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A novel technique: Falciform ligament wrapping repair of overlooked duodenal gunshot injury

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Abstract

Surgical treatment of Duodenal injuries is still among the injuries that leave surgeons in a difficult position. Although many surgical techniques are defined to reduce complications and mortality in the surgical treatment of duodenal injuries, as recent studies have shown, minimally invasive surgical techniques are preferred to reduce complications and mortality in repairing injuries.

Case presentation: The patient operated in another center due to gunshot injury, was admitted to our center on the 5th postoperative day when the patient brought bile from the drains on the third postoperative day, and in the explorative laparotomy performed, two-segment and three segment injuries of the duodenum were detected. This injury site was repaired by the Tube duodenostomy Billroth II gastroenterostomy method using ligamentum Falciforme hepatitis.

Conclusions: Various methods have been described in the treatment of duodenal injuries, depending on the degree of injury and other visceral organ injuries. Among these methods, minimally invasive surgical methods reduce post-injury complication rates and mortality rates. Among these methods, successful results are obtained with the use of falciform ligament.

Keywords: duodenal injury, falciform wrap repair, trauma surgery

Introduction

Background

Although duodenal injuries are rare, they constitute approximately 3-5% of all abdominal injuries [1]. Penetrating injuries constitute 80% of these injuries [2]. Although it is difficult to injure the duodenum due to its anatomical position in the retroperitoneum, when it is injured, it makes the management of the injury difficult due to significant anatomical formations such as the surrounding pancreas, main bile ducts, large arteries, and veins in the abdomen. In addition to duodenal injuries, liver, pancreas, colon, stomach, small intestine, and vascular structures are also seen in most cases [3-5]. Among the duodenal injuries, the most common injury is the second segment with 36%, followed by the third segment with 18%, the fourth segment with 15%, and the first segment with 13%. More than one segment injury is seen in 18% of the cases [6].

Case presentation

A 29-year-old male patient was operated on seven days ago in another center due to a gunshot wound. Two injury sites are seen at the level of the small intestine during exploration. Segmental small intestine resection is performed on these injury areas, and the integrity of the intestinal system is achieved with the side-by-side anastomosis method. Patient's follow-up, third postoperative day, the patient is referred to our center for treatment when there is bile from the drain. We took over the patient on the 5th postoperative day. When he was taken over, the patient had a moderate-poor general condition, open consciousness, cooperative orientation, and septic appearance at the first examination. There was 2 Jackson Pratt (JP) drains placed in the abdomen of the patient. The total flow rate of the drains was determined as approximately 450 cc per day with bile. Among the patient's vital signs, the heart rate was 120 bpm, blood pressure arterial (TA) 100/65 mmHg respiratory rate 21 / min saturation was 96%. Laboratory values included WBC: 18500, CRP: 224 and Hgb: 10.1 mg / dl. Explorative laparotomy was performed on the same day. A small bowel anastomosis due to the previous operation was observed, the anastomosis was seen as intact. Bile collection was seen in the subhepatic area in the right upper quadrant (Figure 1).



Fig 1: View of bile collection due to overlooked duodenal injury

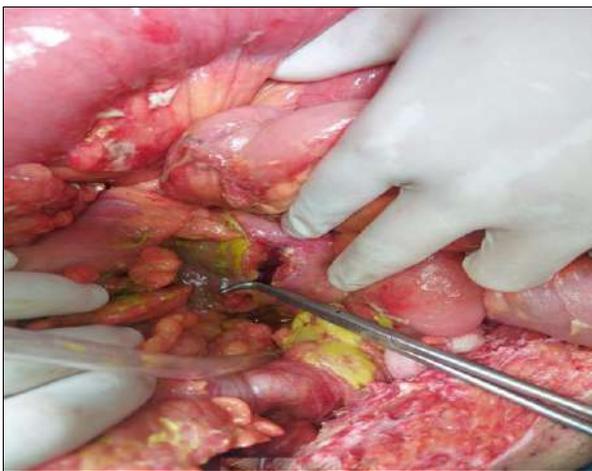


Fig 2: Duodenum 2nd segment injury site

The collection is irrigated and aspirated. The duodenum was evaluated with the help of the coher maneuver performed in the previous operation. An injury area of approximately 35 mm was seen in the duodenum's second segment (Figure 2). Besides, another injury area of approximately 10 mm was seen in the third segment of the duodenum. Duodenum's 3rd part injury was repaired with omentopexy. The injury in the second part was repaired with falciform ligament-assisted tube duodenostomy, feeding jejunostomy, and Billroth II gastroenterostomy (Figure 3).

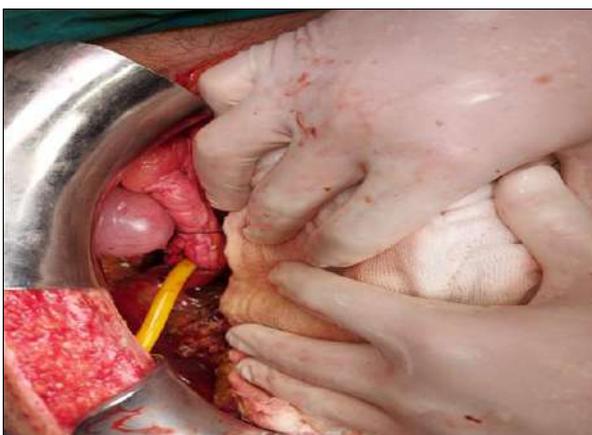


Fig 3: Repair of the injury site with tube duodenostomy and falciforme ligament

Silicone drains were placed in the subhepatic area. Oral closed follow-up of the patient was observed. On the postoperative third day, feeding was started from the feeding jejunostomy. Approximately 200 cc of bile content was seen from the tube duodenostomy. Enteral feeding was started on the 5th day PO. The patient's drains were withdrawn as no bile was observed from the silicone drains on PO 9th day. No collection was seen in the subhepatic region in control computed tomography (figure 4). The patient was discharged on the 11th postoperative day by tube duodenostomy. In the follow-up after discharge, the patient's tube duodenostomy flow rate decreased day by day, and the drain flow of the patient was reset on the 28th postoperative day. On the 30th postoperative day, the patient's tube duodenostomy was withdrawn.

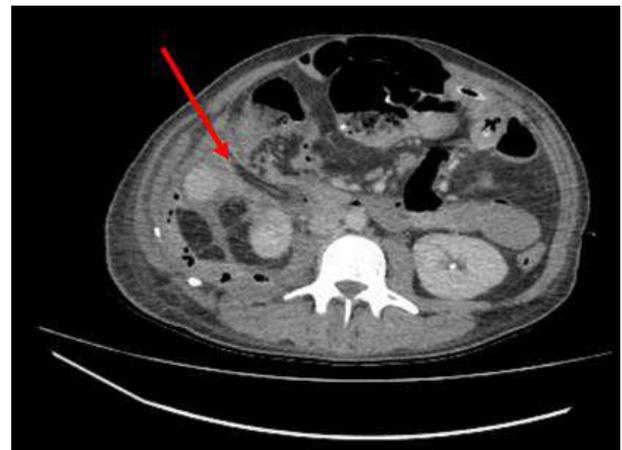


Fig 4: No collection was seen in the subhepatic region in control computed tomography

Discussion

The operative management of the duodenal injury is controversial, especially for high-grade injuries. Surgical procedures can be considered, which vary depending on injuries associated with injury severity and application time. To reduce morbidity and mortality, it is essential to use the appropriate surgical technique at the appropriate time and early diagnosis. Lucas and Ledgerwood [6] showed in 1975 that delayed diagnosis and surgical treatment of duodenal trauma was responsible for high morbidity and mortality indices. These authors stated that mortality was 14% in patients operated on within the first 24 hours after injury and 40% during surgery after this period. Snyder *et al.* [7] reported a 50% mortality in patients recently admitted to surgery and a 50% incidence of fistula in survivors. Repair of high-grade duodenal injury remains a highly controversial issue. Historically, more complex surgical techniques have been used. In 1968, Berne *et al.* Duodenal diverticulization was described in the operative treatment of 16 patients [7]. this approach prevented gastric contents from reaching the repaired duodenum using gastroenterostomy techniques. Vaughan described the first pyloric exclusion involving a similar gastric diversion preservation strategy [8]. In 1983, Martin *et al.* published a report supporting pyloric exclusion as the preferred procedure, after showing that the incidence of fistula formation decreased with the use of pyloric exclusion and that complications secondary to duodenal leakage were less [9]. however, minimally invasive techniques have been preferred over complex techniques in the repair of complex duodenal injuries in recent years [10].

In general, the main goal of the surgical approach of duodenal trauma is to control bleeding, prevent ongoing contamination, and give the patient the appropriate surgical opportunity, primarily based on the principles of damage control surgery.

Conclusion

Many additional methods have been described to prevent duodenal leakage in the treatment of duodenal injuries. There is no algorithm in which situations these techniques should be applied. It has not been demonstrated which of these techniques is superior to the other. Among these techniques; There are pyloric exclusion, duodenal decompression, duodenal diverticularization, gastroenterostomy techniques, feeding tube jejunostomy, gastroenterostomy techniques, and their combinations.

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