of bilirubin, amylase and hemoglobin. After admission to our hospital, she underwent endovascular stent grafting to treat the infrarenal AAA. Her postoperative course was uneventful, and she was discharged on the 9th postoperative day.

One year after the operation, the size of the AAA was found to have decreased (Fig. 3b) compared with that observed before surgery (Fig. 3a). Although the AAA compressing the distal CBD remained, dilatation of the proximal bile duct (Fig. 3d) and the MPD in the body and tail of the pancreas (Fig. 3f) was less prominent than that observed in the preoperative evaluation (Figs. 3c, 3e). The patient is currently asymptomatic.

### Discussion

The gastrointestinal complications of AAA primarily in-
volve rupture into the duodenum (2). Dilatation of the bile and pancreatic ducts due to compression caused by an AAA is rare. According to PubMed searches (from 1949 to June 2012), only 10 previous cases have been reported in the English medical literature (2, 6-14). In seven of these cases (2, 6, 7, 10, 11, 13, 14), direct pressure was applied to bile ducts from unruptured aneurysms. In the remaining cases (8, 9, 12), the bile duct compression was caused by hematomas from extramural leakage.

In our patient, dilatation of the MPD was also related to pancreatic or sphincteric compression caused by the aneurysm. We are aware of only two previous reports of MPD dilatation or pancreatitis due to unruptured aortic aneurysms (10, 14).

The surgical repair of an unruptured aneurysm has been attempted in only one previous report (10). In that case, emergency surgery was performed because the aneurysm rapidly increased in size and the patient had a significant risk of rupture. In other previous cases (2, 6, 7, 11, 13, 14), however, no specific treatments, i.e. aneurysmectomy or endovascular stent grafting, were administered for unruptured aneurysms due to patient age, etc. In the present case, the unruptured AAA was safely and effectively treated with endovascular stent grafting via the femoral artery despite the patient’s advanced age. The patient is currently in good health; however, she is under regular review by both general and vascular surgeons. We firmly believe that endovascular stent grafting is the best therapy for treating elderly patients with AAAs that produces compression of the biliary and/or pancreatic ducts.

Endovascular stent grafting offers a significantly less invasive alternative to conventional open surgical repair. Considerable reductions in hospital stays and early returns to preoperative levels of activity have been demonstrated in patients who undergo endovascular stent grafting. Patients previously considered unsuitable for open repair can often re-

**Figure 3.** CT scans obtained before (a, c, e) and after (b, d, f) surgery. The size of the abdominal aortic aneurysm decreased (b) compared with that observed before the operation (a). Although the abdominal aortic aneurysm compressing the distal common bile duct remained, dilatation of the proximal bile duct (d) and the main pancreatic duct in the body and tail of the pancreas (f) was less prominent than that observed in the preoperative evaluation (c, e).
ceive treatment for aneurysms with endovascular techniques. Despite the minimal invasiveness of this treatment, there are unanswered questions as to the durability and efficacy of devices, which creates concerns about the ability of these devices to successfully protect patients from subsequent rupture (15).

More common causes of compression and lateral deviation of the lower bile duct include pancreatic neoplasms, pancreatic cysts, pancreatic abscesses and acute and chronic pancreatitis. There are also case reports of similar radiological features with malignant lymphadenopathy around the duodenum and cavernous transformation of the portal vein. In the present case, we could have ruled out the possibility of these conditions noninvasively using ultrasound studies, contrast computed tomography and magnet resonance cholangiopancreatography.

In conclusion, unruptured AAA should be considered as a possible diagnosis in elderly patients with findings of dilatation of the bile and pancreatic ducts in the absence of any evidence of stones or tumors in the pancreaticobiliary system. We suggest performing endovascular stent grafting for AAA in elderly patients with these findings.

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

References