Pancreatic fistula: A major complication of cephalic duodenopancreatectomy that should be known

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CASE REPORT

We report the case of a 41-year-old female patient without a cardiovascular risk factor, who underwent a cephalic duodenopancreatectomy (CDP) for a gastrointestinal stromal tumor of the duodenum invading the pancreas. On postoperative day 5, the patient presented a hemorrhagic shock requiring hemostatic laparotomy with the placement of 2 Delbet blades. On day 8, she again presented a hemorrhagic shock requiring arterial embolization. On day 11 of the CDP, the patient presented a septic shock with fever at 39 °C, chills, multiple organ failure: respiratory (dyspnea with polypnea at 30 cycles/min), and cardiac (tachycardia at 120 beats/min) requiring oxygen therapy with a high concentration mask and the use of vasoactive amine. The patient also exhibited a digestive fluid leaking through the Delbet blades. Biologically, procalcitonin was 0.97 ng/mL and C-reactive protein (CRP) increased from 285.41 to 318.97 mg/L. Analysis of the fluid leaking through the Delbet blades found an amylase level of 326 IU/L (approximately 7× the normal value). Hemoglobin was 10 g/dL, prothrombin time (PT) was 70%, and a platelet count was 250 000 mm$^3$. The diagnosis of septic shock on pancreatic fistula was suggested and an abdominopelvic computed tomography (CT) was requested. The latter made it possible to highlight at the level of the surgical site on the anterior aspect of the pancreatic-jejunal anastomosis a collection containing an air bubble, thus, confirming the presence of a pancreatic fistula (Figure 1).

The patient underwent an emergency CT-guided percutaneous drainage (Figure 2) associated with a triple antibiotherapy.

The outcome was overall uneventful, with clinical and biological improvement, with a CRP two days after the percutaneous drainage at 221.80 mg/L. The CT scan performed 2 weeks after the drainage, found a complete drying of the collection, with however, a focal infection of the abdominal wall (Figure 3).

DISCUSSION

The International Study Group on Pancreatic Fistula (ISGPS) has defined three severity stages for the pancreatic fistula, from Grades A to C based on clinical, radiological, and therapeutic criteria and the outcome [1]:

- **Grade A**: The most common, still called “transient fistula.” It has no clinical repercussions and does not require special treatment. It heals spontaneously.

![Figure 1: Abdominal CT scan, axial reconstruction after injection of iodine contrast media, in the portal phase, two contiguous slices. (A) The body and tail of the remaining pancreas are swollen and heterogeneous with loss of the lobulations (blue arrow). (B) Presence of a collection containing an air bubble corresponding to a pancreatic fistula (white arrowhead), at the level of the surgical site next to the pancreatic-jejunal anastomosis. Note a heterogeneous appearance of the spleen secondary to the hemostatic embolization (orange star).](image-url)
in several days without major modification of the postoperative care protocol.

- Grade B: Treated by combining, discontinuation of oral feeding, parenteral nutrition, somatostatin analogues, and antibiotic therapy.
- Grade C: The patient’s stability is at stake with systemic repercussions (septic shock and/or organ dysfunction) that can be life-threatening. In this case, the patient requires intensive care and additional drainage or even re-operation.

In our case, the patient presented a septic shock, so it was a Grade C of pancreatic fistula.

The risk factors for developing a pancreatic fistula after duodenopancreatectomy have been widely studied: the pancreatic parenchyma texture (if it is too soft), the presence of a non-dilated pancreatic duct, obesity, males, diabetes, intraoperative high blood loss, and extensive resections (removal of other organs or vessels). Soft pancreatic parenchyma is the most widely recognized risk of pancreatic fistula. On the other hand, pancreatic fibrosis or the firm texture of the pancreas would decrease the risk of the occurrence of pancreatic fistula [2]. Also, Kang et al. in 2017 showed that the preoperative CT scan could estimate the risk of the occurrence of a pancreatic fistula by studying the kinetics of enhancement of the pancreatic parenchyma; pancreatic fibrosis being characterized by slow enhancement and slow washing or a plateau [2]. Our patient was a female and had normal body mass index (BMI) and she did not get a preoperative multiphase CT scan that could have allowed us to study of the enhancement kinetics of the pancreatic parenchyma. However, the patient presented a significant blood loss requiring a surgical revision and arterial embolization.

The CT scan is the gold standard for the diagnosis of early complications after cephalic duodenopancreatectomy. Although the diagnosis of pancreatic fistula is made upon clinical and biological data, CT scan helps to support this diagnosis by demonstrating a collection containing air bubbles at the level of the surgical site or next to the anastomosis [3]. Our patient presented a typical image of a pancreatic fistula on the CT.

Interventional radiology plays an important role in the management of pancreatic fistulas after cephalic duodenopancreatectomy either by ultrasound-guided or CT-guided percutaneous drainage. However, it requires the patient to be hemodynamically stable with acceptable blood coagulation parameters and the existence of a safe route. It allows, thanks to the installation of a drain by the Seldinger technique, to drain the collection and thus allowing the cicatrization and closure of the fistula [3]. Different studies have shown that more than 85% of patients have successfully underwent percutaneous drainage of pancreatic fistulas without the need of re-operation [4, 5]. However, it has some drawbacks including the need to perform daily and regular cleaning and irrigation of the catheter in order to preserve its permeability as well as frequent monitoring of the fluid flow in order to determine the moment of withdrawal of the catheter. In addition, percutaneous drainage can cause skin irritation and promote the occurrence of infection of the abdominal wall, delay oral refeeding and prolong hospitalization. Other means of treatment are possible including the endoscopic route and surgical revision. In our case, although the patient had a shock, she presented optimal hemodynamic constants under minimal doses of vasoactive amines and a normal blood coagulation parameters. She therefore underwent a CT-guided percutaneous drainage, with a favorable outcome after two weeks, marked by complete drainage of the collection and hemodynamic and respiratory improvement, but developed however a focal infection of the abdominal wall.

**CONCLUSION**

Pancreatic fistula is a major complication of a cephalic duodenopancreatectomy affecting the vital prognosis of these patients, hence, the importance for the radiologist to know how to recognize it. The radiologist also plays an important role in the treatment of this complication through interventional radiology by percutaneous drainage.
Keywords: Cephalic duodenopancreatectomy, Interventional radiology, Pancreatic fistula

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