

Emergency Whipple procedure for traumatic pancreas–duodenum separation in a patient with multiorgan injury: a case report and review

✉ Burak Sakar, ✉ Nuri Berk Konuk, ✉ Duygu Dikici, ✉ Arif Aslaner, ✉ Kemal Eyvaz

Department of General Surgery, University of Health Sciences, Antalya Training and Research Hospital, Antalya-Türkiye

ABSTRACT

Although pancreaticoduodenal injuries are rare, they represent complex surgical conditions associated with high risks of morbidity and mortality. This case report presents an emergency pancreaticoduodenectomy (Whipple procedure) performed on a 17-year-old male patient who was admitted to the emergency department following a non-vehicular traffic accident. Imaging studies revealed free intraperitoneal air and fluid, as well as multiorgan injury, including right renal perfusion loss. Emergency surgical exploration revealed a Grade V pancreatic head avulsion, distal bile duct injury, duodenal laceration, a laceration in the proximal one-third of the transverse colon, and right renal devascularization. Considering the patient's intraoperative hemodynamic stability, a Whipple procedure, segmental colectomy with primary anastomosis, and right nephrectomy were performed. On postoperative day 11, a leak developed at the colocolonic anastomosis site, and the patient underwent emergency surgery involving a right hemicolectomy and end ileostomy. During the follow-up period, no additional emergency surgical intervention was required from a general surgery perspective. This case highlights the importance of multidisciplinary team collaboration and individualized surgical decision-making in the management of high-risk trauma based on the patient's clinical condition. In the presence of complex anatomical injuries, determining appropriate surgical timing, selecting optimal techniques, and managing complications play decisive roles in treatment success. In this context, the surgical approach and timing are discussed in light of the current literature and evaluated in comparison with similar cases.

Keywords: Duodenal injury; emergency surgery; multiorgan injury; pancreatic trauma; Whipple procedure.

INTRODUCTION

The retroperitoneal position of the pancreas provides a degree of anatomical protection in cases of blunt abdominal trauma, rendering isolated pancreatic injuries a rare clinical entity.^[1] Motor vehicle collisions account for nearly 80% of all blunt pancreatic trauma cases.^[2] Injuries to adjacent organs may also occur in association with pancreatic trauma.^[3] Although pancreatic injuries resulting from abdominal trauma are rare, they are associated with a mortality rate ranging from 10% to 30%.^[4] The definitive diagnosis of pancreatic injuries is established through computed tomography (CT) imaging or, in hemodynamically unstable patients, during exploratory laparotomy.

^[5] The timely diagnosis of such injuries depends on both the extent of pancreatic damage and the patient's hemodynamic stability, guiding a spectrum of therapeutic strategies from non-operative management to urgent surgical intervention. To standardize the assessment of clinical severity and management strategies for pancreatic injuries, the American Association for the Surgery of Trauma (AAST) developed a five-grade classification system. According to the AAST pancreatic injury scale, Grade I-II injuries typically involve contusions or superficial lacerations without disruption of the pancreatic duct, whereas Grade III-V injuries represent more severe trauma, including distal or proximal transection of the pancreatic parenchyma, disruption of the pancreatic duct, or fragmentation

Cite this article as: Sakar B, Konuk NB, Dikici D, Aslaner A, Eyvaz K. Emergency Whipple procedure for traumatic pancreas–duodenum separation in a patient with multiorgan injury: A case report and review. *Ulus Travma Acil Cerrahi Derg* 2026;32:94-98.

Address for correspondence: Burak Sakar

Department of General Surgery, University of Health Sciences, Antalya Training and Research Hospital, Antalya, Türkiye

E-mail: drburaksakar@gmail.com

Ulus Travma Acil Cerrahi Derg 2026;32(1):94-98 DOI: 10.14744/tjtes.2025.59829

Submitted: 19.07.2025 Revised: 19.07.2025 Accepted: 06.09.2025 Published: 07.01.2026

OPEN ACCESS This is an open access article under the CC BY-NC license (<http://creativecommons.org/licenses/by-nc/4.0/>).



of the pancreatic head (Fig. 1). This classification plays a critical role in guiding the decision-making process between surgical and conservative management and constitutes a cornerstone of the clinical approach in trauma care.^[6]

This case report presents a patient who sustained pancreatic

head avulsion accompanied by bile duct injury and multiorgan trauma following blunt abdominal injury. Through this case, we aim to highlight the various challenges encountered in the surgical management of complex multiorgan injuries involving the pancreas.

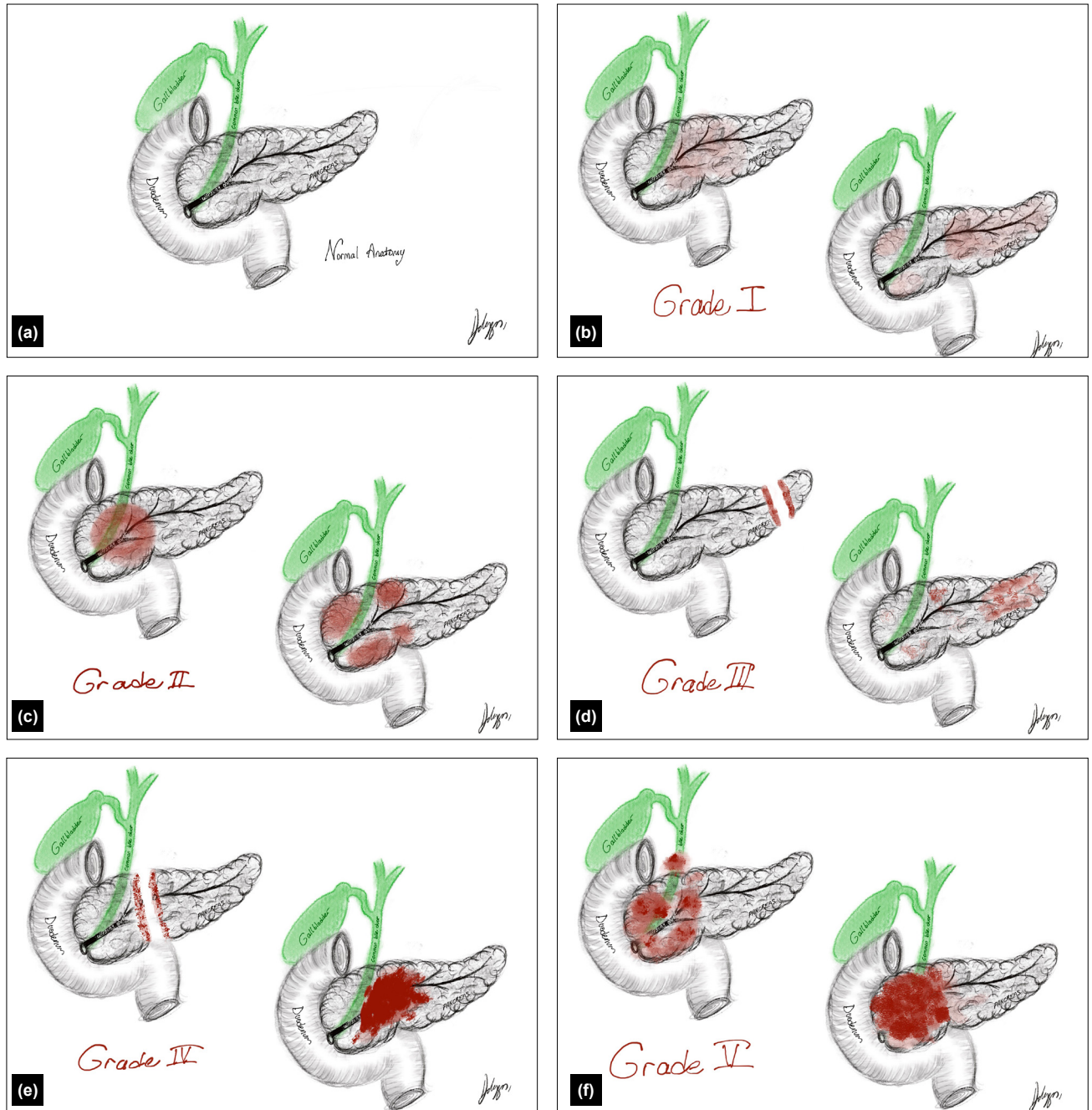


Figure 1. AAST (American Association for the Surgery of Trauma) Pancreatic Injury Scale – visual overview. **(a)** Normal anatomical structure of the pancreas. **(b)** Grade I – Mild bruising or superficial tear without involvement of the main duct or loss of pancreatic tissue. **(c)** Grade II – Hematoma affecting more than one segment or a laceration involving less than half the circumference of the pancreatic tissue, without ductal damage. **(d)** Grade III – Injury to the distal pancreas involving disruption of the main pancreatic duct. **(e)** Grade IV – Laceration or complete transection in the proximal pancreas (to the right of the superior mesenteric vein) accompanied by ductal injury. **(f)** Grade V – Extensive destruction of the pancreatic head with severe structural damage.

CASE REPORT

A 17-year-old male patient presented to the emergency department approximately seven hours after a non-vehicular traffic accident. Upon admission, he was spontaneously breathing but exhibited hypotension and tachycardia. Physical examination revealed an ecchymotic area in the right upper quadrant, along with generalized abdominal tenderness, guarding, and rebound tenderness. Laboratory investigations showed the following results: leukocyte count $10.8 \times 10^3/\mu\text{L}$ (reference: 4-10.5), hemoglobin 12.4 g/dL (12.5-16.1), hematocrit 38.1% (36-47), platelet count $378 \times 10^3/\mu\text{L}$ (150-450), alanine aminotransferase (ALT) 226 U/L (13-45), amylase 345 U/L (22-80), and lipase 830 U/L (7-39).

Abdominal computed tomography revealed a Grade 3 laceration in segment 4B of the liver, loss of perfusion in the right kidney, and a large abdominal wall defect in the right quadrant. Colonic and small bowel loops were observed within the defect area, consistent with herniation of these structures. Free intraperitoneal air measuring up to 8 cm in its deepest location was detected around the duodenum, along

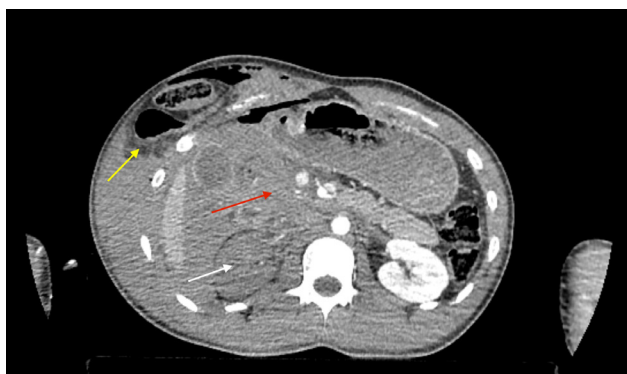


Figure 2. Preoperative axial computed tomography (CT) image. White arrow: hypoperfused right kidney; red arrow: high-grade pancreatic injury; yellow arrow: trauma-related abdominal wall herniation.

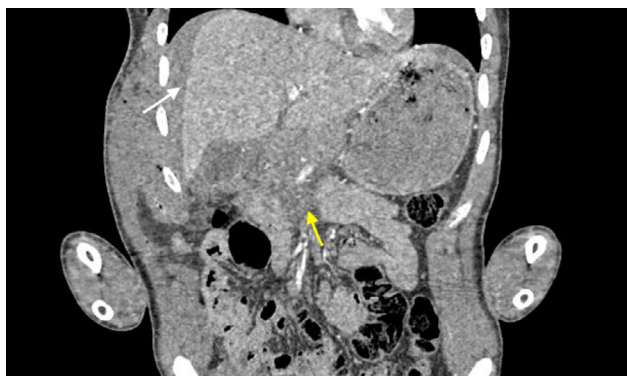


Figure 3. Preoperative coronal computed tomography (CT) image. Yellow arrow: severe pancreatic injury; white arrow: free intraperitoneal fluid.

with a defect distal to the duodenal bulb and an abnormal tract extending superiorly from the defect—findings suggestive of duodenal perforation. Additionally, free intraperitoneal fluid was observed in the perigastric and perihepatic regions, measuring up to 4 cm at its deepest point (Figs. 2 and 3).

Based on the clinical findings, the patient was taken for emergency surgery. During exploration, hemorrhagic fluid was identified within the abdominal cavity. Following copious irrigation with warm saline, detailed exploration revealed fractured ribs in the right upper quadrant and a superficial liver laceration approximately 5 cm in length without active bleeding. Avulsion of the pancreatic head accompanied by injury to the distal bile duct was identified, consistent with an AAST Grade V pancreatic injury (Fig. 4). Additionally, lacerations consistent with an AAST Grade III injury were observed in the duodenum and the proximal one-third of the transverse colon. The right kidney demonstrated absence of perfusion, consistent with devascularization. Given the patient's hemodynamic stability, emergency pancreaticoduodenectomy (Whipple procedure, EPD), segmental colectomy with primary anastomosis, and right nephrectomy were performed by the hepatobiliary surgery team at our institution. Following the operation, the patient was transferred to the intensive care unit (ICU) under intubation. During the 21-day ICU stay, the patient was extubated; however, on postoperative day 11, he required reoperation due to an anastomotic leak. Surgical exploration revealed a leak at the colonic anastomosis site, while the other anastomoses were found to be intact. A right hemicolectomy was performed, and an end ileostomy

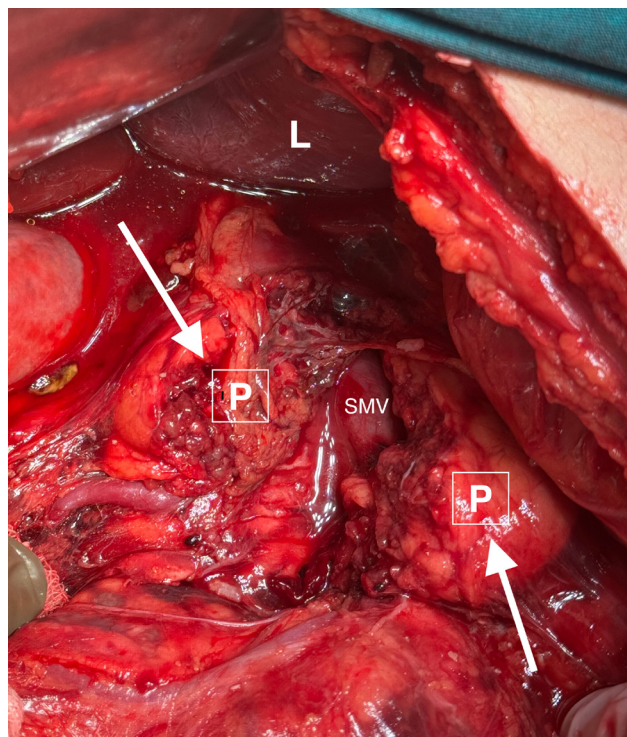


Figure 4. Intraoperative view of a Grade V pancreatic head injury. L: liver; P: pancreas; SMV: superior mesenteric vein.

my was created. During the ICU stay, the orthopedic team performed multiple surgical interventions due to extremity fractures. Following stabilization, the patient was transferred to the orthopedic ward. After the second surgery, no additional pathology requiring urgent surgical intervention from a general surgery perspective was observed. During postoperative follow-up, the patient was discharged and scheduled for outpatient follow-up for evaluation and planning of ileostomy closure.

DISCUSSION

Pancreatic injuries are rare in cases of blunt abdominal trauma and are frequently accompanied by injuries to adjacent organs.^[3,7] In the literature, only a limited number of case reports address the diagnosis and management of such injuries.^[8] This case report aimed to discuss the outcomes of EPD for pancreatic head trauma accompanied by multiorgan injury in the context of the current literature.

Diagnosis of pancreatic injuries is particularly challenging in the early phase. Serum amylase and lipase levels have limited diagnostic value, and computed tomography may also be insufficient for the detection of pancreatic duct injury. Therefore, in cases with high clinical suspicion, diagnostic laparotomy may be warranted.^[9] Surgical intervention is often required for high-grade pancreatic injuries. EPD may serve as a life-saving option in hemodynamically stable patients, particularly in those with pancreatic head and duodenal injuries accompanied by biliary tract damage.^[10] However, this procedure is associated with a high risk of morbidity and mortality. Therefore, the decision to perform surgical intervention requires a multidisciplinary approach.^[11,12] In cases of high-grade pancreatic injuries accompanied by multiorgan trauma, initial hemodynamic stabilization followed by the application of damage control surgery principles is recommended.^[13] In hemodynamically unstable patients, the primary goal in managing severe pancreaticoduodenal trauma is the rapid correction of life-threatening hypovolemia, coagulopathy, acidosis, and hypothermia. The damage control surgery (DCS) approach applied for this purpose includes intra-abdominal hemorrhage control, temporary closure of gastrointestinal perforations, and containment of retroperitoneal contamination. During the initial surgical intervention, limited procedures—such as abdominal packing, drainage, and temporary abdominal closure—are preferred over definitive resections. After this stage, patients are transferred to the intensive care unit for physiological stabilization. Following this initial phase, a second-look surgery is typically performed within 48–72 hours, during which gastrointestinal reconstruction and, if necessary, pancreaticoduodenectomy are performed. This two-stage approach may be lifesaving and can reduce morbidity, particularly in cases involving concomitant vascular injuries and a high risk of mortality.^[14] In this case, considering the patient's intraoperative hemodynamic stability, EPD was performed by a surgical team experienced in hepatopan-

creatobiliary procedures. During the same session, segmental colectomy with primary anastomosis was performed due to the presence of colonic laceration. No complications related to EPD occurred in the postoperative period. However, on postoperative day 11, a leak developed at the colocolonic anastomosis site, necessitating right hemicolectomy and end ileostomy creation. Pancreatic injuries are frequently accompanied by multiorgan trauma, highlighting the importance of a multidisciplinary approach in surgical planning for such cases. In this context, the presence of colonic injuries may warrant avoiding simultaneous anastomosis.^[15] The surgical approach may vary depending on the patient's clinical status, intraoperative findings, degree of intra-abdominal contamination, and the surgeon's experience.

EPD is associated with significant risks, including coagulopathy, massive hemorrhage, prolonged operative times, and pancreatic fistula. According to the literature, patient-related factors such as advanced age, male sex, jaundice, and malnutrition, along with technical factors such as a soft pancreatic parenchyma, narrow duct diameter, and limited surgical experience, have been shown to increase the risk of postoperative complications.^[16] However, in the present case, the decision to perform EPD was primarily guided by several favorable factors, including the patient's young age, preserved hemodynamic stability, absence of accompanying acidosis or coagulopathy, and the surgical team's expertise in hepatopancreatobiliary surgery.

CONCLUSION

Although rare, severe pancreaticoduodenal trauma is a complex clinical condition characterized by a high risk of complications and the need for advanced surgical management. In treating such cases, the patient's hemodynamic status, the presence of concomitant organ injuries, and the surgical team's experience play a critical role in shaping the therapeutic strategy. EPD may be considered a viable option in selected patients who require a multidisciplinary approach and high-level surgical expertise. This case underscores the importance of individualized decision-making and team-based management in the context of complex abdominal trauma.

Acknowledgements: Special thanks to Dr. Duygu Dikici for the illustration of Figure 1.

Informed Consent: Written informed consent was obtained from the patient for the publication of this case report and any accompanying images.

Peer-review: Externally peer-reviewed.

Authorship Contributions: CConcept: B.S., N.B.K., D.D., K.E., A.A.; Design: B.S., N.B.K., D.D., K.E., A.A.; Supervision: B.S., N.B.K., D.D., K.E., A.A.; Resource: B.S.; Materials: B.S., K.E.; Data collection and/or processing: B.S., N.B.K.; Analysis and/or interpretation: B.S., D.D.; Literature review: B.S., N.B.K.; Writing: B.K., N.B.K., K.E.; Critical review: B.S., K.E.

Conflict of Interest: None declared.

Financial Disclosure: The author declared that this study has received no financial support.

REFERENCES

- Huseynova F, Abdullazade M, Abdullazada Z, Bayramov E, Aliyev A, Samadov E. Isolated pancreatic neck injury due to motorbike accident. *Cureus* 2024;16:e70340. [CrossRef]
- Hasanovic J, Agic M, Rifatbegovic Z, Mehmedovic Z, Jakubovic-Cickusic A. Pancreatic injury in blunt abdominal trauma. *Med Arch* 2015;69:130–2. [CrossRef]
- Asensio JA, Demetriades D, Hanpeter DE, Gambaro E, Chahwan S. Management of pancreatic injuries. *Curr Probl Surg* 1999;36:325–419. [CrossRef]
- Yalin K, Xiaojun H, Chengli L, Gang Z, Mei X, Yuying Z, et al. Grading-therapeutic strategy for pancreatic injury after blunt abdominal trauma: therapy based on the condition of pancreatic duct and report of 95 cases. *Hepatogastroenterol* 2013;60:1497–503.
- Brestas PS, Karakyklas D, Gardelis J, Tsouroulas M, Drossos C. Sequential CT evaluation of isolated non-penetrating pancreatic trauma. *JOP* 2006;7:51–5.
- Søreide K, Weiser TG, Parks RW. Clinical update on management of pancreatic trauma. *HPB (Oxford)* 2018;20:1099–108. [CrossRef]
- Lissidini G, Prete FP, Piccinni G, Gurrado A, Giungato S, Prete F, et al. Emergency pancreaticoduodenectomy: When is it needed? A dual non-trauma centre experience and literature review. *Int J Surg* 2015;21:S83–8. [CrossRef]
- Nguyen VQ, Tran MT, Nguyen VM, Le DT, Doan TH. Emergency pancreaticoduodenectomy for complex pancreaticoduodenal damage with multiple organ injuries following blunt abdominal trauma: A case report and literature review. *Int J Surg Case Rep* 2024;124:110409. [CrossRef]
- Bradley EL 3rd, Young PR Jr, Chang MC, Allen JE, Baker CC, Meredith W, et al. Diagnosis and initial management of blunt pancreatic trauma: guidelines from a multiinstitutional review. *Ann Surg* 1998;227:861–9. [CrossRef]
- Krige JE, Nicol AJ, Navsaria PH. Emergency pancreatoduodenectomy for complex injuries of the pancreas and duodenum. *HPB (Oxford)* 2014;16:1043–9. [CrossRef]
- Nieß H, Werner J. Behandlung von Pankreasverletzungen nach stumpfem Bauchtrauma [Treatment of pancreatic injuries after blunt abdominal trauma]. *Chirurgie (Heidelb)* 2023;94:675–81. [In German] [CrossRef]
- Eversen E, Buschel H, Carroll J, Palamuthusingam P. Paediatric pancreatic trauma in North Queensland: A 10-year retrospective review. *BMC Pediatr* 2023;23:88. [CrossRef]
- Roberts DJ, Bobrovitz N, Zygun DA, Kirkpatrick AW, Ball CG, Faris PD, et al.; Indications for Trauma Damage Control Surgery International Study Group. Evidence for use of damage control surgery and damage control interventions in civilian trauma patients: a systematic review. *World J Emerg Surg* 2021;16:10. [CrossRef]
- Cabrera LF, Pedraza M, Sanchez S, Lopez P, Bernal F, Pulido J, et al. Damage control pancreatoduodenectomy for severe pancreaticoduodenal trauma: A multicentric case series in colombia. *Panamerican J Trauma Crit Care Emerg Surg* 2020;9:38–44. [CrossRef]
- Lewis RH Jr, Jacome T, Dooley D, Carr B, Magnotti LJ. Impact of concomitant traumatic pancreatic and colon injuries on outcomes. *Am Surg* 2024;90:2217–21. [CrossRef]
- Conzo G, Gambardella C, Tartaglia E, Sciascia V, Mauriello C, Napolitano S, et al. Pancreatic fistula following pancreatoduodenectomy. Evaluation of different surgical approaches in the management of pancreatic stump. Literature review. *Int J Surg* 2015;21:S4–9. [CrossRef]

OLGU SUNUMU - ÖZ

Çoklu organ yaralanması olan hastada travmatik Pankreas-Duodenum ayrılması için acil Whipple prosedürü: Bir olgu sunumu ve derleme

Pankreatikoduodenal travmalar nadir görülmekle birlikte, yüksek morbidite ve mortalite riski taşıyan komplike cerrahi durumlar arasında yer almaktadır. Bu olgu sunumunda, acil servise araç dışı trafik kazası nedeniyle getirilen ve yapılan görüntülemelerinde batın içinde serbest hava ve serbest sıvı ile birlikte sağ böbrekte perfüzyon kaybı dahil çoklu organ yaralanması saptanan 17 yaşındaki erkek hastaya uygulanan acil pankreatikoduodenektomi (Whipple prosedürü) sunulmaktadır. Hastaya yapılan acil cerrahi eksplorasyonda; Grade V düzeyinde pankreas başı avülsiyonu, distal safra yolu hasarı, duodenal laserasyon, transvers kolonun proksimal üçte birlik kısmında laserasyon ve sağ böbrek devaskularizasyonu tespit edilmiştir. Hastanın intraoperatif hemodinamik stabilitesi göz önünde bulundurularak Whipple prosedürü, segmenter kolon rezeksiyonu ve anastomoz ile birlikte sağ nefrektomi gerçekleştirilmiştir. Ameliyat sonrası 11. günde hastada kolokolonik anastomoz hattında kaçak gelişmiş olup, acil cerrahi girişimle sağ hemikolektomi ve uç ileostomi uygulanmıştır. Takip süresince hastada genel cerrahi açısından ek bir acil cerrahi müdahale gereksinimi olmamıştır. Bu olgu, yüksek riskli travmalarda multidisipliner ekip çalışması ve hastanın klinik durumuna göre bireyselleştirilmiş cerrahi kararların önemini vurgulamaktadır. Kompleks anatomik hasarların varlığında, uygun cerrahi zamanlamanın belirlenmesi, doğru teknik seçimi ve komplikasyonların yönetimi, tedavi başarısında belirleyici rol oynamaktadır. Bu kapsamda, cerrahi yaklaşım ve zamanlama, güncel literatür eşliğinde tartışılmış ve benzer olgularla karşılaştırılmalı olarak değerlendirilmiştir.

Anahtar sözcükler: Acil cerrahi; duodenum yaralanması; çoklu organ yaralanma; pankreas travması; Whipple prosedürü.

Ulus Travma Acil Cerrahi Derg 2026;32(1):94-98 DOI: 10.14744/tjtes.2025.59829