



# Grade III Pancreatic Trauma Following a Bike Ride Accident: Is the Surgery always the Best Solution?

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## Abstract

Pancreatic trauma represents an uncommon case of injuries following blunt abdominal trauma. Isolated trauma is rare and most of the time it is associated with injuries to other organs. Traumatic pancreatic injuries are characterized by high morbidity and mortality. The diagnosis of pancreatic trauma is still challenging today. Signs and symptoms can be non-specific or even absent, and radiological imaging may not always be clear in defining its severity. The management of pancreatic trauma depends on several factors, the most important being the hemodynamic status of the patient and the involvement of the main duct. We present the case of a young woman admitted to the Regional Level 1 Trauma Center after a low-kinetic bike ride accident. The patient was hemodynamically normal at hospital admission, presenting only with abdominal pain. A CT scan of the abdomen was performed, identifying an isolated AAST grade III lesion of the pancreas with complete section of the Wirsung Duct. Despite limited data in the literature, an ERCP was performed and a Wirsung prosthesis was placed. The patient was discharged early, one week after admission, in good general condition.

## Subject Areas

Pancreatic Trauma, Emergency Setting

## Keywords

Pancreatic Trauma, Blunt Abdominal Trauma, Management of Pancreatic Trauma, Main Duct Disruption, Multidisciplinary Approach

## 1. Introduction

Pancreatic trauma is rare compared to other solid organ injuries of the abdomen. It occurs in 0.2% of patients with blunt trauma, while it represents 1% to 12% of penetrating injuries. Approximately 60% of pancreatic injuries are caused by vehicle crashes, resulting from impact with a steering wheel or bicycle handlebars. The increasingly frequent use of electric bicycles should also be considered a potential cause of retroperitoneal trauma. Nevertheless, isolated pancreatic traumas are very rare. In fact, injuries to other organs, such as the spleen, liver, kidney, or vessels, are associated with 50% to 98% of cases. The overall mortality rate is 4.7% for isolated pancreatic injury, depending on AAST-WSES lesion grading, patient age, general health conditions, and the coexistence of other severe abdominal injuries. Diagnosis is difficult because clinical signs are often ambiguous. A CT scan is the preferred examination, with a sensitivity of 87% and specificity of 98%. Ducal disruption is a crucial factor in determining the management approach. Traditionally, surgical intervention was considered the gold standard for severe pancreatic injuries. However, this case report explores the feasibility of non-operative management (NOM) in high-grade pancreatic injuries, when managed in a multidisciplinary setting at a specialized center.

## 2. Case Presentation

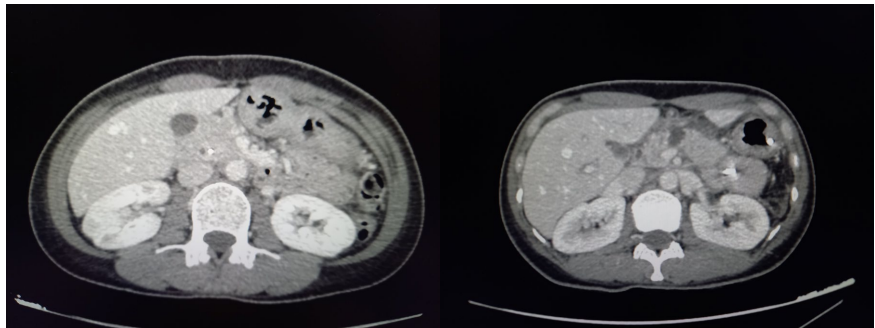
We present the case of a 55-year-old woman with no prior medical history or abdominal surgery, who was admitted to a Regional Level 1 Trauma Center following epigastric trauma against bicycle handlebars. On admission, the patient had a Glasgow Coma Scale (GCS) of 15 and normal hemodynamic parameters. A contrast-enhanced CT scan performed within an hour revealed a wide hypodense area spanning the pancreatic head and body, with suspected complete transection of the Wirsung Duct and retroperitoneal blood/pancreatic collection (**Figure 1**). A nasogastric tube and bladder catheter were placed. A multidisciplinary team, including radiologists, endoscopists, anesthesiologists, and emergency surgeons, opted for a conservative approach. After 24 hours, an ERCP confirmed active contrast media leakage in the pancreatic duct, confirming the AAST grade III lesion. A pancreatic stent was placed across the ductal section, and a nasojejunal feeding tube was positioned. Post-procedure CT confirmed the correct positioning of the stent. During hospitalization, inflammatory markers and serum amylase levels progressively declined. A follow-up CT one week later showed a significant reduction of the pancreatic lesion (from 14 mm to 7 mm) and demarcation of a 16 mm × 12 mm pseudocyst (**Figure 2**). The patient tolerated oral nutrition well and was discharged on post-procedure day seven. A 30-day follow-up showed no recurrence, with CT and MRI indicating near-complete resolution.

## 3. Discussion

Traumatic injuries of the pancreas occur after blunt abdominal traumas or penetrating wounds with a ratio of 3:1 [1]. The impact with steering wheel or with



**Figure 1.** CT scan 22/04: wide hypodense area extending across the entire thickness of the head and the body of the pancreas with a suspected section of the Wirsung Duct, associated with blood/pancreatic collection along retroperitoneal.



**Figure 2.** CT scan a week later: significant reduction of the pancreatic lesion (from 14 mm to 7 mm) and a clear demarcation of the anterior extraparenchymal collection (16 × 12 mm) (pseudocyst).

bicycle handlebars during vehicle crashes represent the most cause of pancreatic injuries, determining approximately 60% of these events [2]. Nowadays, with the increasingly frequent use of new means of transport, even the handlebars of the electric e-bike should be considered as a potential cause of retroperitoneal trauma. Nevertheless, isolated traumatic retroperitoneal injuries, in particular the pancreas one, are uncommon; in 50% - 98% of cases they are associated with injuries to other organs, such as spleen, liver, kidney, large/small intestine, veins or arteries [3]-[5]. They are characterized by high morbidity and mortality with a 45% - 50% combined rate as reported in the reviewed literature [6]. The overall mortality rate was around 4.7% and it depends on several factors such as on AAST grade of lesion, on arrival conditions, age and on the coexistence of severe abdominal injury aside from pancreatic injury.

The diagnosis of isolated injuries of the pancreas is difficult, because of lack of specific symptoms and signs; for this reason the diagnosis is often delayed [7]. That is the key factor to consider, because all authors agree that an early diagnosis and a tempestive management significantly lowers the rate of morbidity and mortality [2] [8]-[10]. When there is a strong suspicion of pancreas injury and the

patient presents an hemodynamic stability, CT scan may be used as the first step. It has a high sensitivity and a specificity to investigate this kind of pathology. On the other side, MRCP and ERCP have superior sensitivity (90% - 100%), particularly for detecting ductal section, that represents the main factor that guide the management of pancreatic trauma [11]. MRCP can be considered a second line noninvasive diagnostic tool to define pancreatic parenchymal and pancreatic duct injuries. Endoscopic retrograde colangiopancreatography (ERCP) can be used for both diagnosis and treatment even in the early phase after trauma, in front of suspected pancreatic duct transection in hemodynamically stable or stabilized adult patients.

In recent years, some researchers have argued that ERCP (Endoscopic Retrograde Cholangiopancreatography) can be used for the early diagnosis and treatment following pancreatic trauma [12]. However, it has been considered that there is a risk of serious complications after the procedure, such as pancreatitis, bleeding, perforation and sepsis/cholangitis. Otherwise, Rosenfeld *et al.* [13] believe that ERCP can be useful to diagnose pancreatic duct injuries and treat late complications such as strictures or fistulas in the same time. They argue that in the early phase of the injury ERCP may not improve prognosis or accelerate recovery. The World Society for Emergency Surgery (WSES) and the American Association for the Surgery of Trauma (AAST) have jointly published guidelines recommending careful selection of patients eligible for ERCP and advise against performing cross-sectional imaging before conducting ERCP when duodenal rupture is suspected [14].

In the last years, many guidelines to standardize the management of pancreatic trauma have been proposed. Therapeutic algorithms are increasingly considering the conservative approach in hemodynamically normal patients even with high grade severity pancreatic lesions, extending the concept of NOM (non-operative management) to the use of endoscopic and/or percutaneous interventions in selected patients. The Western Trauma Association (WTA) and the Eastern Association for the Surgery of Trauma (EAST) recommend that for grade III pancreatic injuries distal pancreatectomy is advised and combined splenectomy depends on the presence or absence of splenic injury [10] [15]. On the other hand, some recent studies have shown that in patients with stable hemodynamic parameters without organ damage, it is reasonable to extend non-surgical treatment to grade III pancreatic injury [12]. Paying more attentions, the WSES-AAST guidelines recommend that, in hemodynamically stable adult patients, very proximal grade IV pancreatic injuries should be considered for non-surgical treatment at high-level trauma centers, while distal grade III pancreatic injuries should only be treated non-surgically in more selected patients and settings. They emphasized the importance of selecting appropriate patients for the treatment of traumatic injuries and the need to be in a high-level trauma center, where endoscopic, interventional procedures or surgical interventions can be performed in a timely manner. This approach aims to ensure optimal patient management, reducing the

risk of complications and improving clinical outcomes. In all other cases, surgery is mandatory. Distal pancreatectomy and pancreatoduodenectomy are the surgical procedure of choice [5] [15] [16].

Regarding the case presented, a hemodynamically normal patient with WSES class III pancreatic injury completely involving the middle-distal pancreatic duct, an endoscopic approach was deemed appropriate. The procedure was successful, resulting the only necessary treatment, saving the patient from more invasive surgical procedures. To our knowledge, this represents one of the few cases in the literature, to utilize an endoscopic procedure involving the stent placement in the middle-distal pancreatic duct for the management of severe pancreatic lesion as a definitive ed efficacy therapeutic choice. Remarkably, this intervention was carried out without any complications in the first six months post-procedure.

#### 4. Conclusion

Managing pancreatic injuries remains a complex issue for surgeons and often requires a multidisciplinary approach. Referring the patient to the hub centers should be the first step when dealing with normal hemodynamic status. In such centers, after an adequate multidisciplinary evaluation of the case, a conservative approach can be considered as a definitive treatment even in front of a sever pancreatic injuries with completely pancreatic main duct disruption, avoiding the risks associated with surgical treatment.

#### Conflicts of Interest

The authors declare no conflicts of interest.

#### References

- [1] Dionigi, R. and Besozzi, M. (1995) Lesioni traumatiche del pancreas. *Chirurgia*. 1378-1379 [cap 14]. Masson.
- [2] Ragulin-Coyne, E., Witkowski, E.R., Chau, Z., Wemple, D., Ng, S.C., Santry, H.P., *et al.* (2014) National Trends in Pancreaticoduodenal Trauma: Interventions and Outcomes. *HPB*, **16**, 275-281. <https://doi.org/10.1111/hpb.12125>
- [3] Stone, H.H., Fabian, T.C., Satiani, B. and Turkleson, M.L. (1981) Experiences in the Management of Pancreatic Trauma. *The Journal of Trauma: Injury, Infection, and Critical Care*, **21**, 257-262. <https://doi.org/10.1097/00005373-198104000-00001>
- [4] Wilson, R.H. and Moorehead, R.J. (1991) Current Management of Trauma to the Pancreas. *Journal of British Surgery*, **78**, 1196-1202. <https://doi.org/10.1002/bjs.1800781017>
- [5] Iacono, C., Zicari, M., Conci, S., *et al.* (2016) Management of Pancreatic Trauma: A Pancreatic Surgeon's Point of View. Department of Surgery, Division of General Surgery, Unit of Hepato-Pancreato-Biliary Surgery.
- [6] Subramanian, A., Dente, C.J. and Feliciano, D.V. (2007) The Management of Pancreatic Trauma in the Modern Era. *Surgical Clinics of North America*, **87**, 1515-1532. <https://doi.org/10.1016/j.suc.2007.08.007>
- [7] Al-Thani, H., Ramzee, A.F., Al-Hassani, A., *et al.* (2022) Traumatic Pancreatic Injury

- Presentation, Management, and Outcome: An Observational Retrospective Study from a Level 1 Trauma Center. *Frontiers of Surgery*, **8**, Article ID: 771121.
- [8] Cerwenka, H., Bacher, H., El-Shabrawi, A., *et al.* (2007) Management of Pancreatic Trauma and Its Consequences Guidelines or Individual Therapy? *Hepatogastroenterology*, **54**, 581e4.
- [9] Rekhi, S., Anderson, S.W., Rhea, J.T. and Soto, J.A. (2010) Imaging of Blunt Pancreatic Trauma. *Emergency Radiology*, **17**, 13-19.
- [10] Ho, V.P., Patel, N.J., Bokhari, F., Madbak, F.G., Hambley, J.E., Yon, J.R., *et al.* (2017) Management of Adult Pancreatic Injuries. *Journal of Trauma and Acute Care Surgery*, **82**, 185-199. <https://doi.org/10.1097/ta.0000000000001300>
- [11] Kong, Y., Zhang, H., He, X., Liu, C., Piao, L., Zhao, G., *et al.* (2014) Endoscopic Management for Pancreatic Injuries Due to Blunt Abdominal Trauma Decreases Failure of Nonoperative Management and Incidence of Pancreatic-Related Complications. *Injury*, **45**, 134-140. <https://doi.org/10.1016/j.injury.2013.07.017>
- [12] Kim, S., Kim, J.W., Jung, P.Y., Kwon, H.Y., Shim, H., Jang, J.Y., *et al.* (2017) Diagnostic and Therapeutic Role of Endoscopic Retrograde Pancreatography in the Management of Traumatic Pancreatic Duct Injury Patients: Single Center Experience for 34 Years. *International Journal of Surgery*, **42**, 152-157. <https://doi.org/10.1016/j.ijssu.2017.03.054>
- [13] Rosenfeld, E.H., Vogel, A.M., Klinkner, D.B., *et al.* (2017) L'utilità dell'ERCP nel trauma pancreatico pediatrico. *Pediatric Surgery*.
- [14] Coccolini, F., Kobayashi, L., Kluger, Y., Moore, E.E., Ansaloni, L., Biffl, W., *et al.* (2019) Duodeno-Pancreatic and Extrahepatic Biliary Tree Trauma: WSES-AAST Guidelines. *World Journal of Emergency Surgery*, **14**, Article No. 56. <https://doi.org/10.1186/s13017-019-0278-6>
- [15] Biffl, W.L., *et al.* (2013) Western Trauma Association Critical Decisions in Trauma: Management of Pancreatic Injuries. *Journal of Trauma and Acute Care Surgery*, **75**, 941-946.
- [16] Petrone, P., *et al.* (2017) Traumatismo de pancreas: Manejo y revision de la literature. Division of Trauma Surgery, Surgical Critical Care & Acute Care Surgery, Department of Surgery New York Medical College, Westchester Medical Center University Hospital.