

A Case Report of Combined Injury to the Stomach and Duodenum Following Blunt Abdominal Trauma

Yoshio SHIRAI, Kazuhiro TSUKADA, Norimasa SANDOH, Tetsuya OHTANI, Terukazu MUTO and Katsuyoshi HATAKEYAMA

The First Department of Surgery, Niigata University School of Medicine, Asahimachi 1, Niigata 951, Japan

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Summary. A case of combined gastric and duodenal injury following blunt trauma is presented. An emergent laparotomy revealed paired gastric perforations in both the anterior and posterior walls of the antrum as well as a huge central retroperitoneal hematoma which obscured a duodenal perforation on the posterior wall of the third portion of the duodenum. Distal gastrectomy, vigorous irrigation, and drainage were performed. The missed duodenal injury resulted in a lateral duodenal fistula. The fistula was managed with conservative measures, subsiding until 35 days after the operation. This report indicates that any trauma surgeon should be aware of this rare combined blunt injury and that discovery of a central retroperitoneal hematoma mandates careful examination of the pancreas and duodenum to exclude injuries.

INTRODUCTION

Although combined injury to the stomach and duodenum is not so unusual in penetrating abdominal trauma,^{1,2)} this combination is extremely rare in blunt trauma.²⁻⁵⁾ Only two cases of such combined blunt injury have been reported.^{2,4)} Despite this, the clinical features of this unusual combined injury have not been documented sufficiently in these reports. We therefore report an additional case of combined gastric and duodenal injury following blunt, motor vehicle trauma in an attempt to clarify the challenging problems in the diagnosis and management of this rare injury.

CASE REPORT

A 34-year-old man was admitted to a Niigata University School of Medicine affiliated hospital 1 h after a

motor vehicle accident in which his upper abdomen was thrust against the steering wheel. The initial abdominal examination revealed generalized guarding and rebound tenderness. A diagnosis of peritonitis was made. A plain radiograph of the abdomen revealed a large soft tissue mass suggestive of a retroperitoneal hematoma (Fig. 1). An emergent laparotomy was performed which revealed paired ("kissing")



Fig. 1. Plain radiograph of the patient's abdomen 1 h after a motor vehicle accident. Note the large, soft tissue dense mass (arrowheads) suggestive of a centrally located, retroperitoneal hematoma, which obliterates bilaterally the psoas shadows.



Fig. 2. Intraoperative photograph of gastric perforations in the antrum. Note the perforation on the anterior wall of the stomach (arrowheads). Through the defect in the anterior wall, the perforation on the posterior wall can be seen (arrow). Note also the bruised tissue surrounding the perforations.



Fig. 3. Fistulogram obtained on the 12th postoperative day. A contrast medium, which has been injected through the peri-pancreatic drain, can flow freely into the duodenum. The perforation was located on the posterior wall of the third portion of the duodenum (arrowheads). The diagnosis of a lateral duodenal fistula was confirmed. Note that contrast medium also flows into the cavity of the retroperitoneal hematoma (arrows).

gastric perforations in both the anterior and posterior walls of the antrum (Fig. 2). Extensive contamination of the peritoneal cavity with undigested food and a large retroperitoneal hematoma located at the root of the mesentery were found. Because the gastric perforations were surrounded by a wide area of ragged tissue, a distal and partial gastrectomy with Billroth I reconstruction was performed. Kocher's maneuver was executed, to reveal that the first two portions of the duodenum were intact. The integrity of the third and fourth portions of the duodenum could not be evaluated because these segments were obscured by the large retroperitoneal hematoma. Drains were placed in the peri-pancreatic space, the subphrenic spaces bilaterally, and the pouch of Douglas. The abdomen was then irrigated with copious amounts of saline and closed.

On the fifth postoperative day, a discharge of duodenal contents through the peri-pancreatic drains was first recognized. Fistulography through one of the drains revealed a lateral duodenal fistula on the posterior wall of the third portion (Fig. 3). At the same time, the integrity of the gastroduodenostomy was confirmed. Nasogastric suction and total parenteral nutrition were instituted. Volume losses were massive. Amounts greater than two liters via the peri-

pancreatic drains, and 500 mL via the nasogastric tube were lost per day. This resulted in transient, acute renal failure secondary to hypovolemia. A crystalloid infusion of approximately seven liters per day was required to maintain the patient's intravascular volume. The acute renal failure was subsequently resolved, and metabolic acidosis resulting from the loss of duodenal fluid was aggressively corrected. On the 12th postoperative day, acute acalculous cholecystitis developed and was treated with percutaneous biliary drainage. On the 15th postoperative day, an upper gastrointestinal hemorrhage occurred. This was treated successfully with the administration of an H₂-blocker and secretin. The patient developed a paralytic ileus, abdominal pain, and rebound tenderness on the 26th postoperative day. A laparotomy was performed at this time which revealed an intra-abdominal remnant abscess. Abdominal irrigation and drainage were performed, after which the patient recovered well. The duodenal fistula was healed 35 days after the initial operation. Oral feedings were begun on the 48th day, and the patient was subsequently discharged 70 days after the initial trauma. A follow-up examination 6 years after the injury showed an uneventful course of recovery.

DISCUSSION

Although combined injury to the stomach and duodenum is not so rare in penetrating trauma,^{1,2)} this combination resulting from blunt trauma is extremely rare.²⁻⁵⁾ Only two cases of such combined blunt injury to the stomach and duodenum have been reported in the literature.^{2,4)} The clinical features of this unusual injury, however, have not been elucidated in both reports. We here report an additional case of this injury with full documentation of the clinical course. Regarding the mechanism of this combined injury in our case, the findings that the "kissing" perforations of the stomach and the duodenal perforation are all located on the vertebral column (Figs. 2, 3) suggest that both the stomach and duodenum were crushed between the steering wheel and the vertebra. The bruised gastric tissue around the perforations (Fig. 2) also suggests that this combined injury was of "crush injury" origin.

The clinical course of this patient was complicated by the missed duodenal perforation; the injury was missed for a number of reasons. The concomitant gastric perforations, huge retroperitoneal hematoma, and location of the perforation on the posterior wall of the third portion made recognition of the duodenal perforation difficult. A duodenal injury was suspected, and thus, a Kocher maneuver was performed. No injury was found in the first two portions of the duodenum. Similar scenarios with missed duodenal injuries have often been reported.^{2,6)} Although injuries are likely to occur in the second portion of the duodenum, the surgeon must examine the entire duodenum by way of an extended Kocher maneuver with mobilization of the transverse mesocolon when duodenal injury is suspected.²⁾

Blunt gastric injury is often complicated postoperatively by an intra-abdominal abscess.³⁻⁵⁾ In this case, extended contamination from gastric contents was recognized, and copious irrigation and extensive drainage were employed. These procedures, however, did not prevent the occurrence of a remnant abscess. Aggressive management with repeat laparotomy is usually necessary to deal with abdominal septic complications following blunt gastric injury.³⁻⁵⁾

The morbidity and mortality rates associated with the development of a lateral duodenal fistula are quite high.^{7,8)} In this case, a missed duodenal perforation led to the development of a lateral duodenal fistula. The fistula was healed with conservative measures. If a Billroth II reconstruction had been performed, achieving duodenal diversion, the clinical course of

this patient would have been better. In 1968, Berne et al. advocated an end-to-side Billroth II gastrojejunostomy for the treatment of combined duodenal and pancreatic trauma, or severe duodenal trauma.⁸⁾ When a gastrectomy is performed in the setting of a concomitant, or suspected injury to the pancreas or duodenum, then a Billroth II reconstruction should follow.

In 1985, Henao and Aldrete proposed a classification of retroperitoneal hematomas.⁹⁾ The pelvic, flank, central, and combined hematomas were reported to differ in characteristics, and recommendations were made regarding treatment considerations for each. Centrally located hematomas can frequently mask extensive injuries to the mesenteric vessels, the pancreas, or the duodenum.^{9,10)} In this case, the large central hematoma concealed a significant duodenal injury. When a central retroperitoneal hematoma is encountered, a high likelihood of injuries to the structures concealed by the hematoma should be considered.

In conclusion, this report indicates that any trauma surgeon should be aware of this rare combined injury, and that the discovery of a central retroperitoneal hematoma mandates careful examination of the pancreas and duodenum to exclude additional injuries.

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