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The Management of Pancreatic Trauma in the Modern Era

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Pancreatic trauma, while uncommon, presents challenging diagnostic and therapeutic dilemmas to trauma surgeons. Indeed, injuries to the pancreas have been associated with reported morbidity rates approaching 45%. If treatment is delayed, these rates may increase to 60% [1–3]. The integrity of the main pancreatic duct is the most important determinant of outcome after injury to the pancreas [1]. Undiagnosed ductal disruptions produce secondary infections, fistulas, fluid collections, and prolonged stays in the intensive care unit and hospital [1,4]. This article analyzes the epidemiology, diagnostic approaches, options for nonoperative and operative management, and outcome after blunt and penetrating pancreatic trauma.

Epidemiology

Injuries to the pancreas occur in approximately 5% of patients with blunt abdominal trauma [1–4], 6% of patients with gunshot wounds to the abdomen [5], and 2% of patients with stab wounds to the abdomen [6]. Because of the proximity of the pancreas to multiple important structures, isolated pancreatic injuries are rare. Most patients with pancreatic injuries sustain multiple other significant injuries, which compounds an already high mortality rate [6–10]. After blunt abdominal trauma, injuries to the pancreas are most commonly associated with trauma to the duodenum, liver, and spleen.

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Conversely, victims of penetrating trauma most frequently have concomitant injuries to the stomach, major vascular structures, liver, colon, spleen, kidney, and duodenum [11]. Ilahi and colleagues [12] reported on 40 patients with blunt pancreatic injuries, and this group had a mean Injury Severity Score (ISS) of 29 ± 13. Similarly, Vasquez and colleagues [6] described 62 patients with penetrating pancreatic trauma with a mean ISS of 28 ± 17. Additionally, Asensio and colleagues [10] reported on 18 patients who underwent pancreatoduodenectomy for combined pancreatoduodenal injuries with a mean ISS of 27 ± 8. In this series, there was an average of 2.7 associated nonvascular injuries and 0.89 associated vascular injuries per patient.

Diagnosis

Grading system

To standardize the diagnosis and treatment of pancreatic injuries, the American Association for the Surgery of Trauma (AAST) published a pancreas Organ Injury Scale (OIS) in 1990 (Table 1). This scale involves five grades, which are determined by the presence or absence of ductal disruption and by the anatomic location of injury. In general, grade I or II injuries are treated with relatively straightforward management techniques, whereas grade III or higher injuries often require resection.

Serum amylase levels

Isolated pancreatic injury may present with few abnormal physical findings; therefore, early diagnosis may be difficult [8]. Unfortunately, initial serum levels of amylase are neither sensitive nor specific for predicting an injury to the pancreas. Jones [13] reported that up to 35% of patients with complete transection of the main pancreatic duct may have normal serum amylase levels. If the amylase level is abnormal, however, further investigation with a contrast-enhanced abdominal CT scan or endoscopic

Table 1
Pancreas Organ Injury Scale of the American Association for the Surgery of Trauma

Grade	Injury	Description
I	Hematoma	Minor contusion without duct injury
	Laceration	Superficial laceration without duct injury
II	Hematoma	Major contusion without duct injury or tissue loss
	Laceration	Major laceration without duct injury or tissue loss
III	Laceration	Distal transection or parenchymal injury with duct injury
IV	Laceration	Proximal transection or parenchymal injury involving ampulla
V	Laceration	Massive disruption of pancreatic head

Data from Moore EE, Cogbill TH, Malangoni MA, et al. Organ injury scaling II: pancreas duodenum, small bowel, colon, and rectum. J Trauma 1990;30:1427–9.