NEGLECTED, TRAUMATIC DUODENAL RUPTURE – CASE REPORT

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A case of neglected, double-site, post-traumatic duodenal rupture, which was overlooked at the emergency laparotomy due to intra-abdominal bleeding is presented. For nine days the excessive laceration remained asymptomatic, probably because of visceral adhesions. Both tears of the duodenum were eventually repaired, but symptoms and signs of high mechanical obstruction had developed afterwards, requiring repeated surgery (gastric decompression). Endoscopy performed 2 weeks after duodenal repair showed both, repair site and gastro-jejunal anastomosis permeable. All symptoms quickly withdrawn and the patient recovered. Possible causes of the atypical clinical course in this case were discussed.

Key words: duodenal trauma, duodenal obstruction

Duodenal trauma is rather rare among other abdominal viscera injuries. Deep and posterior localization with intestines and transverse colon as protecting shield may result in low incidence of those problems. Blunt non penetrating abdominal trauma with causing force acting frontally results more often in spleen, liver, stomach, small intestine or transverse colon rupture. Duodenal laceration is usually caused by more energetic injury pushing it against vertebral column or according to sudden rise of intra-luminar pressure in loop between pylorus and Treitz’s ligament (1). Pancreatic trauma accompanies very often duodenal laceration due to close anatomical localization (2, 3, 4). Literature reveals that posterior retroperitoneal duodenal wall is more vulnerable for rupture than anterior part and that duodenal laceration has higher incidence among children than adults (1, 2, 6). Isolated duodenal injuries are rare, they usually accompany more complex trauma including those extra-abdominal (2, 3, 5).

After non penetrating abdominal trauma intraperitoneal bleeding is the most common indication for laparotomy. This life threatening situation is the main cause of mortality among patients with abdominal injuries especially in multi organ trauma group. Duodenal laceration does not usually cause significant bleeding and due to this is relatively difficult for discovering during emergency laparotomy and can be easily overlooked.

We present a case of patient with duodenal laceration which was overlooked at emergency laparotomy due to posttraumatic abdominal bleeding and remained asymptomatic for relatively long time, with no peritonitis, infiltration of retroperitoneal space or sepsis. We did not find similar case in literature and, therefore, we believe it is worth publishing.

CASE REPORT

A 46-year old male patient was admitted to our department in June 2011. He was referred to us from surgical department of local hospital with diagnosis of laceration of posterior wall of duodenum. 7 days before he sustained
thorax and abdominal trauma in car accident (driver after collision with tree), transported by the ambulance to the nearest hospital which was district hospital (II degree reference in I-III scale). He was discharged home after basic diagnostic process and several hours observation in Emergency Unit. He fainted just after coming back home. Family brought him to another local hospital with their car where he underwent emergency laparotomy because of symptoms of hypovolemic shock and peritoneal hemorrhage suspected in US. Large transverse colon and its mesentery laceration, small intestine mesentery rupture and more than 1000 ml of blood intraperitoneally were found during operation. Moreover hematoma in retroperitoneal space was discovered but not inspected simultaneously. Hemostasis was achieved, 3/4 of transverse colon was resected, with distal exclusion and proximal colostomy. Four units of red blood cells concentrate were administered intra- and post-op. There were not any complications until 4 day post-op when digestive tract hemorrhage was observed (blood in nasogastric tube), what did not result in disturbances of circulatory and blood parameters. Endoscopy revealed massive clot stopping the entrance to duodenum but primary source was not discovered. Repeated endoscopy after 2 days showed duodenal posterior wall laceration without signs of active bleeding. Patient’s status remained stable and peritoneal drainage discharge stayed stained with blood with decreasing quantity within that time.

Patient was referred to authors department in 7 day post-op due to duodenal laceration. At admission patient’s status remained stable with undisturbed wound healing, competent colostomy and mild complaints. There was 300 ml per day of nasogastric tube discharge and no fluid in three remaining peritoneal drainages. At the following day abdominal contrast CT was performed and revealed duodenal anterior wall laceration in descending and inferior part where small amount of gas and fluid was found in the surrounding tissues (fig. 1 and 2). Attempt of conservative treatment was undertaken due to lack of signs of peritonitis and possibility of spontaneous healing. Parenteral nutrition was induced, peritoneal drainage was removed and antibiototherapy was ceased (cephazolin and metronidazolum which were in use for 7 days).

Patient’s status deteriorated after two days what manifested in abdominal pain, raised inflammatory parameters. Plain abdominal X-ray showed air under diaphragm, US revealed free fluid intraperitoneally. Decision for re-operation was made up in such a situation with suspicion of dehiscence of healing duodenal perforation. During re-laparotomy using previous epigastric mid-line incision small amount of serous fluid without bile staining was found. Transverse laceration of descending and inferior part of duodenum 4 cm long was exposed after dissection of small intestine adhesions (fig. 3). Mobilization with Kocher’s

![Fig. 1. CT imaging showing defect of the duodenal wall (arrowed yellow) and air collection in the neighbouring peritoneal cavity. Duodenal outline is marked with white arrows](image1)

![Fig. 2. CT imaging of the abdomen showing distended shape of the duodenum (arrowed). This projection fails to show the rupture](image2)
maneuver for better visualization and to decrease tension revealed second laceration at posterior wall 2 cm in length. Both lesions were closed with two layers single sutures. Bigger anterior wall laceration edges were debrided before repair procedure. External layer of sutures (serous membrane) was applied under slight tension which was decreased by maximal mobilization of duodenum also distally. After patency test of suture nutritional jejunostomy and peritoneal drainage were performed.

Post-op period was complication-free up to fourth day when increased amount of nasogastric tube drainage (1.5-2.5 l/day) was observed. Pharmacological treatment (metoclopramid and omeprazol) was not sufficient. Barium meal examination was performed in seventh day post-op because of suspicion of obstruction of duodenum in repair site which confirmed the stoppage of the passage between its descending and inferior part (fig. 4). In eighth day post-op third laparotomy was done due to developing electrolytes disturbances (hypocalcaemia and metabolic alkalosis) and significant amount of nasogastric tube drainage. No bile condensation was found on exploration. Duodenal repair was covered by intestinal adhesions which were not dissected not to endanger suture site, but decision for gastric drainage was made up. Jejunostomy catheter was removed and gastrojejunosotmy and entero-entro anastomosis according to Braun were performed. During following two days nasogastric tube drainage was moderate but then raised to 2 liter per day. Five days after third operation another barium meal examination was performed what confirmed narrowed trans-duodenal passage and obstructed gastroenterostomy (fig. 5). Abdominal X-ray done on following day revealed contrast in distal small intestine and great bowel. Under those circumstances in seventh day after third operation and 15 days after second surgery another endoscopic examination was suggested what confirmed undisturbed passage both through repair site in duodenum and in anastomosis with small intestine. Decrease in gastric tube drainage and patient’s status improvement was observed afterwards. After following 3 days nasogastric tube was removed, oral nutrition was induced and after 25 days of hospitalization in our department patient was discharged home in good general status. Patient lost 15 kilograms during this 1 month-long treatment. Closing of colostomy is planned in 4-5 months.

**DISCUSSION**

Duodenal laceration especially in its posterior wall can be easily overlooked during

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**Fig. 3.** Four cm long, complete rupture of the anterior wall of the duodenum

**Fig. 4.** Barium meal performed 7 days after duodenum repair showed its complete obstruction, which appeared inconsistent with the actual status
emergency laparotomy because of intraperitoneal bleeding after abdominal trauma. Developing of peritonitis and sepsis in relatively short time, after 1-2 days in those patients is described by majority of authors in literature not depending on site of perforation (1, 2, 7, 8). One of the case-reports discusses blunt abdominal trauma in child with 5cm posterior wall duodenal laceration who developed peritonitis and radiological findings of perforation (gas under diaphragm) within 10-15 hours (2). This type of scenario seems to be the most common. In case of patient we treated there was no development of any serious abnormal symptoms within first 9 days after trauma, with probably duodenum wide open intraperitoneally. It only may be explained by closing of perforation by intestinal adhesions or remnants of transverse colon mesentery. We could not encounter a case with similar course to our in the literature. We find interesting the fact that there was no bile condensation in the peritoneal space and signs of peritonitis during second operation.

CT with contrast seems to be the most useful and effective method in diagnosis of non-penetrating abdominal trauma including those addressing duodenum and pancreas. It allows visualization of majority of injuries of abdominal organs even stomach and intestines (4, 5). We also performed CT in our case and its results were corresponding with intraoperative findings although it did not reveal laceration of posterior wall of duodenum. Abdominal X-ray (with or without contrast) and US have restricted precision and should not be an alternative to CT which is obtainable in every multi-organ trauma center.

Immediate diagnosis and repair of duodenal laceration seem to be the best and the most commonly performed procedures (2, 4, 5). Duodenal drainage by advancing of nasogastic tube or by jejunostomy can be added (8). Safety duodenostomy, cholecystectomy and T-tube common bile duct drainage were described in previous papers (7, 9) but their effectiveness has not been proved and they are not advised to be performed any more (1, 4, 5, 10). Nutritional jejunostomy which is indicated allows intestinal feeding in case of dehiscence of the suture or other complications (1, 2, 5). Described repair of two-sites duodenal laceration was risky due to postponing of procedure, its size and inflammation phase of healing of perforation. Mobilization of duodenum and minimal debridement of wound edges allowed repair with just slight tension. Duodenojejunostomy using Roux-Y loop or temporal pyloric exclusion with gastroenterostomy are performed in cases of massive and neglected duodenal ruptures without great possibility of successful direct repair (1, 3, 7, 11). Especially pyloric exclusion seems to be relatively simple and reliable treatment option. Transpyloric passage is regained spontaneously within 2-3 weeks what allows healing of duodenum. In latest publications the tendency is observed to go toward simply closure of laceration with optional added gastric drainage procedure done in damage control system – not immediately but after 2-4 every day laparotomies (5, 10). Injuries of duodenum particularly with concomitant other abdominal viscera trauma are linked with relatively high 20-30% mortality and frequent complications like dehiscence of the suture, duodenal fistula, narrowing even causing obstruction and intraperitoneal abscesses. Two cases of duodenal stenosis after repair causing upper GI obstruction with following gastroenterostomy as treatment were described in one of the papers.
This complication is explained by authors with ischemia causing fibrosis and narrowing. In our case we observed two episodes of significant passage limitation (obstruction in fact) through repaired part of duodenum and then also in gastroenterostomy done as bypass. Radiological examination with barium meal confirmed diagnosis of obstruction which was suspected also by clinical signs and conservative treatment was insufficient during these two episodes (fig. 3, 4, 5). It is difficult to explain this course, but there were similar problems in one of the papers (11). It seems that endoscopy performed 8 days after second operation could have revealed the “true story”.

That decision was very difficult because of still not completely reliable patency of the suture and danger of dehiscence during endoscopy. Operational drainage of the stomach (gastro-enterostomy) seemed for us safer than procedure with the risk of causing a duodenal fistula.

Our case seems to be exceptional because of significantly long symptom-free period after major, two sites, intra- and extraperitoneal duodenal laceration. It is also difficult to explain a week long paralytic obstruction of duodenum and gastrojejunostomy. This patient’s history may be educational for surgeons dealing with abdominal trauma.

REFERENCES