

Review Article

Duodenal lesions management

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ABSTRACT

Penetrating injuries are more typical overall, and traumatic damage to the duodenum only happens in 3 to 5% of individuals with abdominal injury. The majority of blunt injuries in the US are brought on by auto accidents. Lesions are evenly dispersed across the other sections of the duodenum, with the second segment being more frequently afflicted. Duodenal damage symptoms are non-specific and could be less noticeable after retroperitoneal surgery. Computed tomography (CT) is used to evaluate the duodenum in the diagnosis of duodenal injury in hemodynamically stable patients. CT findings related to this evaluation include duodenal thickening, periduodenal fluid, extraluminal air, and accumulation of heterogeneous fluid (clot) close to the site of injury. According to the mechanism and severity of the damage, the care of duodenal lesions should be cautious in patients with grade I or grade II closed duodenal hematoma who are hemodynamically stable. When duodenal lesions need to be repaired, surgery is necessary. With death rates of about 15%, duodenal injury complications include intra-abdominal abscess, duodenal fistula, and post-traumatic pancreatitis.

Keywords: Injuries, Duodenum, Surgical treatment

INTRODUCTION

Duodenal tumors are exceedingly uncommon, and both diagnosis and treatment can be challenging. Duodenal lesions are commonly accompanied by concurrent lesions, and their signs and symptoms are non-specific. Treatment for duodenal lesions is based on the kind of damage-closed or penetrating-and the severity of the injury. A damage control strategy for duodenal injury may be necessary due to concurrent injuries, which may call for more immediate treatment.²

Due to changed mental status or sleepiness in circumstances of severe trauma, it might be difficult to ascertain a patient's medical history or symptoms. It is critical to assess whether the patient needs antiplatelet or anticoagulant treatment and to note any existing medical problems or comorbidities. Although focused assessment with sonography in trauma (FAST) is an effective test for

spotting hemoperitoneum, it is unreliable for duodenal injury detection. While hemodynamically unstable individuals may have their duodenal damage detected during surgery, stable patients who are worried about it need CT imaging.²

One to five percent of patients with abdominal injuries also experience duodenal injuries, which are quite uncommon. After a thorough study, penetrating trauma caused 80 percent of duodenal injuries, making penetrating wounds more frequent than blunt wounds. Any object or projectile that penetrates the belly can hurt the duodenum, however because to their tremendous intensity, gunshot or shotgun wounds hurt more severely than stab wounds. Automobile accidents are more likely to result in blunt duodenal damage, with the most typical mechanism being the duodenum being crushed between the steering wheel or seat belt and the spine.³

Hardly can duodenal injuries happen by themselves; instead, they frequently accompany injuries to other organs as the liver, pancreas, small intestine, colon, stomach, and significant arterial systems. With 17 percent of related lesions, the liver is the organ that sustains the greatest injuries, followed by the pancreas, small intestine, colon, and stomach. Ten percent of patients experienced serious abdominal vein injuries, largely to the inferior vena cava, whereas seven percent of patients experienced severe artery injuries, mostly to the aorta.⁴

Laboratory tests are frequently carried out as part of normal trauma evaluation in addition to the history and physical examination. Patients with duodenal damage may have higher serum levels of lipase or amylase, but these laboratory tests are not precise enough to confirm or rule out the diagnosis. Patients with forceful abdominal trauma who do not have duodenal damage may also have elevated amylase or lipase values. Serum amylase values can also be impacted by a wide range of drugs, and changes in serum amylase levels can result from a number of illnesses unrelated to trauma or the duodenum.⁵

It is crucial to remember that duodenal injury symptoms are vague, and early examination findings such as abdominal discomfort and peritoneal signs may point to an intra-abdominal lesion but are not specific to a duodenal lesion. As a result, to establish the diagnosis of a duodenal injury, diagnostic imaging procedures such as a CT scan, ultrasound, or magnetic resonance imaging (MRI) may be required.⁶

DIAGNOSIS

Imaging tests, such as CT scans of the abdomen, are frequently used to diagnose duodenal damage, particularly in hemodynamically stable patients with vague symptoms and abnormal findings on physical examination. Oral contrast may not help with the diagnosis of duodenal damage and is often not required for CT scans. Thickening of the duodenal wall, periduodenal fluid, fluid in the right anterior pararenal space, reduced enhancement of the damaged segment, the "sentinel clot" sign, and extravasation of oral contrast in the minor sac are specific CT findings that point to duodenal injury. Nonetheless, certain duodenal lesions may still be missed by CT scans. The duodenum should be aggressively inspected in patients who have emergency laparotomy reasons for probable damage. During laparotomy, methods for exposing the duodenum and its intraoperative assessment are reviewed.⁷

Duodenal injuries are often categorized using the American association for trauma surgery (AAST) categorization system. On the basis of CT results or, more accurately, during surgical investigation, the degree of the damage can be determined. The AAST categorization system assigns the following ratings to duodenal injuries:⁸

Grade I: Hematoma affecting a single portion of the duodenum or partial thickness laceration without perforation.

Grade II: Hematoma involving more than one portion or rupture of less than 50 percent of the circumference or major laceration without duct injury or tissue loss.

Grade III: Laceration with rupture of 50 to 75 percent of the circumference of the second portion or rupture of 50 to 100 percent of the circumference of the first, third, and fourth portions.

Grade IV: Laceration with disruption of more than 75 percent of the circumference of the second portion or involving the ampulla or distal common bile duct.

Grade V: Massive laceration with rupture of the duodenopancreatic complex or devascularization of the duodenum.

TREATMENT

Patients with low-grade injuries, which are characterized as grade I or II closed duodenal hematomas that do not significantly clog the colon or impair the vascular system, may also benefit from conservative care. Conservative management in these situations may entail keeping an eye on the patient's symptoms and offering supportive care such as bowel rest, nutritional assistance, and pain relief.⁹

The patient's general health, the severity of the injury, and the presence of any other injuries or consequences must all be taken into account while deciding whether to follow conservative therapy in each individual situation. Patients with significant hemodynamic instability or numerous injuries, for instance, would not be appropriate candidates for conservative care.⁹

Careful observation is necessary during conservative therapy to spot any indications of deterioration or complications that may call for surgical intervention. Patients should be continuously monitored for symptoms such as ongoing abdominal discomfort, increasing abdominal soreness, ongoing nausea or difficulty to accept oral meals, unexplained hypotension, increased leukocytosis, and elevated serum lipase or amylase.⁹

A crucial component of conservative management is nutritional assistance. In most situations, early enteral feeding is favored over parenteral nutrition since research has shown that it leads to better results and fewer problems. Nevertheless, it can be difficult to establish and maintain enteral access in patients with duodenal damage, particularly when there is a severe bowel obstruction or associated problems.¹⁰

Patients who have exploratory laparotomy for various reasons must have their duodenum evaluated. Many individuals with various abdominal diseases will have

their duodenal damage discovered during an abdominal check. Visible portions of the retroperitoneum should be examined for bile stains, free bile fluid, trapped air bubbles, and periduodenal or perirenal hematomas after managing abdominal bleeding or gastrointestinal contamination. Each of the actions listed below should be carried out to mobilize and evaluate the duodenum if there is a strong suspicion of duodenal projectile damage or highly related lesions.¹¹

The first step is to conduct a Kocher technique, which entails separating the first, second, and third segments of the duodenum from their lateral peritoneal insertions. The second step is to split the gastrocolic ligament to get access to the minor sac and examine the medial and posterior aspects of the first and second portions of the duodenum, respectively. The third stage involves performing a right medial visceral rotation to expose the third section of the duodenum. The fourth section of the duodenum should then be exposed by loosening the Treitz ligament.¹²

The duodenum should be carefully examined for full-thickness lesions throughout the examination. The majority of duodenal hematomas will heal with conservative care, thus if one is seen or felt during an emergency laparotomy due to physical trauma, it should be left undisturbed. Although removing the hematoma can seem appealing, doing so runs the risk of turning a partial-thickness lesion into a full-thickness damage. Exploring bruises in the context of penetrating trauma is important.¹³

Inspection reveals the majority of duodenal perforations. By injecting methylene blue through the nasogastric tube and checking for subserosa duodenal staining, one can spot subtle full-thickness lesions. Full-thickness duodenal lesions in the ampulla area call for a thorough cholangiopancreatography examination of the ampulla, bile ducts, and pancreatic ducts.¹⁴

Treatment for injuries that do not immediately endanger life, such as duodenal injury, is deferred in favor of urgent management of bleeding sites (including those connected to duodenal or pancreatic lesions) and gastrointestinal contamination. Fluid resuscitation, patient warming up, and correction of coagulation deficiencies follow intraperitoneal tamponade and temporary abdominal closure in the critical care unit.¹⁵

Damage management for duodenal lesions may entail removal of a full-thickness duodenal lesion without restoring continuity or fast closure of the affected region. Tamponade is frequently unable to stop bleeding from high-grade pancreaticoduodenal lesions; hence, resection with or without rapid repair may be required. To regulate duodenal and pancreatic secretions, closed suction drains are positioned. Definitive excision and reconstruction (Whipple) may be done after resuscitation and stability.¹³

Simple techniques, such as debridement and primary repair, or resection and reanastomosis, can be used to treat the majority of duodenal lacerations. While it is uncommon, the requirement for more complicated operations is linked to a higher risk of postoperative problems, such as suture line failure and anastomotic leaking or the development of fistulas in the small intestine. Moreover, mortality rises with more involved surgery, while it frequently results from other injuries and is not solely a result of duodenal repair.¹⁶

Patients with grade I or grade II duodenal hematomas did not respond to conservative therapy should have exploratory laparotomy or laparoscopic surgery to relieve the hematoma. Moreover, avoiding morbidity and death from duodenal injuries requires early detection and treatment. The AAST advises considering diagnostic peritoneal lavage or CT scanning with intravenous contrast to look for potential duodenal injury in patients with penetrating injuries to the abdomen, especially those with anterior abdominal stab wounds.¹⁷

DISCUSSION

The article addresses the very few occurrences of duodenal injuries and how difficult it may be to diagnose and treat them because of their vague signs and symptoms and connections to other injuries. Also, it underlines the significance of learning about the patient's medical history, including any comorbidities or pre-existing diseases, and figuring out whether the patient needs antiplatelet or anticoagulant treatment. The diagnosis of a duodenal injury may need the use of diagnostic imaging tests like CT scans, ultrasounds, or MRIs.^{18,19}

For grading the seriousness of duodenal injuries, the AAST categorization system is frequently utilized. Low-grade injuries may just need conservative treatment, but high-grade injuries may call for more urgent care, including surgery.⁸

CONCLUSION

In conclusion, because of their vague symptoms and frequent co-occurrence with other injuries, duodenal injuries can be difficult to diagnose and treat. Nonetheless, gathering comprehensive patient histories, performing diagnostic imaging tests, and classifying injuries according to severity can aid medical practitioners in selecting the best course of action. To guarantee the best possible outcomes for patients, diagnosis and therapy must be comprehensive and personalized.

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