

Confusing delayed hematemesis, unusual arterial hemorrhage after pancreaticoduodenectomy: a case report

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Abstract

Pancreaticoduodenectomy (PD) is one of the most complex surgeries and is associated with a high rate of complications, including bleeding, delayed gastric emptying (DGE), and pancreatic fistula. Although the frequency of postoperative hemorrhage is not high, this complication results in severe adverse outcomes. A 67-year-old man was diagnosed with pancreatic cancer and underwent PD. On the tenth day after surgery, he developed hypovolemic shock with hematemesis. Urgent digital subtraction angiography identified the bleeding artery as the jejunal mesenteric artery at the afferent loop, and the bleeding artery was embolized with two coils. After digital subtraction angiography, the patient had an uneventful recovery with no further complications. Therefore, we concluded that it is possible that bleeding may occur in the afferent loop when hemorrhage occurs after PD.

Keywords

Pancreaticoduodenectomy, hematemesis, jejunal mesenteric artery, bowel vascular lesion, digital subtraction angiography, case report

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Introduction

Hemorrhage after pancreaticoduodenectomy (PD) occurs occasionally, with an incidence of approximately 2% to 18%.¹ However, post-PD hemorrhage is a serious complication because of potential mortality.² Hematemesis, a symptom of hemorrhage after PD, is always due to anastomotic bleeding. Herein, we report a rare case with delayed hematemesis, without anastomotic bleeding during PD. The patient developed hypovolemic shock with hematemesis on the tenth day after surgery. Urgent gastroscopy showed no obvious bleeding on the mucosal surface of the gastrointestinal anastomosis, and the bleeding eventually stopped after the jejunal mesenteric artery was embolized with coils.

Case presentation

A 67-year-old man was hospitalized with slight abdominal pain in the right upper quadrant. There were no remarkable findings detected on physical examination. Abdominal contrast-enhanced magnetic resonance imaging (MRI) showed that both the common bile duct and pancreatic duct were markedly dilated, and there was a solid neoplasm located in the pancreatic head. Laboratory tests revealed the following: carbohydrate antigen 50: 44.7 U/mL (normal range, 0–25 U/mL), carbohydrate antigen 19-9: 198.5 U/mL (normal range, 0–37 U/mL), carcinoembryonic antigen: 2.62 ng/mL (normal range, 0–5 ng/mL), direct bilirubin: 7.4 μ mol/L (normal range, 0.1–6.8 μ mol/L), gamma-glutamyl transpeptidase: 139.2 U/L (normal range, 10–60 U/L), aspartate aminotransferase: 33.1 U/L (normal range, 15–40 U/L), and alanine aminotransferase: 161.2 U/L (normal range, 9–50 U/L). Pancreatic cancer was diagnosed presumptively, and PD was performed smoothly. The pathological diagnosis was pancreatic mucinous adenocarcinoma.

The patient had no remarkable medical history, and his family history was also unremarkable.

Three drains were placed: one each behind the bilioenterostomy, above the pancreaticojejunostomy, and below the pancreaticojejunostomy. The drainage fluid volume from above the pancreaticojejunostomy was 50 mL on postoperative day 1 (POD1), followed by 70 mL on POD2, and the volume lessened gradually beginning on POD3. Only a small amount of exudate drained from the other two drains. The amylase concentration in the drainage fluid on POD2 was 4065.4 U/L and 2017 U/L on POD3. The concentration gradually decreased to normal, thereafter. Contrast-enhanced CT (CECT) on POD6 showed that there was no obvious peritoneal effusion or abscesses. No obvious signs of infection were observed after the operation, and the patient recovered anal exhaust and was supported with enteral nutritional suspension from POD4.

On POD10, the patient suddenly felt dizzy, and a large volume of blood clots were vomited. However, there was no blood in the drainage fluid. Because hematemesis is a cardinal symptom of gastric bleeding, urgent gastroscopy was performed. Gastroscopy identified blood clots pouring from the afferent loop and no obvious bleeding on the mucosal surface of the gastrointestinal anastomosis (Figure 1a). After endoscopic examination, the patient's blood pressure decreased to 56/33 mmHg, and his heart rate increased to 120/minute. Laboratory tests revealed a hemoglobin concentration of 61 g/L (normal range, 130–175 g/L) and prothrombin time of 20.4 s (normal range, 11–14.5 s). Urgent CECT was performed, which showed that the contrast agent extravasated into the intestinal lumen (Figure 1b). Therefore digital subtraction angiography (DSA) was performed. Extravasation of contrast agent was detected from the jejunal

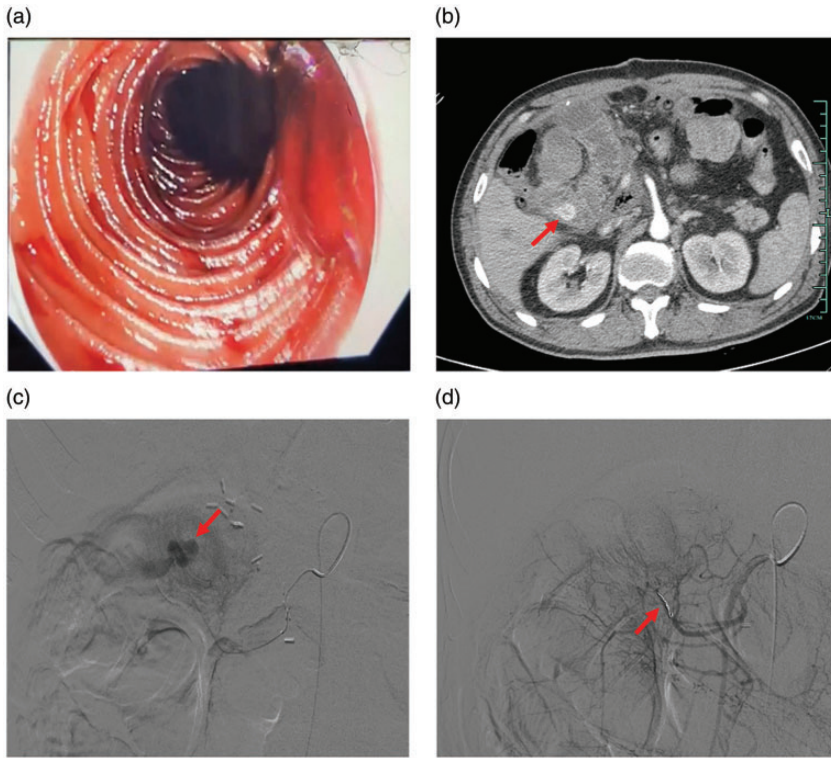


Figure 1. (a) The afferent loop under endoscopy. (b) CECT scan of the abdomen on POD10. Red arrow: contrast agent. (c) and (d) Images obtained during the urgent DSA. (c) Before embolization. Red arrow: contrast agent. (d) After embolization. Red arrow: coils. CECT, contrast-enhanced computed tomography; POD, postoperative day; DSA, digital subtraction angiography.

mesenteric artery at the afferent loop (Figure 1c). After selecting the jejunal mesenteric artery with a microcatheter, the bleeding artery was embolized with two coils. No further extravasation of contrast agent was detected after embolization (Figure 1d). After DSA, the patient had an uneventful recovery with no further complications, and he was satisfied with the treatment.

Discussion

Hemorrhage after PD can be classified as early or late hemorrhage, according to

its onset. Early hemorrhage occurs less than 24 h postoperatively, while late hemorrhage occurs more than 24 h postoperatively.³ Both hematemesis and intraperitoneal hemorrhage are important symptoms of early hemorrhage after PD, and hematemesis is always due to anastomotic bleeding. However, late hemorrhage after PD is characterized by intraperitoneal hemorrhage and not hematemesis. This study reported a case of late hemorrhage caused by unusual arterial hemorrhage on the tenth day after PD. The symptom in this case was hematemesis rather than intraperitoneal hemorrhage. Late hemorrhage appearing

with the symptoms of early hemorrhage after PD may lead to an incorrect diagnosis and delay proper treatment.

Pancreatic fistula, subsequent abdominal abscess, and subsequent pseudoaneurysm, are important inducements for late hemorrhage.^{4,5} Although there are various possible bleeding sites after PD, the gastroduodenal artery stump is the most common bleeding artery. In our case, although the amylase concentration was elevated temporarily, it did not cause a serious abdominal infection. Because the blood in this case accumulated in the intestinal lumen rather than the abdominal cavity, in retrospect, a ruptured pseudoaneurysm caused by a pancreatic fistula was not a possible cause of the hemorrhage. Venous hemorrhage is characterized as accumulation of blood in the gastrointestinal tract and is always due to portal vein hypertension.⁶ The patient in this case had no history of portal hypertension or intraoperative portal vein injury.⁷

Several causes of postoperative bleeding have been reported in previous studies, such as output jejunal loop intussusception in the stomach,⁸ massive hemorrhage from a ruptured celiac-hepatic artery after PD,⁹ postoperative bleeding caused by pancreatitis,¹⁰ and postoperative hemorrhage caused by a coagulation factor deficiency.¹¹ However, these situations were not present in our case. Using DSA, we identified very rare jejunal mesenteric artery bleeding after PD in this case. In this rare arterial hemorrhage, bowel vascular lesions, such as Dieulafoy's lesion and arteriovenous malformation, may be primary causes. Vascular malformations may rupture when inducements arise, such as a sharp decrease in abdominal pressure. Although Dieulafoy's lesion and arteriovenous malformation are potential risk factors for acute life-threatening hemorrhage after PD, these conditions are difficult to completely avoid intraoperatively. From this rare case, we obtained the following

clinical lessons: (1) avoid using intestinal loops that have bowel vascular lesions, during PD; and (2) realize it is possible that the bleeding site may be located in the afferent loop when hemorrhage occurs after PD.

Reoperation is a routine treatment for hemorrhage after PD. However, it would have been difficult to find the intracavitary bleeding lesion during exploratory laparotomy in this case. Endoscopic hemostasis is another choice for intracavitary hemorrhage. However, it would have been difficult to reach the exact bleeding lesion in this case, which was located in the afferent loop. Given that radiological intervention is considered the first-line method for diagnosing and treating arterial hemorrhage,¹² DSA was obviously a better choice. Some scholars even suggest that angiography should be performed more actively after symptoms with hemorrhage after PD, such as hematemesis, melena, or a slight drop in hemoglobin.¹³ This case report can help surgeons identify the correct bleeding sites in a timely manner when they encounter similar bleeding symptoms after PD.

Conclusion

Intestinal loops with bowel vascular lesions should not be used during PD because it is possible that the bleeding site may be located in the afferent loop when hemorrhage occurs postoperatively. Timely DSA can help identify an unusual bleeding artery and decrease the incidence of fatal complications. The reporting of this study conforms to the CARE guidelines.¹⁴

Author contributions

LNW and GLG contributed equally to this work; LNW and GLG drafted the manuscript; JHY and LL revised the manuscript for important intellectual content; all authors have read and approved the final version of the manuscript to be published.

Declaration of conflicting interest

The authors declare that there is no conflict of interest.

Ethics statement

Ethics approval is not required in our institution for case reports. Written informed consent was obtained from the patient to publish the details of his case and for the use of his data for scientific purposes. The patient also provided informed written consent prior to the procedures performed in this study.

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