

Contents lists available at [ScienceDirect](http://www.sciencedirect.com)

## International Journal of Surgery Case Reports

journal homepage: [www.casereports.com](http://www.casereports.com)

# Unusual case of digestive bleeding nine months after a cephalic pancreaticoduodenectomy (CPD)



Assamoi Brou Fulgence Kassi<sup>a,b,\*</sup>, Jérémie Thereaux<sup>a</sup>, Bertrand Dousset<sup>a</sup>

<sup>a</sup> Service de Chirurgie Digestive, Hepato-Biliaire et Endocrinienne, Hôpital Cochin, Assistance Publique–Hôpitaux de Paris, Université de Paris Descartes, Paris, France

<sup>b</sup> Division of digestive surgery, University hospital of Cocody-Abidjan, Cote d'Ivoire

## ARTICLE INFO

### Article history:

Received 30 January 2016

Received in revised form 18 February 2016

Accepted 23 February 2016

Available online 9 March 2016

### Keywords:

Post-pancreaticoduodenectomy

Hemorrhage

Arterial bleeding

Gastroduodenal artery stump

Abdominal CT angiography

## ABSTRACT

**INTRODUCTION:** Post-pancreaticoduodenectomy hemorrhage is mostly due to the gastroduodenal artery stump erosion. The diagnosis of arterial bleeding is done by digestive endoscopy, selective angiography or video capsule endoscopy. On failure of etiological research, surgery is the last resort despite its technical difficulties.

**CASE PRESENTATION:** A 63 years-old woman was admitted in surgery, nine months after cephalic pancreaticoduodenectomy for a pain of the right hypochondria combined with a pneumoperitoneum, after a 3rd episode of hemorrhage. Exploratory laparotomy is performed after a third hemorrhagic episode and failure of etiological research. Bleeding from the gastroduodenal artery stump was discovered and successfully treated.

**DISCUSSION:** Post-pancreaticoduodenectomy hemorrhage can occur very late. In these cases, a secondary arterial erosion obstructed by left hemi-liver should not be excluded. In these cases, despite the technical risks, surgery is required.

**CONCLUSION:** The failure of the means used for diagnostic must lead to the surgery right away, despite operating risk.

© 2016 The Authors. Published by Elsevier Ltd. on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## 1. Introduction

Post-pancreaticoduodenectomy hemorrhage is mostly due to arterial erosion, with or without aneurysm in contact with a pancreatic fistula [1]. It is mostly about cataclysmic hemorrhage with a significant death rate [2,3]. Usually, the hemorrhage comes from the gastro-duodenal artery stump [4] but the rupture of a pseudo-aneurysm of the hepatic artery, of the pancreatic arteries or of the superior mesenteric artery can be the cause [5,6]. The diagnostic of these arterial hemorrhages is made possible by digestive endoscopy, selective angiography or video capsule endoscopy [7]. Surgical treatment of arterial hemorrhages by arterial ligation after cephalic pancreaticoduodenectomy (CPD) is technically complex and dangerous [1]. The selective radiological arterial embolization has become the prime treatment when the source of the bleeding is identified [8,9].

We report the case of a recurrent digestive hemorrhage by erosion of the gastro-duodenal artery, covered by the left hemi-liver, not visualized by the angiography and the endoscopy; the finding

and effective treatment of this complication during surgery despite the technical risk.

## 2. Case presentation

A 63 years-old woman was admitted in emergency for a pain of the right hypochondria combined with a pneumoperitoneum, after a 3rd episode of high digestive hemorrhages.

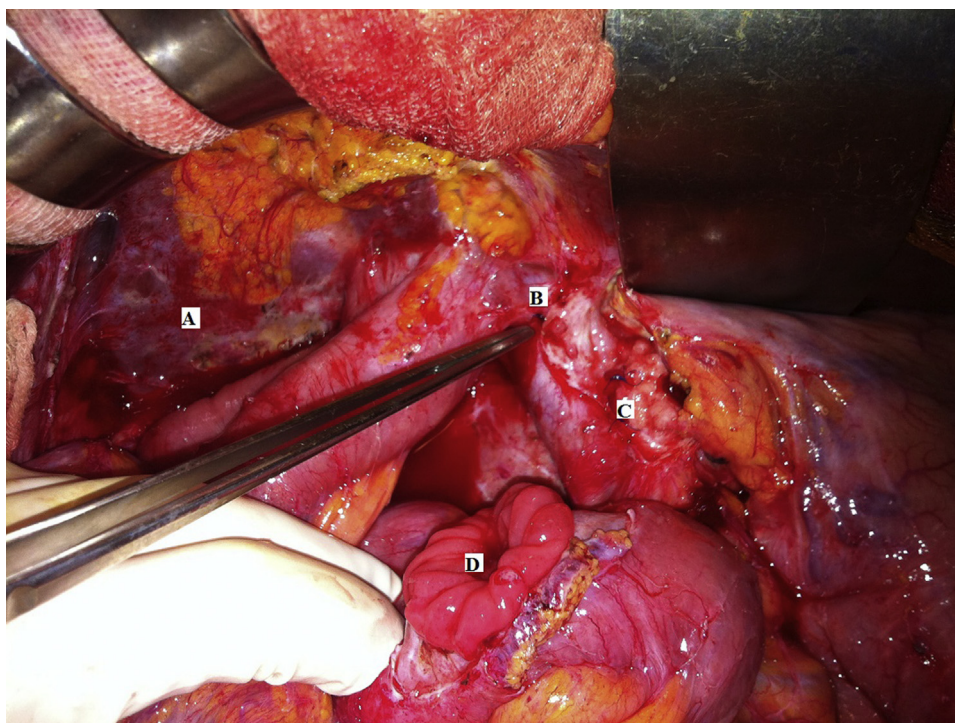
Nine months earlier, the patient had a CPD on a normal pancreas for pancreatic head adenocarcinoma with good evolution. The anatomo-pathological examination concluded of an adenocarcinoma of the head of pancreas pT2N+. An adjuvant chemotherapy by Gemzar and 5-FU is introduced but stopped precociously (3 courses) due to a bad tolerance.

The patient showed a first episode of hematemesis with hemorrhagic shock requiring a hospitalization for 48 h in surgery intensive care (transfusion of three corpuscular caps). Oeso-gastro-duodenal fibroscopy shows three ulcerations on the set-in ileac efferent loop without any hemorrhagic sign, treated by endoscopy. Ten days later a 2nd episode of high digestive haemorrhage, with a state of shock, occurred. The patient was hospitalized for etiological research and monitoring. Two œsogastro-duodenal fibroscopies, followed by a colonoscopy and a video capsule endoscopy did not help to identify the origin of the bleeding. An abdominal computed tomography (CT) angiography with high opacification did not find any active

\* Corresponding author at: Service de Chirurgie Digestive, Hepato-Biliaire et Endocrinienne, Hôpital Cochin, 27, rue du Faubourg Saint-Jacques, 75679 Paris Cedex 14, France.

E-mail address: [kassful3@gmail.com](mailto:kassful3@gmail.com) (A.B.F. Kassi).

<sup>1</sup> Present address: 80 boulevard voltaire, 92600 Asnières sur Seine, France.



**Fig. 1.** Pancreatico-jejunal anastomosis, dismantled: bleeding site of the gastroduodenal artery stump.

A: left hemi-liver  
B: bleeding site  
C: pancreatic stump  
D: jejunal stump

arterial bleeding, neither any pseudo-aneurism of the different branches coming from the celiac trunk (particularly from the gastroduodenal artery stump). It was not found apparent leaks of the pancreatico-jejunal anastomosis.

The occurrence 33 days later after the 1st episode, of a 3rd episode of high digestive hemorrhage combined with faintness and a melena required the carrying out in emergency of an abdominal CT angiography. This showed a pneumoperitoneum of average abundance without any apparent sign of leak. With a stable clinical state, an abdomen tenderness, and because of a surgery made complex by the CPD previous history, without possible detecting of the perforation on abdominal CT scan, a medical treatment with nasogastric tube, proton-pump-inhibitor (PPI) intravenous and antibiotherapy was introduced. After 24h, the patient was transferred to digestive surgery due to the aggravation of the abdominal pain combined with a light muscular defense. Abdominal CT scan with ingestion of contrast product did not show any leaking of the contrast product. The patient was conscious without any sign of hemodynamic choc, the abdomen was painful with a severe pain on the right hypochondrium combined with a light muscular defense. Biology did not show any signs of cardiovascular decompensation (level of hemoglobin = 8,8 g/dl), nor of hemostasis disorder. An exploratory laparotomy was done due this clinical condition. Surgical exploration showed a chronic sinus between the pancreatico-jejunal anastomosis and the left hemi-liver. The sinus was 1 cm of length; We noted there, an active bleeding of the gastroduodenal artery stump covered by the left hemi-liver (Fig. 1). A perfect hemostasis of the gastro-duodenal artery stump is carried out by a double ligation with Prolen 5/0. A pancreatic cutting is carried out at the level of the fistula, followed by a repairing of the pancreatico-jejunal anastomosis on a solid pancreas and, of a Wirsung canal of moderate caliber. Two TACOSIL compresses are placed on the vessels. A drain is placed on the Wirsung, as well as a multi-tubulated blade ahead of the great omentum and

draining the posterior face of the pancreatico-jejunal anastomosis. The pancreatic cutting was not invaded during the extemporaneous anatomic-pathological examination. The operating effects were simple with an authorized exit of fifteen days after the operation. No hemorrhagic recurrence was noted up to this date after eight months of passed time.

### 3. Discussion

The distinctive feature of our observation is related to the absence of clinical signs of pancreatico-jejunal anastomosis leak during the nine months following the CPD and during bleeding episodes, to the very late occurrence of the arterial hemorrhage, to the failure of the paraclinical methods of investigation; to the success of the surgical treatment despite the theoretical risk of difficulty of the surgical gesture.

The clinical history of this observation suggests that the sinus between the pancreatico-jejunal anastomosis and left hemi-liver would be responsible for the erosion then the bleeding of the gastro-duodenal artery stump. A pancreatic leak or a leak of the pancreatico-jejunal anastomosis can be complicated by a fistula in 2–20% of the cases [10]. Indeed, arterial hemorrhages are more frequent in the case of pancreatic fistulas [11,12]. The simple post-operating effects after the CPD, does not allow us to explain the occurrence of the pancreatic fistula. On the other hand, a weak pancreas during the CPD in opposition to the solid pancreas of the chronic pancreatitis exposes to a high risk of fistula [13]. Finally we have to note that acute necrotising pancreatitis can be complicated by arterial hemorrhage and by pseudo-aneurysm outside of any fistula after the CPD [1]. The arterial hemorrhages after the CPD are classified as precocious or as belated according to the time of their occurrence. The precocious arterial hemorrhages occur less than 24h after the CPD, and are related to a technical default or to an insufficient hemostasis [4]. Belated arterial hemorrhages

occur more than 24 h after the CPD. It is a general rule, in those cases, of arterial hemorrhage by rupture of an arterial pseudoaneurysm, by vascular erosion or by anastomotic ulceration [1,10]. These belated hemorrhages have a tendency to bleed in two phases with an initial hemorrhage « sentinel bleeding » which ceases spontaneously, and a brutal recurrence. In our observation, the arterial hemorrhage has occurred nine months after the CPD, and then re-occurred at D10 and D33 after the beginning. Periods of 20 days, 45 days or even of 4 months have been reported in the literature [14]. This is the longest period of diagnostic of arterial hemorrhage by pseudoaneurysm or by vascular erosion after the CPD, to our knowledge. Pseudoaneurysm or vascular erosion is mostly found on the gastro-duodenal artery stump or on the right gastric artery. These arteries are severed during the CPD. Their stumps are exposed in case of fistula of the pancreatico-jejunal anastomosis, due to their proximity.

In our observation the different oesogastro-duodenal fiberoscopies (3 in total), the video-capsule and the abdomino-pelvic angioscanner, with high opacification have not objectivized the sinus, neither the source of the bleeding. Finally, it is the surgical exploration that will show an active bleeding of the gastroduodenal artery stump, in comparison with a chronic sinus between the pancreatico-jejunal anastomosis and the left hemi-liver; this suggests that the hemorrhage would be due to the erosion of the gastro-duodenal artery stump by this chronic sinus. This sinus of a length of about 1 cm surely explains the belated feature of the vascular erosion, therefore of the arterial bleeding but also of the lack of leaking of the contrast product during the high opacifications. The likelihood of an arterial spasm between the bleedings could explain the lack of visualization during the different arteriography. The setting of metallic clamps on the stump of the gastro-duodenal artery during the CPD could be orientated during a previous arteriography [15].

The treatment of the arterial hemorrhages complicating the CPD presently rest upon the operational radiology by selective arterial embolization [7,9]. However, the embolization of the gastro-duodenal artery after the CPD, exposes to a risk of hepatic ischemia [15].

Surgery after CPD is technically difficult, and exposes to a high hemorrhagic risk [5]. The most effective technique for reconstructing the continuity of the pancreas after the duodeno-pancreatectomy is the pancreato-gastrostomy [16]. Nevertheless, in our observation, we opted for a successful repairing of the pancreatico-jejunal anastomosis.

#### 4. Conclusion

Arterial hemorrhage after CPD can occur belatedly even if there is lack of apparent clinical sign of pancreatic leak. The failure of the means used for diagnostic must lead to the surgery right away, despite operating risk.

#### Conflicts of interest

There is no conflict of interest to declare.

#### Funding

None.

#### Open Access

This article is published Open Access at [scimedirect.com](http://scimedirect.com). It is distributed under the [IJSCR Supplemental terms and conditions](#), which permits unrestricted non commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.

#### Ethical approval

Not needed : case report.

#### Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

#### Author contributions

Study design: Assamoi Brou Fulgence Kassi, Data collection: Assamoi Brou Fulgence Kassi, Jérémie Thereaux, Writing: Assamoi Brou Fulgence Kassi, Bertrand Dousset.

#### Guarantor

Pr Bertrand Dousset.

#### References

- [1] E. Vibert, H. Kobeiter, B. Malassagne, et al., Rupture of a jejunal artery pseudoaneurysm after a cephalic duodenopancreatectomy, *Ann. Chir.* 128 (2003) 626–629.
- [2] P. Buresta, A. Freyrie, O. Paragona, et al., Ruptured pancreaticoduodenal artery aneurysm: A case report and review of the literature, *J. Cardiovasc. Surg.* 45 (2004) 153–157.
- [3] M.N. Wente, J.A. Veit, C. Bassi, et al., Postpancreatectomy hemorrhage (PPH)—an international group of pancreatic surgery (ISGPS) definition, *Surgery* 142 (2007) 20–25.
- [4] K. Robinson, M.R. Rajebi, N. Zimmerman, et al., Post-pancreaticoduodenectomy hemorrhage of unusual origin: treatment with endovascular embolization and the value of preoperative CT angiography, *J. Radiol. Case Rep.* 7 (2013) 29–36.
- [5] T. Takei, M. Sakai, T. Suzuki, et al., Surgical resection of a ruptured pancreaticoduodenal artery aneurysm, *Am. J. Case Rep.* 17 (2016) 39–42.
- [6] K. Mori, S. Murata, H. Yoshioka, et al., Transcatheter embolization of celiac artery pseudoaneurysm following pancreaticoduodenectomy for pancreatic cancer. A case report, *Acta Radiol.* 39 (1998) 690–692.
- [7] J. Zhang, X. Zhu, H. Chen, et al., Management of delayed post-pancreaticoduodenectomy arterial bleeding: interventional radiological treatment first, *Pancreatol.* 11 (2011) 455–463.
- [8] J. Feng, Y.L. Chen, J.H. Dong, et al., Post pancreaticoduodenectomy hemorrhage: risk factors, managements and outcomes, *Hepatobiliary Pancreat. Dis. Int.* 13 (2014) 513–522.
- [9] H.F. Xu, X. Zhu, H. Chen, et al., Angiographic findings and interventional therapy for post-pancreaticoduodenectomy hemorrhage, *Zhonghua Yi Xue Za Zhi* 93 (2013) 55–57.
- [10] D. Petermann, R. Ksontini, N. Halkic, et al., Cephalic duodenopancreatectomy: indications, results and dealing with complications, *Rev. Med. Suisse* 4 (2008) 1563–1566.
- [11] J.F. Chen, S.F. Xu, W. Zhao, et al., Diagnostic and therapeutic strategies to manage post pancreaticoduodenectomy hemorrhage, *World J. Surg.* 39 (2015) 509–515.
- [12] Q.X. Gao, H.Y. Lee, W.H. Wu, et al., Factors associated with post-pancreaticoduodenectomy hemorrhage: 303 consecutive cases analysis, *Chin. Med. J.* 125 (2012) 1571–1575.
- [13] M.W. Büchler, J. Kleef, H. Friess, Surgical treatment of pancreatic cancer, *J. Am. Coll. Surg.* 205 (2007) 81–86.
- [14] H. Sugimoto, T. Kaneko, T. Ishiguchi, et al., Delayed rupture of a pseudoaneurysm following pancreaticoduodenectomy: report of a case, *Surg. Today* 31 (2001) 932–935.
- [15] H.K. Wei, S.E. Wang, Y.M. Shyr, et al., Risk factors for post-pancreaticoduodenectomy bleeding and finding an innovative approach to treatment, *Dig. Surg.* 26 (2009) 297–305.
- [16] G.P. Guerrini, P. Soliani, G. D'Amico, et al., Pancreaticojejunostomy versus pancreaticogastrostomy after pancreaticoduodenectomy: an up-to-date meta-analysis, *J. Invest. Surg.* 18 (2015) 1–10.