Endoscopic management of duodenal anastomotic leakage in descending part of duodenum: a case report and literature review.

Jiang Li (✉ lijiang511434@163.com)

Gastrointestinal Surgery, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, 430022.

Yinghao Cao

Gastrointestinal Surgery, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, 430022.

Shenghe Deng

Gastrointestinal Surgery, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, 430022.

Kailin Cai

Gastrointestinal Surgery, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, 430022.

Case Report

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Abstract

Background

Duodenal leakage following duodenectomy is a dreadful complication with high mortality. Patients with leakage may already have concurrent infection, nutritional deficiency, or organ failure, making surgical revision more difficult. Despite significant advances have occurred, the management of duodenal anastomotic leakage remains challenging. Although many cases had been reported, the treatment guideline is not concluded.

Case presentation

We report a case of anastomotic leakage in descending part of duodenum. By endoscopic management, the duodenal drainage tube was inserted into the duodenal cavity for endoscopic negative pressure therapy and the feeding tube was placed for nutritional support. The surgery was performed while the status for patient was improved. In the end the patient was perfectly recovered.

Conclusion

In the case we reported our experience with endoscopic management as the first-line treatment for anastomotic leakage following duodenectomy. The key to treatment is that we converted diffuse leakage into localized external fistula which was controlled. As flexible endoscopic technology had improved, we made full use of endoscopic management to achieve sufficient drainage and nutritional support. Endoscopic technology helped the patient getting through the most dangerous stages with a minimally invasive approach to buy time for the repairment surgery.

Background

Duodenal leakage following duodenal surgery is a dreadful complication with high mortality^[1, 2]. Despite advances in treatment, the overall mortality rate which has not declined in recent years is more than 40%. Patients with leakage may already have concurrent infection, bleeding, nutritional deficiency, or organ failure making surgical revision more difficult^[3]. Duodenal fluid which is a mixture of gastric, bile and pancreatic juices is more corrosive than other digestive juices. Moreover, duodenal drainage fluid is usually high-flow fluid which is greater than 1000ml/day. The duodenum is a partial retroperitoneal organ. It is difficult to achieve adequate drainage of duodenal fluid. For these above reasons, duodenal anastomotic leakage also has the worst prognosis. The management of duodenal anastomotic leakage remains challenging. Although many cases had been reported, the treatment guideline has not been concluded^[4]. There is no standard treatment which has been proposed for the postoperative complications. Therefore, it is very important to summarize the treatment experience for duodenal anastomotic leakage.

Case Presentation

A 64-year-old male patient was found a lesion in the descending part of duodenum. Cholecystectomy was performed in 2011 for acute cholecystitis in the patient in previous history. CT scanning, MRCP and endoscopic ultrasonography were performed. CT scanning suggested that a 22mm×14mm nodule was found in the descending part of duodenum near vater's papilla. Endoscopic ultrasonography suggested that the lesion originated from the duodenal walls (**Figure.1**). By the above precise preoperative evaluation, we performed duodenal segmental resection and duodenal anastomosis on October 18, 2016. In the first day after the surgery, systemic inflammatory response syndrome was developing in the patient. The dark brown drainage fluid was visible in the abdominal drainage tube. The duodenal anastomotic leakage accompany with systemic inflammatory response was rapidly diagnosed in the patient.

The patient was transferred to the Intensive Care Unit for the first time. Initial treatment included mechanical ventilation, “open-abdomen” approach through the abdominal wound^[5], volumetric therapy, anti-infective therapy and parenteral nutritional support. The key for management was how to achieve unobstructed drainage to avoid the digestive juices remaining in the abdominal cavity which caused a severe abdominal infection. As matters stand, the surgical intervention such as partial gastrectomy and pancreaticoduodenectomy were considered as too hazardous given the local and systemic conditions of the patient. Considering the rich experiences which the author team had in flexible endoscopic devices and technology, endoscopic options were available for the management of the anastomotic leakage. The author team observed the leakage with duodenoscopy under intravenous anesthesia on November 4, 2016. A partial defect was found at the anastomotic stoma (**Figure.2–3**). In order to achieve adequate drainage, the intraduodenal decompression tube was pulled deeply into the descending part of the duodenum near anastomotic stoma covering the leak sufficiently by the negative-pressure therapy. Another feeding tube was placed in the jejunum assisted by X-ray to give enteral nutrition. The enteral nutrition was gradually increasing from 500kcal/day to 2000kcal/day. The speed was controlled with a nutrient micropump for 24h. The extracted digestive juice from the drainage tube was given back to the patient through oral administration after filtration and sterilization. Duodenal anastomotic leakage was slowly transformed into duodenal fistula.

After a week a large amount of blood was drained from the wound and drainage tube on November 10,2016. The patient received the emergency exploratory laparotomy immediately. We placed “T” drainage tube through duodenal fistula. The duodenal bulb and downstream jejunum were anastomosed. A new bypass was built. We continued to give the negative-pressure therapy and nutritional support (**Figure.4–5**). By the application of transluminal contrast agent, the leak was not detected anymore after six weeks. The partial gastrectomy and gastrointestinal anastomosis were performed subsequently after two months. In the meantime, abdominal wound closure was also achieved whereby the further postoperative course was uneventful. All surgical and endoscopic procedures were performed by the same experienced medical team. Full recovery was achieved afterwards (**Figure.6**). The treatment was deemed effective by the patient. The patient was finally discharged from the hospital on January 23,2017.

Discussion And Conclusion

Duodenal anastomotic leakage is the most serious clinical complication, which can cause systemic and local pathophysiological changes, difficult treatment and high mortality. The major factor for the difficult self-healing of duodenal leakage is the erosion and infection caused by the continuous outflow of duodenal fluid in the abdominal cavity. Once duodenal anastomotic leakage occurs, it is necessary to deal with clinical complications such as infection and bleeding. However, there is currently no standard consensus regarding the prevention and management of duodenal anastomotic leakage. So far studies on duodenal repair mainly focus on sepsis treatment and infection control. It is believed that surgery can solve the fundamental problem. But it is very difficult to grasp the right timing of surgery^[6]. More and more evidences showed that surgery is not considered necessary and tolerable^[7]. Most noteworthy, in recent years endoscopic surgical technique has been rapidly developing and widely applied to the management of duodenal repair^[8, 9]. However, the endoscopic management of duodenal anastomotic leakage is rarely reported. For the treatment of duodenal anastomotic leakage, this case demonstrates the great potential of the perfect combination of endoscopic techniques and surgical procedures.

The experience in this case suggests: (1) The most critical treatment idea is to convert the duodenal anastomotic leakage into the duodenal fistula for avoiding diffuse abdominal infection. The balance of internal environment, infection control and nutritional support are the important basis of systemic therapy. (2) Endoscopic technology has improved and more flexible endoscopic devices have been developed. Endoscopic technology may be the first line of treatment for duodenal anastomotic leakage^[10]. Endoscopic negative-pressure therapy has been shown to be a revolutionary option for adequate drainage in similar situations. Revision surgeries have become partially unnecessary by switching to the endoscopic procedure. While endoscopic technology has limitations in situations such as evidence of bleeding and serious infection, surgical alternatives should be considered under these circumstances. Endoscopy and surgery should complement each other^[11]. It is flexible to choose the right treatment at the right time. (3) Patients need adequate nutritional support. Parenteral nutrition should be given firstly to ensure adequate energy supply, electrolyte and fluid requirements. Early implementation of enteral nutritional support can enhance immunity, improve nutritional status and promote fistula healing. The sequential nutrition support should be performed from total parenteral nutrition to parenteral nutrition combined with enteral nutrition, finally to total enteral nutrition. (4) This case is challenging. The treatment requires the multidisciplinary cooperation. The surgeon was responsible for endoscopic and surgical treatment. In the future, we need more surgeons with exquisite endoscopic skills and rich experience to manage duodenal anastomotic leakage.

Declarations

Ethics approval and consent to participate

The study was approved by the Human Ethics Committee of Huazhong University of Science and Technology Tongji Medical College.

Consent for publication

The authors declared the consent for publication. The authors had written consent to publish identifying images or other personal or clinical details which were obtained from study participants.

Availability of data and material

Not applicable

Competing interests

The authors declared that they have no competing interests.

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Authors' contributions

All authors were members of the treatment team. JL, YC and SD contributed to the study design and literature search. JL and YC contributed to write the manuscript. KC contributed to revise the manuscript. All authors read and approved the final manuscript. JL and KC are the corresponding authors.

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Figures

Figure 1

The red arrow showed the lesion in the duodenum by endoscopic ultrasonography. It may be originated from the lamina propria.

Figure 2

The red arrow showed the leakage under duodenoscopy on November 4, 2016.

Figure 3

CT scanning examined the abdominal cavity on November 3, 2016. The abdominal infection diffused.

Figure 4

Radiography was performed to evaluate the fistula status on December 5, 2016. Contrast agents were injected through intraduodenal decompression tube. They were drained through the peritoneal drainage tube. The red arrow showed that a small amount of contrast agents was observed in the abdominal cavity.

Figure 5

The “T” drainage tube through the fistula was observed in duodenal lumen under duodenoscope. The fistula was significantly smaller than before. The greater feeding tube was placed on December 8, 2016.

Figure 6

Radiography by duodenal drainage tube was performed on January 23,2017. There was not obvious diffusion of contrast agents to the abdominal cavity in the descending part of duodenum. The contrast agents could fully enter into the distal jejunum.