





Duodenotomy and Primer Repair in Perforated Retroperitoneal Duodenal Diverticulum

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ABSTRACT In this case report, the management of a duodenal diverticulum perforation was evaluated. A 63-year-old male patient was admitted to the emergency room with an onset of a sudden abdominal pain along with back pain. The patient was evaluated by physical examination, laboratory and imaging methods. Diagnostic laparotomy decision was taken. Diverticulum perforation was detected in the posterior wall of the duodenum, in the distal of the second part of the duodenum. Duodenotomy was performed on the second part of the anterior wall of the duodenum. Then closed with a 3.0 polyglactin suture inside the diverticulum mouth. The abdomen was closed after placing the abdominal drain. On the 14th postoperative day, the patient was discharged. If diverticulum excision and primer repair cannot be performed in diverticulum perforations located in the posterior wall of the duodenum, then duodenotomy and intraduodenal diverticulum repair may be performed in selected cases.

Keywords: Duodenal diseases; diverticulum; retroperitoneal space

Diverticula are most commonly observed in the duodenum after the colon. The prevalence in the autopsy series is 22%.^{1,2} Ninety percent of the duodenal diverticula are extraluminal, of which 62% are found in the second part of the duodenum.³ Although they are common entities, symptoms caused by duodenal diverticula are relatively rare. Rare complications such as duodenum, obstruction of the bile duct and pancreatic duct, biliary fistula, diverticulitis, hemorrhage and perforation may develop. Perforation is the rarest and the most serious complication. The mortality rate is around 20%.^{4,7} Surgery has always been the mainstay approach for symptomatic diverticula. But non-surgical conservative treatments have also been tried.⁸

In this case report, the management of a duodenal diverticulum perforation (second part, posterior wall, with acute abdomen findings) was evaluated.

CASE REPORT

A 63-year-old male patient was admitted to the emergency room with an onset of a sudden abdominal pain along with back pain. After the patient's

physical examination and the utilization of imaging methods (direct abdominal x-ray and computed tomography with intravenous contrast agent); no pathology was reported. The patient again returned to our hospital emergency room after 4 hours when the complaints increased. The patient had a heart rate of 80, blood pressure of 130/90, and fever of 37.2°C. Physical examination revealed palpation and tenderness in the right upper quadrant. However, no rebound was observed. According to the laboratory tests, the white blood cell count was 16.300/ μ L, platelet count: 227000 / μ L, hemoglobin value: 13.1 g/dL, C reactive protein: 6 mg /L, creatinine: 1 mg/dL, Lactate dehydrogenase: 382 U/L, amylase 41 U/L, and liver enzyme levels were normal. No fluid collection was observed on the ultrasonic (USG) evaluation. The patient's computerized tomography (CT) imaging was repeated. In the second part of the duodenum, distension and contamination in the peripheral mesenteric tissue were observed along with an increase in the linear density (Figure 1). In addition, air density belonging to the perforation around the duodenum was observed (Figure 2). Diagnostic laparotomy decision was taken as a result of the current clinical and laboratory findings of the patient. Informed consent



FIGURE 1: Axial CT image shows In the second part of the duodenum, distension and contamination in the peripheral mesenteric tissue were observed along with an increase in the linear density (arrow).

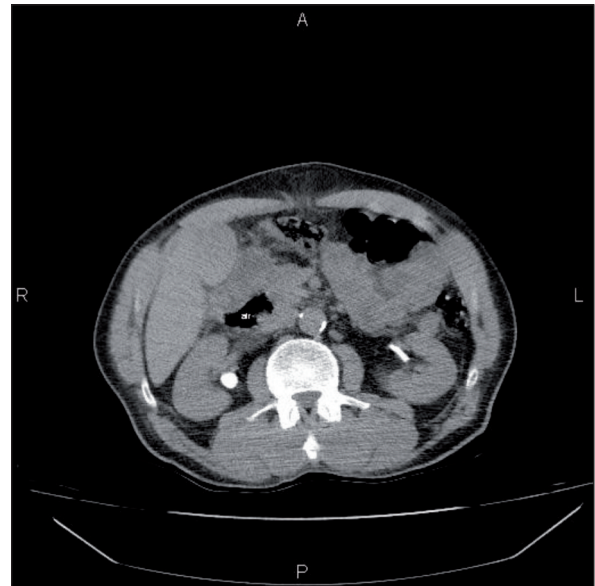


FIGURE 2: Axial CT image shows air density belonging to the perforation around the duodenum was observed.

was obtained from the patient. During the exploratory procedure, bile collection and inflammation were seen at posterior of the duodenum. Then, extended Kocher maneuver was applied, and diverticulum perforation was detected in the posterior wall of the duodenum, in the distal of the second part of the duodenum. No reason was found to explain the perforation. Dissection was attempted in order to reach the diverticulum root. However, the diverticulum root could not be reached due to the inflammation present between the uncinata process and the diverticulum. Due to the absence of extensive inflammation in the anterior wall of the duodenum, Duodenotomy was performed on the second part of the anterior wall of the duodenum. The inner entry point of the diverticulum was reached. Once the duodenal inner entry point was not found to be in close proximity to the pancreas and bile duct, the primary was then closed with a 3.0 polyglactin (vicryl[®]) suture inside the diverticulum mouth. Nasogastric tube was placed in the second part of the duodenum. Subsequently, the duodenotomy was closed with the Heineke Miculicz technique. The perforated diverticulum at the posterior of the duodenum was debrided and complete abdominal lavage of the abdomen was performed. The perforation was closed after placing the abdominal drain.

In the postoperative follow-up, oral intake was stopped, and total parenteral nutrition and broad-spectrum antibiotics were started. There was a daily 500 cc fluid drainage from the nasogastric tube. Biliary and pancreatic leakage was not observed in the first 3 days of abdominal drain. Between the 4th and the 7th day, it was observed that 300 cc of bile fluid came out daily, and then it had gradually decreased. On the tenth day when the drain was absent, oral fluid intake was started and the nasogastric drain was withdrawn. Abdominal fluid was not observed in control abdominal USG. On the 14th postoperative day, the patient was discharged. No pathology was observed in the first postoperative month at the outpatient clinics.

DISCUSSION

The traditional approach for the treatment of perforated duodenal diverticulum is surgery. The surgical procedure depends on the clinical condition of the patient and the intraoperative findings. Approximately 200 duodenal diverticulum perforations have been reported up to date. If inflammation permits, diverticulectomy and primer repair are the accepted outstanding treatments.^{9,10} However, depending on the condition of the inflammation, the surgical option can range from local excision to Whipple procedure. Furthermore, diversion procedures are also included as surgical procedures in order to keep the gastric and bile flow away from the duodenum. For this purpose, gastrojejunostomy procedures are used for the closure of the distal pyloric canal, for T tube drainage, as well as for tube duodenostomy and for gastrointestinal continuity.¹¹ However, in these procedures, morbidity and mortality rates reach as high as 30%. Duodenal fistulization is a commonly seen complication. It is usually treated with conservative methods.¹² In our case, diverticular perforation was detected in the posterior wall of the second part of the duodenum. The base of the diverticulum could not be reached due to the inflammation of the posterior wall and due to the anatomical relationship between the diverticulum and the uncinat process. For this reason, duodenotomy was performed from the anterior wall. The distance between the diverticu-

lum opening and the pancreatic duct was observed to be as 2 cm during the exploration. For this reason, intraduodenal primer repair was performed by applying 3.0 polyglactine to the diverticulum. After placing the nasogastric tube in the repair area, the duodenotomy Heineke Miculicz technique was closed as a primer. Debridement and abdominal lavage were applied to the retroperitoneal area, and then abdomen drain was inserted and subsequently the abdomen was closed. As far as we know, there is no duodenotomy and intraduodenal diverticulum repair technique found in the literature. Advantages of this technique can be stated as: 1. Clear observation of the relationship between duodenal mouth and the bile and pancreatic duct 2. Early intraluminal drainage with nasogastric tube 3. Surgical procedure is not a complicated procedure. The disadvantages can be stated as: 1. Failure to provide adequate and long-term decompression with the nasogastric tube. 2. Possibility of two repair sites with a risk of fistulization. 3. Diverticular tissue may not be fully excised despite the debriding.

Conservative treatment can be performed in patients who are stable or in patients who are poor candidates for surgery due to the associated comorbidities. For this purpose and for bowel rest, a nasogastric drainage or drainage without oral intake, antibiotic therapy, total parenteral nutrition can be applied and if needed percutaneous catheter can be used for the drainage of the retroperitoneal collection.^{13,14} In our case, conservative treatment was not applied, since the findings from clinical, laboratory and imaging examinations suggested perforation and also because of lack of relevant experience in conservative treatment.

The approach to duodenal diverticula is on a case by case basis, although generally treatment is through surgery. Surgical options are determined according to the clinical condition of the patient and intraoperative findings. If diverticulum excision and primer repair cannot be performed in diverticulum perforations located in the posterior wall of the duodenum, then duodenotomy and intraduodenal diverticulum repair may be performed in selected cases (lack of common inflammation, stability of the patient).

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, ex-

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Authorship Contributions

Idea/Concept: Nurettin Ay, Ünal Beyazıt; **Design:** Nurettin Ay, Vahhac Alp, Recai Duymuş; **Supervision/Consultancy:** Nurettin Ay, Ünal Beyazıt; **Data Collection and/or Processing:** Nurettin Ay, Vahhac Alp, Recai Duymuş; **Analysis and/or Interpretation:** Nurettin Ay, Vahhac Alp, Ünal Beyazıt; **Source Survey:** Vahhac Alp, Ünal Beyazıt, Recai Duymuş; **Article Writing:** Nurettin Ay; **Critical Review:** Vahhac Alp, Ünal Beyazıt, Recai Duymuş.

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