

CASE REPORT

Pseudoaneurysmal Rupture of the Common Hepatic Artery into the Biliodigestive Anastomosis. A Rare Cause of Gastrointestinal Bleeding

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ABSTRACT

Context Pseudoaneurysm of the hepatic artery after a pancreaticoduodenectomy is a serious complication, which should always be considered in the differential diagnosis when late bleeding has occurred. **Case report** We report a case of pseudoaneurysmal rupture of the common hepatic artery into the biliodigestive anastomosis. A 55 year old female patient with a history of pancreatic head cancer underwent a pylorus preserving pancreaticoduodenectomy at our hospital in September 2008. Six days postoperatively the patient underwent surgery because of sentinel bleeding of a portal vein branch. On the 40th postoperative day she presented melena. Upper gastrointestinal endoscopy indicated bleeding near the biliodigestive anastomosis. An emergency angiography demonstrated a pseudoaneurysm of the common hepatic artery. Transcatheter arterial embolization was performed and a hemodynamic stabilization of the patient was achieved. Six days after the embolization the patient developed hemorrhagic shock and an urgent relaparotomy was carried out. The explorative laparotomy revealed bleeding of the common hepatic artery into the biliodigestive anastomosis in the form of an arteriointestinal fistula. The anastomosis was opened, the ruptured pseudoaneurysm was sutured, and a new biliodigestive anastomosis was made. The patient has been well for two months with good liver function, without rebleeding. **Conclusion** This case illustrates the occurrence of a rare complication (rupture of a hepatic artery pseudoaneurysm) inside the biliodigestive anastomosis after pancreaticoduodenectomy, appearing as upper gastrointestinal bleeding. Different modalities such as transarterial embolization and the use of stents give promising results, but ligation of the pseudoaneurysm and repair of the intestinal communication is also an effective modality of treatment.

INTRODUCTION

Almost 50% of hepatic artery aneurysms are pseudoaneurysms and are mainly associated with interventional procedures of the biliary tract and are diagnosed with greater frequency nowadays thanks to the increased use of CT-scan after blunt abdominal trauma [1, 2]. Bleeding from a pseudoaneurysm of the major visceral arteries is an uncommon but important complication which can occur postoperatively. Delayed massive hemorrhage complicated by fistula formation is a common cause of death after pancreaticoduodenectomy. The observation of sentinel bleeding should lead to emergency angiography, and depending on the result, to emergency relaparotomy to increase the likelihood of survival [3]. Hepatic artery

pseudoaneurysm can result in hemorrhage into the gastrointestinal tract when an abnormal communication is established between the vessel and the enteric part involve. We report the case of a ruptured aneurysm of the common hepatic artery into the biliodigestive anastomosis.

CASE REPORT

A 55-year-old Caucasian woman with a history of pancreatic head cancer underwent a pylorus preserving pancreaticoduodenectomy operation at our hospital in September 2008. The patient had no history of abdominal trauma, liver surgery or percutaneous interventions. The intraoperative course was uneventful. Postoperatively the patient displayed anxiety with a low hemoglobin concentration (6.5 g/dL; reference range: 12.0-15.2 g/dL). The patient was immediately re-operated, however the laparotomy did not reveal an obvious bleeding source. After 48 hours of intensive care monitoring and an additional 72-hour stay in the clinic with no further hemodynamic instability, the symptoms reappeared. Moreover she had sentinel bleeding from her abdominal drains. She was resuscitated with intravenous fluids and blood transfusions. The patient was operated on once again.

Received April 5th, 2009 - Accepted June 4th, 2009

Key words Aneurysm, Ruptured; Hepatic Artery; Pancreaticoduodenectomy

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Document URL <http://www.joplink.net/prev/200907/15.html>

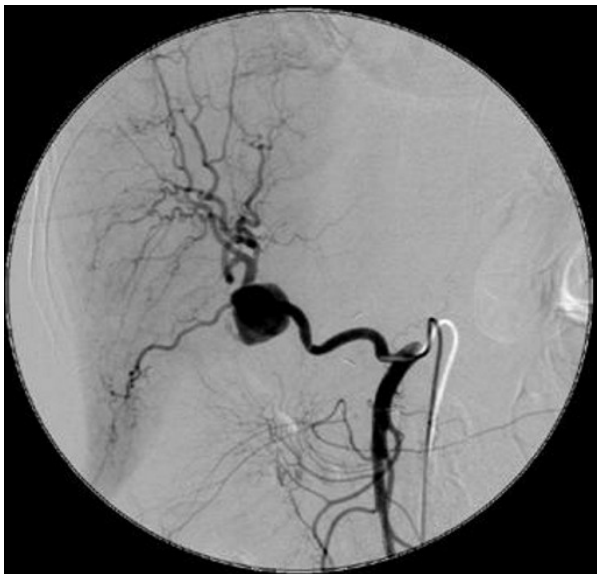


Figure 1. Selective hepatic artery angiogram showing a pseudoaneurysm of the common hepatic artery.

This time the laparotomy showed a bleeding portal vein branch under the biliodigestive anastomosis. The leakage was sutured and the bleeding was stopped. After a short stay in the intensive care unit, the patient showed no further symptoms and was released. Thirty-three days later the patient was readmitted with melena as the dominant symptom. An initial diagnosis was made through an upper gastrointestinal endoscopy which indicated bleeding in the anastomotic area. The selective hepatic artery angiogram confirmed the existence of a pseudoaneurysm of the right hepatic artery deriving from the superior mesenteric artery, in relation to the biliodigestive anastomosis. An embolization of the pseudoaneurysm was planned. After super selective catheterization of the hepatic

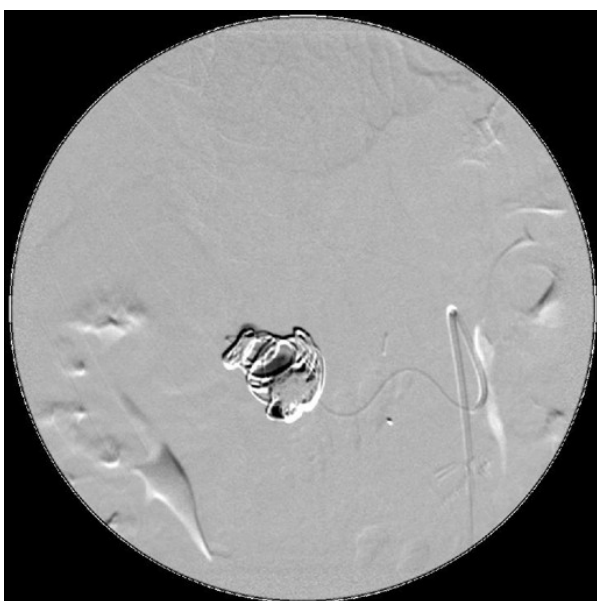


Figure 2. Angio-embolization of the pseudoaneurysm.

artery, the aneurysm was embolized using gel foam and micro coils (Figures 1, 2, and 3). The patient was monitored in the intensive care unit where she remained stable hemodynamically and did not have any further episode of upper gastrointestinal bleeding. Six days after this last intervention, there was suddenly another reduction of the hemoglobin concentration (6.0 g/dL) together with abdominal pain and the appearance of peritoneal signs. The clinical features suggested the possibility of intra-abdominal bleeding, so the patient immediately underwent another laparotomy. The explorative laparotomy proved the existence of new acute bleeding, this time inside the biliodigestive anastomosis. The pseudoaneurysm of the common hepatic artery had ruptured inside the anastomosis in the form of an arteriointestinal fistula. The anastomosis was opened and the ruptured pseudoaneurysm was sutured. A new connection to the intestinal track was effectuated..

Post-operatively the patient remained in the intensive care unit for two days and an additional 14 days in the clinic for observation. Two months later on a follow-up she was doing well.

DISCUSSION

Pseudoaneurysms arise as a consequence of visceral inflammation adjacent to the arterial wall, which damages to the adventitia and leads to thrombosis of the vasa vasorum resulting in localized weakness of the vessel wall. Digestion of the hepatic arterial wall due to infectious bile from anastomotic leakage, arterial irritation due to a localized abscess in the inferior hepatic space and mechanical injury of the artery during the operation (mainly due to lymph node dissection for malignancy), are the three predisposing factors for pseudoaneurysmatic formation after surgery. These are prone to rupture [4, 5].

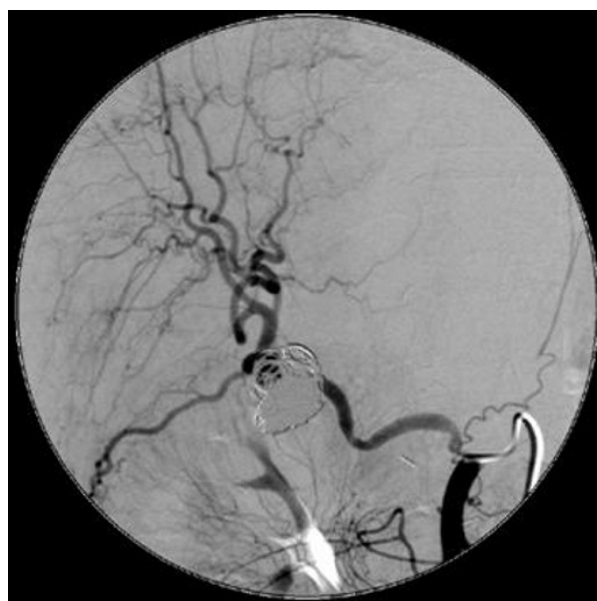


Figure 3. Post- embolization image showing non-filling of the pseudoaneurysm

Pseudoaneurysm of the hepatic artery is a rare and potentially life threatening entity [6]. Among the visceral artery pseudoaneurysms, pseudoaneurysms of the hepatic artery are the second most common [7]. Causes include blunt or penetrating abdominal trauma, liver surgery, and less commonly, percutaneous interventional procedures involving the liver (biopsy or biliary stent placement) [8, 9]. Pancreatitis may also cause pseudoaneurysms of the hepatic artery but more frequently it affects other branches of the celiac axis, most commonly the splenic branch [10, 11]. Hepatic artery pseudoaneurysms related to a pancreaticoduodenectomy are rare complications. Postoperative bleeding complications are reported in 5-16% of patients after pancreaticoduodenectomy and are associated with a high morbidity and mortality. Late bleeding after pancreaticoduodenectomy is usually massive with peripheral circulatory impairment. It occurs suddenly, after the second or third post-operative weeks in hemodynamically stable patients, sometimes after an apparently uneventful postoperative course [3]. However, to our knowledge, in addition to the cases currently reported in the literature, it is the first time an arteriointestinal fistula has been reported to have developed inside the biliodigestive anastomosis. In most cases the hemorrhage developed from pseudoaneurysms of the major arteries around the pancreaticojejunostomy [12]. Visceral pseudoaneurysms usually present abdominal pain but there are patients having ruptured pseudoaneurysms without any clinical symptoms [13]. Other unusual presentations include upper gastrointestinal hemorrhage or obstructive jaundice. Our patient presented both abdominal pain and upper gastrointestinal hemorrhage but no jaundice. The initial investigation for a patient having such symptoms is ultrasonography with color Doppler. However, the fact that most patients experience sentinel bleeding 0-6 days before massive bleeding, indicates the need for immediate assessment by contrast CT or angiography. A multidetector row CT scanner can depict both hepatic artery anatomy and pathology efficiently and accurately and it has proved useful in detecting extrahepatic hepatic artery complications such as pseudoaneurysm or dissection [14, 15]. An upper gastrointestinal endoscopy, in most cases, does not reveal any lesions in the stomach and duodenum. In our case, it was helpful in that it revealed the source of bleeding as being the biliodigestive anastomosis. A selective hepatic artery angiography is the diagnostic modality of choice when a pseudoaneurysm is suspected. It helps in making the diagnosis, provides anatomical details of the visceral arteries important for the preoperative planning and it can help to avoid the need to operate. Moreover, together with embolization, it can stabilize the patient and convert an emergency situation into a semi-elective one. Transarterial embolization seems to be a treatment option for preventing major hemorrhage if any anomaly is detected, as shown in recent case reports and studies, but the clinical relevance has not yet been

evaluated in larger studies. Sato *et al.* [16] and Yoshida *et al.* [17] have both shown that transarterial embolization allows for temporary control of major hemorrhaging providing hemodynamic stabilization of most patients and a low recurrence rate of about 14%. Nonetheless, in their series, it did not seem to be an alternative to exploration; given the fact that the mortality rate was 57% due to systemic sepsis and multi-organ failure. Based on the latest studies, interventional radiology with selective embolization of pseudoaneurysm is a safe and a definitive treatment in most cases. Angiographic embolization should be performed proximal and distal to the origin of the pseudoaneurysm rather than proceeding with embolization in the pseudoaneurysmal cavity [5]. Various methods have been used for successful embolization; intravascular coils, gelatine foam, cyanoacrylate glue, ethanol sclerosant, and detachable balloons [18]. Percutaneous transcatheter embolization with metallic coils has an 85% success rate of [2]. However, because of the fewer collaterals than normal after the Whipple procedure, embolization of the hepatic artery may result in liver abscess, cholangitis or even in fatal liver failure in the case of disruption of the hepatic arterial flow. Thus, the implantation of a covered stent may be better than transarterial embolization for preserving hepatic arterial blood flow. However, no evidence is available concerning the safety and long-term patency of the covered stent for pseudoaneurysms after the Whipple procedure [14]. The surgical approach involving ligation of the hepatic artery distal to the celiac axis remains the most promising treatment of late intra-abdominal hemorrhage due to the fact that hemostasis, subsequent to suturing, could stop arterial bleeding without blocking blood flow [19, 20]. In our case the arteriointestinal fistula was sutured and a new biliodigestive anastomosis was realized.. Proximal control of the hepatic artery should always be attempted first. Post-operatively, liver function should also be controlled via blood-tests, as well as sonographically by checking the perfusion of the hepatic vessels.

CONCLUSION

Pseudoaneurysm of the hepatic artery after a pancreaticoduodenectomy is a rare but serious complication. Early diagnosis can be difficult even in symptomatic patients. Angiography and transarterial embolization are the means used for diagnosis and hemostasis, respectively, and are necessary to bring the patient out of hemorrhagic shock thus bridging the time until the patient can be operated upon .Some studies have provided promising results regarding the placement of covered stents in order to bridge the pseudoaneurysm of the visceral artery, but no sufficient follow-ups exist as yet. Operative ligation of the pseudoaneurysm remains, in some cases, the treatment of choice. Finally the existence of an arteriovisceral

fistula and bleeding inside the anastomosis should also be part of the differential diagnosis.

Conflict of interest The authors have no potential conflict of interest

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