

Endoscopic management of duodenal fistula in a patient operated after abdominal injury

Authors' Contribution:
 A – Study Design
 B – Data Collection
 C – Statistical Analysis
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ABSTRACT:

Post-traumatic duodenal injuries constitute a relatively rare group among this type of lesions reported in the abdominal structures. In the vast majority of cases, a post-traumatic duodenal injury is accompanied by damage to other important organs. The surgical management of duodenum injuries poses a high risk of life-threatening complications with duodenal fistula among the most common. In some cases, the combination of basic and advanced surgical procedures and intensive conservative treatment is insufficient to treat the complication. The progress in endoscopic techniques and the application of modern instruments have allowed for the use of these procedures to manage gastrointestinal injuries of various aetiology. The aim of the study is to present an effective endoscopic occlusion of post-traumatic duodenal fistula.

KEYWORDS:

duodenal fistula, duodenal injury

INTRODUCTION

Post-traumatic duodenal injuries account for merely 0.5–5% of all abdominal injuries. In about 85% of cases, duodenum damage is a result of penetrating trauma and in 96–100% it is accompanied by serious injuries to other organs and abdominal structures. In duodenal injuries with interruption of the retroperitoneal wall, diagnosis is often delayed which usually results from an atypical clinical picture and leads to more frequent life-threatening complications during further treatment. However, early diagnosis of duodenum damage and implementation of appropriate treatment does not protect the patient against these complications (they occur in about 66%) with duodenal fistula as one of the most serious [1, 2, 3].

A CASE REPORT

A 43-year-old man in an average general condition was brought to the emergency department with a multiple injury; he was probably battered. The abdominal CT performed without intravenous contrast showed bruising with a rupture of the hepatic parenchyma in the right lobe, haematoma of the hepatic hilus, haematomas in the following structures: right iliac fossa, extra-renal space on the right side, hypogastrium, inter-loop area, vicinity of the spleen and pelvis minor. The patient was qualified for emergency surgical treatment. Laparotomy revealed a massive haematoma in the small intestine mesentery reaching the mesentery of the cecum and ascending colon as well as retroperitoneal haematoma on the right side; blood was found in the peritoneal cavity, there were no features of bleeding, setonage of the peritoneal cavity and retroperitoneal space was performed on the right side with a drain left in the pelvis.

After 24 hours, relaparotomy was performed. During the second surgical procedure, the presence of bile content was reported in the peritoneal cavity as well as the reservoir of bile in the

retroperitoneal space penetrating through the mesentery of the transverse colon and hepatic flexure. After a wide Kocher manoeuvre, a full-wall duodenal rupture was found at the border of the descending and horizontal part, at the $\frac{3}{4}$ circumference of the intestine which corresponds to third-degree damage according to the scale evaluating the severity of duodenal injuries [4, Tab. I.]. A site of the duodenal rupture was stitched with a single continuous suture and the de Pezzer catheter was introduced proximally as lateral duodenostomy. Additional 3 drains were installed in the peritoneal cavity (including one accompanying drain in the area where the duodenum was sutured). Total parenteral nutrition (TPN) was initiated. In the first week after the operation, the patient had a fever, during duodenostomy a trace amount of bile content was collected from the accompanying drain (over 250 mL of bile/day). Gastroscopy was performed on day 10 after surgery revealing a duodenostomy drain in the duodenal bulb; distally, at the site of the intestinal management, a fistula opening 20 mm in diameter was found with an accompanying drain in the bottom; the passage to the horizontal part of the duodenum was impossible.

The duodenostomy was removed, an accompanying drain was pulled up by about 3 cm, the opening after duodenostomy and the fistula opening were closed with basic endoscopic clips. TPN was continued during further hospitalization. The features of duodenal fistula with stomach content secretion up to 5000 mL/day maintained while hospitalization in the Intensive Care Unit. Further treatment saw a gradual reduction in secretion from duodenal fistula until its complete closure (on day 50 after surgery). The oral administration of liquids was initiated and then the oral diet was gradually extended with good tolerance; the drain was removed from the duodenal area on day 60 after surgery. The patient was discharged in a good general condition after 65 days of hospitalization.

After another 40 days, the patient was re-admitted to the Department of General Surgery on an emergency basis due to a growing, painful tumour in the right inguinal region accompanied by

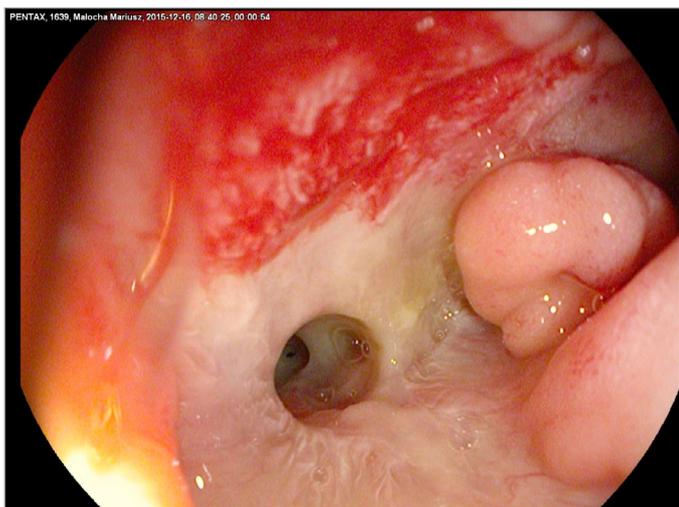


Fig. 1. Duodenal fistula.

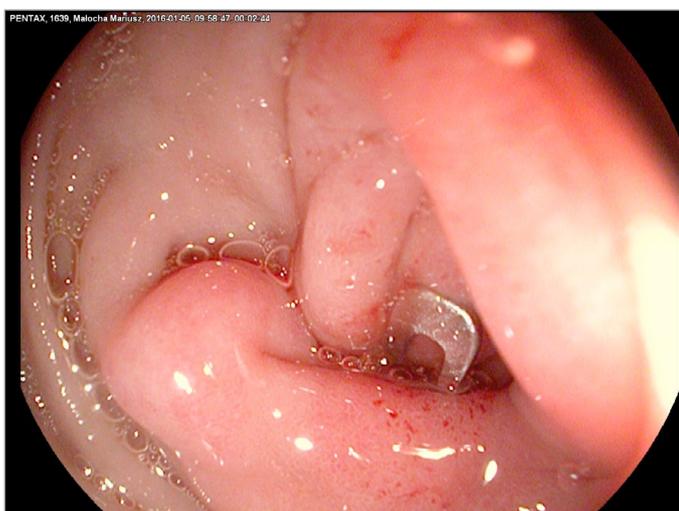


Fig. 2. The fistula opening in the duodenum closed with an OTS clip.

fever up to 39°C. The laboratory tests revealed as follows: CRP 208.8 mg/L, WBC 23.99 k/ μ L. The abscess was diagnosed in the right inguinal area. An incision and drainage of the abscess of the right inguinal area were performed – over 300 mL of the purulent fluid was evacuated without admixture of bile/intestinal contents. A CT of the abdomen and pelvis with contrast revealed an extensive inflammatory infiltration with abscesses formed in the retroperitoneal space, descending to the right iliac fossa; the infiltration started in the descending part of the duodenum; the end of the drain was left in the reservoir in the right iliac fossa. TPN and broad-spectrum antibiotic therapy were initiated and modified according to the results of antibiograms. The patient's condition improved, fever subsided, the values of inflammatory parameters reduced.

Endoscopy was performed because of a suspicion of leakage of the duodenal content to the retroperitoneal space. An opening of the fistula (at the site where the duodenum was previously stitched) 10 mm in a diameter was found in the extra-bulbar part of the duodenum; the passage to the distal part of the duodenum was free (Fig. 1.). On day 20 of conservative treatment, gastroscopy was performed under general anaesthesia. The fistula opening in the descending part of the duodenum was closed with an Over-the-Scope clip (OTSC type gc 12 mm, Ovesco Endoscopy AG). After application

of the clip, the passage through the duodenum was free (Fig. 2.). On day 6 after the procedure, the plain abdominal X-ray was performed after the oral contrast administration – the duodenum and the distal part of the intestine were contrasted, without features of a contrast leak beyond the intestinal lumen, a metallic clip is visible in the duodenum. Liquid oral nutrients were introduced and diet was expanded to mixed and easily digestible. On day 12, after endoscopic clipping of the fistula opening, the patient was discharged in a good general condition.

DISCUSSION

The technique of surgical treatment of post-traumatic duodenal injuries has been widely discussed in available surgical textbooks and the current guidelines of surgical scientific societies. The choice of treatment method should always correlate with the general condition of the patient and the extent of post-traumatic damage [1, 3]. Over 80% of duodenal injuries, which require surgical treatment, can be initially closed (I, II, III degree according to the scale assessing the severity of duodenum injuries). In other cases (IV and V degree), injuries require the use of advanced and complicated procedures, such as bile duct reconstruction, biliary-intestinal anastomosis or pancreatoduodenectomy in extensive damage of the duodenal-pancreatic field [1]. More extensive injuries usually cause more complications in the postoperative period. Despite the rapid diagnosis, carefully selected and performed surgery and intensive treatment in the perioperative period, we are unable to completely protect the patient against possible leakage at the site of duodenal injury management. Therefore, regardless of the aetiology of duodenum damage, all injuries should be widely drained and various methods of upper gastrointestinal tract decompression ought to be applied. In severe duodenal injuries, the duodenal fistula can occur in the postoperative period in approximately 43% of patients [3]. In the initial period, efficient duodenal drainage of the duodenal content can protect the patient against the formation of an abscess and the symptoms of generalized infection. When determining the strategy for further treatment of gastrointestinal fistula the following risk factors increasing mortality and/or lowering the chances of fistula closure should be taken into account: location (lateral surface of the duodenum), significant content excretion (>500 mL/day), generalized infection, a foreign body in the fistula canal, not drained abscess cavity, obstruction distally to the fistula outlet, extensive wall damage (>1 cm), malnutrition [5, 6]. In our case, after the patient was re-admitted to hospital and duodenal fistula was diagnosed, we considered the surgery to drain the duodenal area. Giving up aggressive surgical treatment associated with a high risk of serious perioperative complications and the use of an advanced endoscopic procedure (OTSC), as the main treatment method, with additional TPN and targeted antibiotic therapy, allowed for permanent closure of the duodenal fistula.

In 1993, the first work was published on endoscopic closure of gastrointestinal perforation with a haemostatic clip (gastric perforation) [7]. In the last 2–3 years, many scientific papers were published on the management of the upper and lower gastrointestinal fistula using advanced endoscopic methods [5, 8, 9].

Based on the review of literature, the authors present endoscopic methods of management of full-wall thickness upper gastrointestinal tract injuries which are divided into: perforations, leaks and

fistulas [5, 8, 9, 10, 11]. Among all the aforementioned injuries, fistulas are the most difficult to close. In retrospective clinical trials, fistula/leakage within the gastrointestinal tract by means of OTS clips was closed in 75–89% of cases [5]. However, in a similar study, despite 89% efficacy in fistula closure, the lesion recurred over an average of 39 days in about 46% of patients [5]. There are no studies in the literature describing successful closure of a post-traumatic duodenal fistula using an endoscopic clip.

Endoscopic techniques aimed at closing full-thickness gastrointestinal defects include: TTS (through-the-scope), covered self-expanding metal stents (CSEMS), endoscopic stitching techniques (e.g. OverStitch™, Apollo Endosurgery), endoscopic internal drainage, endoscopic vacuum therapy (EVT), tissue adhesives and OTS (over-the-scope) clips [5, 8, 9, 10].

Fistula leads to chronic inflammation causing fibrosis and swelling of the surrounding tissues which is a big challenge for endoscopic management. It is possible to close the wall defects up to 30 mm in diameter with OTS clips. The condition for proper closure of the defect is to position an endoscope just the opposite – which in the duodenum is difficult and requires a lot of endoscopic experience [10].

Patients with duodenal fistula caused by post-traumatic injuries constitute a very diverse group of patients taking into account the following: the extent of an injury, the surgical technique originally used, the place of treatment (surgical ward in a district hospital/large clinical hospital), hence there is no detailed research

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Tab. I. Severity of duodenal injuries [4].

DEGREE*	TYPE OF DAMAGE	DESCRIPTION OF DAMAGE
I	Haematoma	Haematoma covering a single part of the duodenum
	Tear	A tear of the wall of incomplete thickness, without perforation
II	Haematoma	Haematoma covering more than one part of the duodenum
	Tear	Rupture < 50% of the wall circumference
III	Tear	Rupture 50–75% of the circumference of the descending part of the duodenum (D2)
		Rupture 50–100% of the circumference of the duodenal bulb, transverse or ascending part (D1, D3, D4)
IV	Tear	Rupture > 75% of the descending duodenum, including the papilla or the final section of the common bile duct (D2)
V	Tear	Massive damage to the duodenum and pancreas
	Vascular	Devascularization of the duodenum

*In degrees I-III, we should add one degree in patients with multiple injuries.

available on the endoscopic management of post-traumatic duodenal fistula. The therapeutic management should take into consideration the methods of classic surgical treatment and modern minimally invasive techniques. Despite advances in endoscopic and surgical techniques as well as in intensive peri-operative care, duodenum injuries and their complications (including duodenal fistula) are still subject to high mortality, i.e. of 15–47%, where a quick diagnosis of damage is one of the main factors improving prognosis [1, 12].

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