



Acute bleeding obstruction pancreatitis after Roux-en-Y anastomosis in total gastrectomy: a single center experience

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Abstract

Anastomotic intraluminal bleeding is a well-known complication after total gastrectomy. Nevertheless, few data are published on acute bleeding obstruction pancreatitis (BOP) due to a bleeding from the jejunojejunostomy (JJ). In this paper we describe our experience. A total of 140 gastrectomies for EGJ cancer were performed in our Institute from January 2012 to January 2017. All reconstructions were performed with a Roux-en-Y anastomosis: a mechanical end-to-side esophago-jejunostomy and a mechanical end-to-side JJ. Three patients suffered from a bleeding at the JJ with a consequent BOP. We analyzed the time of diagnosis, the treatment and the outcomes. The three patients presented anemia at the laboratory findings on post-operative day (POD) 1. In patient I laboratory findings of acute pancreatitis were found in POD 2. CT scan was performed and showed signs of BOP. Endoscopic treatment was tried without success. Therefore, patient underwent surgery: JJ take down, bleeding control and anastomosis rebuild were performed. In spite of this the patient died of MOF in POD 4. Patient II had a persistent anemia treated with blood transfusions until POD 3, when laboratory tests showed increased lipase and bilirubin levels. Patient was successfully treated with endoscopy but several blood transfusions and a prolonged recovery were necessary. Patient III had laboratory findings of acute pancreatitis on POD 1. Immediate surgery was performed and patient was discharged on POD 9 without sequelae. BOP is a rare but deadly complication after Roux-en-Y anastomosis. An early diagnosis and an aggressive treatment seem to improve the outcome.

Keywords Anastomotic bleeding · Bleeding obstruction pancreatitis · Management · Outcome

Introduction

Anastomotic intraluminal bleeding is a well-known complication after gastric resection either for benign or malignant pathology [1–3], with a reported incidence of 1–8% [4–7]. In many cases, postoperative bleeding can be successfully treated endoscopically [2, 3, 8, 9]. Little is known about bowel obstruction due to blood clots formation after intraluminal bleeding in gastric surgery. Endoscopic toilette can be attempted to solve the obstruction, but in many cases a reoperation is necessary due to the endoscopic impossibility to remove the organized clots [10, 11].

We point the attention on a pancreatitis caused by a bleeding from the jejuno-jejunostomy (JJ), defined in this paper as bleeding obstruction pancreatitis (BOP), that causes an obstruction of the duodenal outflow due to blood clots in the lumen. This leads to an obstruction of the biliopancreatic outflow with the development of an acute pancreatitis. At present, only one case report from China is published [12]. The Authors describe the case of an obese young male who underwent laparoscopic Roux-en-Y gastric-bypass. In postoperative day (POD) 1, the patient presented upper abdominal pain followed by hemorrhagic shock, associated with blood drain debt from the nasogastric tube. Emergency laparoscopy evidenced small-vessel hemorrhage on the posterior wall of JJ anastomosis, with intraluminal blood clots, resulting in Roux limb and afferent loop obstruction. A laparoscopic enterotomy with blood clots removal and hemostasis were performed. Eight hours after the reoperation, a diagnosis of severe acute pancreatitis was made and an intensive treatment was implemented. Nevertheless, patient's

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condition was refractory to treatment and patient died of multi-organ failure (MOF) in postoperative day 15.

Due to its rarity, the optimal treatment is not yet defined. In this paper, we report our experience in BOP in a high-volume center for esophageal and gastric surgery. We focused the attention on the importance of timing in diagnosis and treatment, and the outcomes related to different type of treatment.

Clinical series

We analyzed all the patients that underwent total or subtotal gastrectomy for gastric (GC) or esophago-gastric junction cancers (EGC) in Upper GI Surgery Division of Verona University from January 2012 to January 2017. Data were retrospectively analyzed from a prospective collected database.

We considered intraluminal bleeding only for patients with an endoscopic diagnosis.

BOP was defined as a postoperative acute pancreatitis (according to Atlanta classification 2012, two of the following: acute onset of a persistent, severe, epigastric pain often radiating to the back, serum lipase/amylase activity at least 3 times greater than the upper limit of normal, or characteristic findings of acute pancreatitis on CT scan or magnetic resonance imaging) [13] associated with decrease of hemoglobin level and blood clots bowel obstruction. Diagnosis was confirmed with either imaging, endoscopy or surgery.

Every patient was singularly analyzed and discussed.

Surgical technique reconstruction

Surgical reconstruction was performed with a Roux-en-Y anastomosis: in total gastrectomy (TG), an end-to-side *trans*-mesocolic esophagojejunostomy (EJ) was performed with a circular stapler (25 mm diameter); in subtotal-gastrectomy (STG) a *trans*-mesocolic end-to-side gastro-jejunostomy (GJ) anastomosis was performed between the gastric remnant and the jejunal loop using a mechanical stapler (25 mm in diameter). An end-to-side mechanical JJ was realized with a circular stapler (21 mm in diameter). Manual reinforcement of the anastomosis was performed using a 4/0 monofilament absorbable suture.

All surgical procedures were done by three expert upper GI surgeons (GdM, SG, MDC).

Results

From January 2012 to January 2017 a total of 246 gastrectomies were performed in our Institution: 140 TG (57%) and 106 STG (43%). Of all the patients, 121 were males (49%) and 123 were females (51%), with a median age of 68.5-year-old (18–92 years old range). Of these patients,

75 underwent neoadjuvant chemo- or chemoradiotherapy (30%), 171 underwent surgery upfront (70%). R0 resection rate was 83% (205 patients). We observed a total of 11 (4%) cases of intraluminal bleeding. Of these, 7 (63.5%) originated from the EG or EJ anastomosis, whilst 4 (36.5%) originated from JJ. Three of these patients developed a BOP.

Patient I

Patient I was a 71-year-old man with a EGJ cancer, Siewert type II, staged as cT2N0. He was in good general conditions, with an American society of Anesthesiologists (ASA) physical status of I. An open total gastrectomy with a D2 lymphadenectomy was performed (R0 resection). He was asymptomatic until the night of POD 1, about 32 h after surgery, when he started to complain back pain associated with confusion. In the morning of POD 2, the patient complained persistent pain associated with fever without chill (37.8 °C). Laboratory tests evidenced a high lipase level (10673 U/L), bilirubin (total serum bilirubin: 3.8 mg/dL; conjugated bilirubin: 2.6 mg/dL), leukocytosis (WBC: $13.85 \times 10^9/L$) and a decrease of hemoglobin level (Hb 11.5 g/L from 15.3 g/L, value of the evening post-operative control). A CT scan was immediately performed, confirming the diagnosis of BOP: significant dilation of the Roux limb and of the hepatobiliary limb (Fig. 1), both filled with clots, associated with signs of pancreatic inflammation (Fig. 2). An immediate operative endoscopy was performed to unblock the limbs but it failed because of the presence of irremovable clots at the JJ level. Therefore, patient underwent surgery: JJ take down with



Fig. 1 Dilation of the Roux limb and of the hepatobiliary limb after anastomotic bleeding



Fig. 2 Abdomen imaging identifies acute pancreatitis

removal of the blood clots from the lumen, control of the bleeding from the staple line and anastomosis rebuild were performed. The patient was transferred to the intensive care unit (ICU) for post-operative care. Patient's respiratory status progressively deteriorated and acute renal failure developed: treatment included hemodynamic support with amine, respiratory support, infection prophylaxis, parenteral nutritional support, correction of electrolyte disturbance, acidemia correction and continuous renal replacement therapy. In spite of these treatments, patient died of MOF in POD 4. Autopsy showed signs of pancreatitis with focal necrosis of pancreatic tissue and generalized necrosis of peri-pancreatic fat tissue.

Patient II

Patient II was a 52-year-old man with a medical history of hypertension. He was dysphagic but in good general condition and his ASA-score was II. He was affected from a locally advanced EGJ cancer, with suspicion of peritoneal carcinomatosis. He underwent a palliative total gastrectomy after an intraoperative confirm of peritoneal carcinomatosis. After surgery, the patient was transferred to ICU; about 20 h later, he showed a decrease in hemoglobin level, associated with hypotension and increased lactate levels (until 7.7 mmol/L). Lipase levels were normal. He was treated with several blood transfusions and inotropic support until POD 3. In POD 3, laboratory tests showed an increased level of lipase (value: 2641 U/L) and serum bilirubin (2.6 mg/dL; conjugated bilirubin: 1.1 mg/L). CT scan showed signs of BOP. Because of disease stage and general conditions, a conservative treatment was attempted instead of immediate surgery. The patient was treated with an operative endoscopy that successfully removed part of the clots and placed a nasogastric tube in the hepatobiliary loop in order to obtain a better outflow. Unfortunately, the bleeding source could not

Table 1 Clinical and laboratory features of BOP patients

	Patient I	Patient II	Patient III
Symptoms onset (h)	32	20	20
Endoscopy timing (h)	40	28	–
Re-operation (h)	42	–	22
Max lipase level (U/L)	10,673	2641	6689
Max bilirubin level (mg/dL)	3.8/2.6	2.6/1.1	3.5/1.8
Hemoglobin drop (g/dL)	3.8	nv	3.7

be found. Patient conditions gradually improved but several blood transfusions and a prolonged recovery were necessary. He was transferred to a long-term care in POD 27.

Patient III

Patient III was a 55-year-old man, without systemic disease. He was staged as cT3N + EGJ cancer, Siewert type III. Patient refused the proposed neoadjuvant treatment and therefore he underwent immediate surgery. A total gastrectomy with D2-plus lymphadenectomy was performed. Twenty hours later, the patient presented abdominal pain and fever (38.5 °C), without chill. Blood tests showed a decrease in hemoglobin level (Hb 10.8 g/L from 13.5 g/L) associated with increased levels of lipase (6689 U/L) and serum bilirubin (3.5 mg/L, conjugated bilirubin: 1.8 mg/L). Clinical and biochemical parameters drove to a diagnosis of BOP. Patient was directly submitted to surgical revision. BOP diagnosis was confirmed intraoperatively. An enterotomy next to the JJ anastomosis with blood clots evacuation and bleeding control were performed. JJ anastomosis was then rebuilt 10 cm lower and a jejunostomy for enteral nutrition was placed. The post-operative course was uneventful and patient was discharged on POD 9, without sequelae.

In Table 1, we summarized the main features of each patient, highlighting the importance of timing in diagnosis and treatment.

Discussion

This paper describes our experience on BOP, a rare but severe complication after gastric surgery. It is caused by an intraluminal bleeding from the JJ anastomosis that leads to an obstruction of the hepatobiliary limb and, consequently, of the biliopancreatic drainage. In literature only one case report is known, it describes a BOP after gastric bypass for obesity in a Chinese patient [12]. We reviewed our experience on gastrectomies in the last 5 years, founding a 4% incidence of intraluminal bleeding (11 patients). These data are consistent with the literature [4–6] that describes an

incidence of 1–8%. Within this group we recorded 3 cases of BOP (1%).

Several reports of bariatric surgery have studied the relation between the type of anastomosis performed (circular stapler, hand sewn, linear stapler) and the subsequent complications. Jiang et al. [14], in their meta-analysis, evidenced that hand-sewn anastomosis had a significantly lower incidence of postoperative bleeding as compared to circular stapler anastomosis. We routinely perform the JJ anastomosis with a circular stapler, followed by a manual reinforcement of the suture; therefore, it is possible that our incidence of bleeding from the JJ anastomosis could be caused by our technique, even if the global incidence of intraluminal bleeding in our series is in line with the literature.

When the JJ bleeding causes an obstruction of the hepatobiliary limb, the retrograde high pressure determines an abnormal activation of pancreatic enzymes that leads to a BOP. In our experience, BOP clinical signs are non-specific, as they present like a postoperative pancreatitis. Its evolution probably depends on the bleeding rate that causes a partial (patient II) or a complete (patient I and III) obstruction of the limb. In our series, none of the patients presented hematemesis. Blood tests drive the suspect showing high levels of lipase and of conjugated bilirubin that confirm the obstruction of both the pancreatic and hepatic outflow, associated with a decrease in the hemoglobin level caused by the intraluminal bleeding.

A CT scan is the gold standard imaging tool to confirm the diagnosis, nevertheless if the clinician has a high clinical suspicion of BOP, an immediate treatment should be carried out without delay. Treatment timing is the key to achieve a good outcome: clinical condition of a BOP patient rapidly degenerates because of evolution to fulminant pancreatitis.

Aim of the treatment is the unblocking of the hepatobiliary limb and it can be achieved either with the use of endoscopy or surgically. Endoscopic treatment, although less invasive, in our experience it often does not permit clot aspiration and cannot find and treat the bleeding site. Endoscopic therapy for early intraluminal bleeding at gastrojejunostomy or JJ site is recommended [14]. In patient II, the placing of an NG-tube in hepatobiliary limb associated with a partial clot aspiration led to a progressive resolution of the BOP. Nevertheless patient recovery was slow and required many blood transfusions. In our experience, surgery is the treatment of choice in case of BOP: it has to be performed without any delay, blood clots removal through an enterotomy and control of the bleeding are the aims. In patient III, surgery without delay resulted in a prompt recovery of the patient without sequelae.

In conclusion, we described BOP, a rare but deadly complication after gastric surgery. Its evolution toward a fatal pancreatitis can be stopped with a proper treatment, thus changing the patient's outcome. Therefore, we think that

upper gastrointestinal and bariatric surgeon should know about this entity.

Compliance with ethical standards

Conflict of interest There are no conflicts of interest to declare.

Research involving human participants and/or animals The research does not involve Human Participants and/or Animals.

Informed consent There was no need to get informed consent.

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