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CASE REPORT

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Comparative Surgical Strategies for Esophageal Injuries Following Penetrating Thoracoabdominal Gunshot Wounds: Two Case Reports and Literature Review

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Abstract

Background: Esophageal injuries following penetrating thoracoabdominal gunshot wounds are rare (<1% of trauma admissions) and carry substantial morbidity if diagnosis and treatment are delayed. We describe two patients with similar injury patterns who were managed with different surgical strategies and summarize the recent literature to contextualize decision-making.
Case Presentations: Case 1 involved a 28-year-old male with thoracoabdominal gunshot trauma, right hemopneumothorax, and distal esophageal leak. Following initial abdominal repair of the diaphragm and esophagus with jejunostomy, a persistent esophageal fistula was detected on postoperative day 5. Endoscopic stent placement achieved complete resolution within 4 weeks. Follow-up at 1, 3, and 6 months revealed normal swallowing with no late fistula.
Case 2 concerned an 11-year-old male with hemodynamic instability after a trans-thoracic gunshot wound causing bilateral diaphragmatic, gastric, and hepatic injuries. A right thoracotomy with primary esophageal repair was performed. Recovery was uneventful. At 3 and 6 months, oral intake was well tolerated with no fistula or stricture.
These cases emphasize tailoring the surgical approach to hemodynamic status and imaging findings. A stepwise strategy with delayed thoracic intervention and endoscopic stenting can limit initial invasiveness in stable patients, whereas immediate thoracotomy is lifesaving in unstable cases. Contemporary series support early diagnosis, selective use of endoscopy/stenting, and structured nutritional support to reduce leak risk and mortality.
Conclusion: Individualized timing and modality of surgical intervention, combined with multidisciplinary coordination, are pivotal to optimizing outcomes in penetrating esophageal trauma.(**International Journal of Biomedicine. 2026;16(1):107-110.**)

Keywords: penetrating trauma • thoracoabdominal gunshot wound • thoracotomy • endoscopic stent

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Introduction

Penetrating esophageal trauma is uncommon, accounting for less than 1% of all trauma admissions, but it carries a high risk of morbidity and mortality due to delayed recognition, mediastinitis, and sepsis.[1] Early diagnosis remains challenging because clinical manifestations are often subtle and masked by concomitant thoracoabdominal injuries.[2] Optimal surgical management remains debated and largely depends on hemodynamic stability, extent of contamination, and associated organ injuries.[3] Immediate thoracotomy and primary repair are recommended in unstable patients or when contamination is severe, while staged or minimally invasive approaches—including endoscopic stenting and delayed repair—may be suitable for stable patients.[1,4] We report two cases of penetrating thoracoabdominal gunshot wounds involving the esophagus, managed with different surgical strategies according to physiological status: a stepwise approach versus immediate thoracotomy. Their comparison is followed by a brief review of the current literature to contextualize evolving surgical decision-making in this rare but life-threatening condition.[5]

The cases were retrospectively reviewed at the University Hospital of Trauma (Tirana, Albania), focusing on clinical presentation, imaging findings, surgical management, and postoperative outcomes. Diagnostic evaluation included

contrast-enhanced computed tomography (CT) and contrast swallow studies, performed according to institutional trauma protocols.

To provide clinical context and comparative interpretation, a brief review of relevant publications on penetrating esophageal injuries and their surgical management was conducted using PubMed. Priority was given to recent articles and reviews discussing the timing of intervention, the choice of surgical approach, and the role of endoscopic stenting. The aim was to situate the reported cases within the current evidence and highlight practical decision-making considerations.

Case Presentations

Case 1

A 28-year-old male sustained a thoracoabdominal gunshot wound. Initial imaging revealed a right hemopneumothorax, diaphragmatic laceration, and distal esophageal leakage. The patient underwent abdominal repair of the diaphragm and esophagus and a feeding jejunostomy. On postoperative day (POD) 5, clinical suspicion and imaging confirmed a persistent esophageal fistula (Grade 5). Endoscopic esophageal stenting was performed, with complete resolution within 4 weeks. Oral diet was progressively reinstated. Follow-up at 1, 3, and 6 months showed normal swallowing and no late fistula or stricture. Preoperative imaging is shown in Figure 1; postoperative imaging after endoscopic stent placement is shown in Figures 2 and 3.

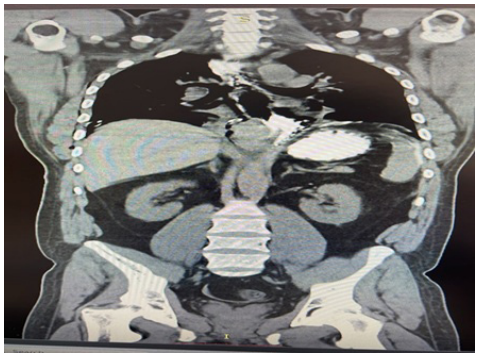

Fig. 1. *Preoperative CT scan showing right hemopneumothorax and distal esophageal leak.*

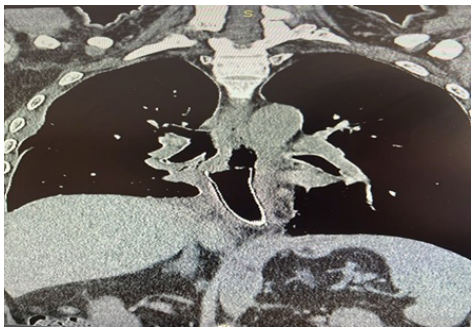

Fig. 2. *Postoperative CT scan after endoscopic stent placement demonstrating containment of the esophageal leak.*

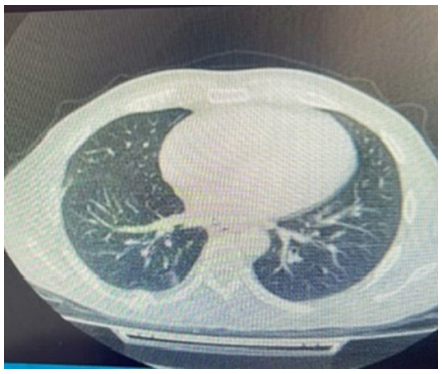

Fig. 3. *Six-month follow-up CT scan showing complete healing of the distal esophageal lesion with no evidence of leak or mediastinal collection. Lung fields are clear and symmetrically expanded.*

Case 2

An 11-year-old male presented hemodynamically unstable following a trans-thoracic gunshot wound with entry at the left anterior axillary line and exit at the right mid-axillary line. Emergency laparotomy identified bilateral diaphragmatic tears, gastric injury, and segment VII liver involvement. A contrast-enhanced CT scan subsequently demonstrated a lower esophageal leak. The patient underwent right thoracotomy with primary esophageal repair. Postoperative recovery was uneventful. At 3- and 6-month follow-up, oral feeding was well tolerated without dysphagia, fistula, or stricture. Preoperative imaging is shown in Figure 4; three-month postoperative imaging is shown in Figure 5.

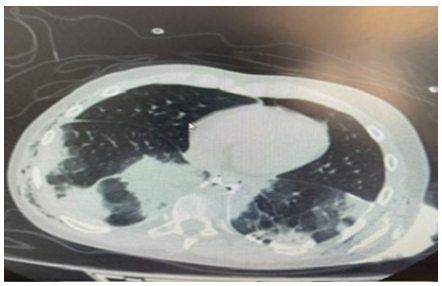

Fig. 4. *Preoperative CT scan demonstrating lower esophageal leak and associated thoracoabdominal injuries (diaphragm, stomach, and liver involvement).*

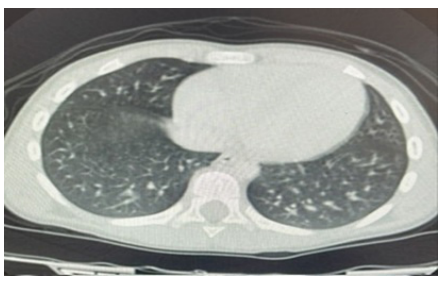

Fig. 5. *Three-month postoperative CT scan showing intact esophageal repair with normal mediastinal structures and no recurrence of leak.*

Discussion

These cases illustrate two complementary paradigms in managing penetrating esophageal injuries. In stable patients, staged management with early nutritional access, vigilant leak surveillance, and selective endoscopic stenting can obviate the need for immediate thoracotomy while achieving durable healing. In unstable patients or when contamination is extensive, prompt thoracic exploration and primary repair remain the standard. Key decision factors include hemodynamic status, injury location, contamination burden, associated injuries, and institutional expertise.

Endoscopic stenting has emerged as a valuable adjunct in managing postoperative leaks and selected traumatic perforations, serving as a bridge to recovery while protecting the repair and enabling enteral nutrition. A multidisciplinary approach—including trauma surgery, thoracic surgery, endoscopy, intensive care, radiology, and nutrition—optimizes timing and reduces complications. Reported predictors of adverse outcomes include delayed diagnosis (>24 hours), mediastinal contamination, and severe associated injuries. Early recognition, tailored repair or diversion, and structured follow-up are therefore essential. Representative images for both cases are shown in Figures 1–4.

Over the last decade, several multicenter and registry-based studies have refined the management of penetrating esophageal trauma. The AAST and EAST collaborative analyses [6,7] emphasize that early recognition within 24 hours remains the strongest predictor of survival. Contemporary reviews highlight the progressive role of endoscopic interventions, including stenting and vacuum-assisted closure, as adjuncts to surgical repair.[4]

Studies comparing immediate thoracotomy to staged or minimally invasive approaches show comparable mortality when the delay does not exceed 24 hours, and contamination is controlled.[8,9] Early nutritional support via jejunostomy and the selective endoscopic therapy have been associated with reduced mediastinitis and shorter hospital stay.

Literature increasingly emphasizes the role of coordinated care among trauma surgeons, thoracic surgeons, and endoscopists in individualizing treatment. The use of standardized postoperative imaging and nutritional follow-up, as illustrated in our two cases, aligns best with WSES recommendations.[5]

Our two cases exemplify opposite but equally valid management paths: a stable adult patient benefiting from minimally invasive stenting, and a hemodynamically unstable pediatric patient salvaged through immediate thoracotomy. Both strategies achieved leak control and functional recovery without stricture, consistent with the <10% leak rate reported in contemporary series when treatment is individualized.

Taken together, the synthesis of recent evidence supports a paradigm shift from a one-size-fits-all surgical model to physiology-driven decision-making. Early imaging, timely intervention, and the selective use of endoscopic stents have markedly improved survival and functional outcomes in penetrating esophageal trauma.

Penetrating esophageal injuries remain uncommon but clinically formidable because early signs can be subtle while the risk of mediastinitis and sepsis rises rapidly with delay. Extensive multiinstitutional experience emphasizes that timely diagnosis (ideally <24 hours), adequate source control, and restoration of alimentary continuity are the pillars of care.[6,10] Our two cases reinforce that the choice between immediate thoracic exploration and a staged approach should be individualized, primarily based on hemodynamic status, associated injuries, the anatomic location of the perforation, and contamination burden.

In unstable patients, prompt thoracic exposure with primary repair remains the standard because it achieves rapid control of contamination and bleeding and permits wide mediastinal debridement when needed.[6] By contrast, in physiologically stable patients without overwhelming contamination, a stepwise plan that prioritizes early nutritional access (e.g., feeding jejunostomy), vigilant leak surveillance, and delayed thoracic intervention can be both safe and organpreserving.[4] Observational series and contemporary reviews suggest that this selective strategy does not compromise outcomes when strict monitoring and early reintervention thresholds are observed.[4,7,8]

Therapeutic endoscopy with covered stent placement has emerged as an effective adjunct for postoperative leaks and certain contained traumatic perforations, reducing ongoing contamination, protecting the repair, and enabling enteral nutrition.[4,11,12] In Case 1, an esophageal fistula identified on POD 5 was successfully bridged with an endoscopic stent, with complete resolution after four weeks and excellent mediumterm function. Systematic appraisals indicate that stent therapy is most effective when instituted early, in the absence of uncontrolled sepsis, and when accompanied by drainage and antibiotic therapy; careful followup is essential to detect migration or stricture.[4]

Clinical suspicion must remain high in thoracoabdominal gunshot wounds that traverse the mediastinum. Crosssectional imaging with contrast, selective contrast swallow, and early endoscopy are complementary modalities; institutional protocols that integrate these tests shorten timetodiagnosis and improve outcomes.[5,10,13] The World Society of Emergency Surgery (WSES) guidelines support tailored diagnostic algorithms and emphasize damagecontrol principles in unstable patients.[5]

Across historical and contemporary cohorts, predictors of morbidity and mortality include delayed presentation (>24 hours), extensive mediastinal contamination, cervical vs. thoracic location differences, and severe associated injuries.[6,7,9,10] Registry analyses underscore that noniatrogenic esophageal trauma frequently coexists with major thoracoabdominal injuries, making coordinated, multidisciplinary management pivotal.[7,9] Our cases align with these observations: the unstable pediatric patient benefited from immediate thoracotomy and primary repair, whereas the stable adult patient achieved healing with a staged, minimally disruptive pathway. Implications for practice. These experiences support a pragmatic algorithm: (i) resuscitate and triage by physiology; (ii) obtain early crosssectional imaging ± endoscopy; (iii) choose immediate thoracic repair when unstable or when contamination is diffuse; (iv) consider staged management

with nutritional access and selective stenting when stable and contamination is limited; and (v) ensure structured followup to detect late complications such as leak, stricture, or dysphagia.[4-7,9] Within such a framework, individualized timing and modality of intervention, together with early nutrition and close surveillance, optimize functional recovery while minimizing reoperation and longterm morbidity.

Conclusion

Tailored surgical strategies based on physiological status and imaging are central to successful outcomes in penetrating esophageal trauma. Staged management with endoscopic stenting can be effective in stable patients, while immediate thoracotomy is indispensable in unstable scenarios. Multidisciplinary coordination and early nutritional planning are crucial to minimize leaks, infections, and long-term morbidity.

Conflicts of Interest

The authors declare that they have no competing interests.

References

1. Mubang RN, Sigmon DF, Stawicki SP. Esophageal Trauma. 2023 Jul 25. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan–. PMID: 29261892.
2. Petrone P, Kassimi K, Jiménez-Gómez M, Betancourt A, Axelrad A, Marini CP. Management of esophageal injuries secondary to trauma. Injury. 2017 Aug;48(8):1735-1742. doi: 10.1016/j.injury.2017.06.012. Epub 2017 Jun 19. PMID: 28648409.
3. Petrone P, Kassimi K, Jiménez-Gómez M, Betancourt A, Axelrad A, Marini CP. Management of esophageal injuries secondary to trauma. Injury. 2017 Aug;48(8):1735-1742. doi: 10.1016/j.injury.2017.06.012. Epub 2017 Jun 19. PMID: 28648409.
4. Sudarshan M, Cassivi SD. Management of traumatic esophageal injuries. J Thorac Dis. 2019 Feb;11(Suppl 2):S172-S176. doi: 10.21037/jtd.2018.10.86. PMID: 30906582; PMCID: PMC6389559.
5. Chirica M, Kelly MD, Siboni S, Aiolfi A, Riva CG, Asti E, et al. Esophageal emergencies: WSES guidelines. World J Emerg Surg. 2019 May 31;14:26. doi: 10.1186/s13017-019-0245-2. PMID: 31164915; PMCID: PMC6544956.
6. Asensio JA, Chahwan S, Forno W, MacKersie R, Wall M, Lake J, et al.; American Association for the Surgery of Trauma. Penetrating esophageal injuries: multicenter study of the American Association for the Surgery of Trauma. J Trauma. 2001 Feb;50(2):289-96. doi: 10.1097/00005373-200102000-00015. PMID: 11242294.
7. Raff LA, Schinnerer EA, Maine RG, Jansen J, Noorbakhsh MR, Spigel Z, et al.. Contemporary management of traumatic cervical and thoracic esophageal perforation: The results of an Eastern Association for the Surgery of Trauma multi-institutional study. J Trauma Acute Care Surg. 2020 Oct;89(4):691-697. doi: 10.1097/TA.0000000000002841. PMID: 32590561.
8. Bhatia P, Fortin D, Inculet RI, Malthaner RA. Current concepts in the management of esophageal perforations: a twenty-seven year Canadian experience. Ann Thorac Surg. 2011 Jul;92(1):209-15. doi: 10.1016/j.athoracsur.2011.03.131. PMID: 21718846.
9. Aiolfi A, Inaba K, Recinos G, Khor D, Benjamin ER, Lam L, Strumwasser A, Asti E, Bonavina L, Demetriades D. Non-iatrogenic esophageal injury: a retrospective analysis from the National Trauma Data Bank. World J Emerg Surg. 2017 Apr 27;12:19. doi: 10.1186/s13017-017-0131-8. PMID: 28465715; PMCID: PMC5408440.
10. Søreide JA, Viste A. Esophageal perforation: diagnostic work-up and clinical decision-making in the first 24 hours. Scand J Trauma Resusc Emerg Med. 2011 Oct 30;19:66. doi: 10.1186/1757-7241-19-66. PMID: 22035338; PMCID: PMC3219576.
11. Herrera A, Freeman RK. The Evolution and Current Utility of Esophageal Stent Placement for the Treatment of Acute Esophageal Perforation. Thorac Surg Clin. 2016 Aug;26(3):305-14. doi: 10.1016/j.thorsurg.2016.04.012. PMID: 27427525.
12. Papaefthymiou A, Gkolfakis P, Basiliya K, Ramai D, Tziatzios G, Sehgal V, Telese A, Norton B, Aslam N, Johnson G, Haidry R. Success rates of fixation techniques on prevention of esophageal stent migration: a systematic review and meta-analysis. Endoscopy. 2024 Jan;56(1):22-30. doi: 10.1055/a-2147-8294. Epub 2023 Aug 3. PMID: 37536365.
13. Makhani M, Midani D, Goldberg A, Friedenberg FK. Pathogenesis and outcomes of traumatic injuries of the esophagus. Dis Esophagus. 2014 Sep-Oct;27(7):630-6. doi: 10.1111/dote.12132. Epub 2013 Aug 29. PMID: 24033532; PMCID: PMC3938994.

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