

Penetrating Neck Injuries from Firearms Accompanied by Laryngeal Injuries, Two Case Studies

Kledia Pollo¹, Agron Dogjani^{2*}, Hekuran Braho¹, Bardhyl Veizaj³, Luan Nikollari⁴

Received: 12 June 2025 / Accepted: 28 August 2025 / Published online: 20 January 2026

This article is published with open access at <https://journal.astes.org.al>

© The author(s) 2026. © The Albanian Journal of Trauma and Emergency Surgery is an Open Access Journal. All articles are distributed under the terms of the Creative Commons Attribution Non-Commercial License: <http://creativecommons.org/licenses/by-nc/> which permits unrestricted non-commercial use, distribution, and reproduction in any medium provided the original work is properly cited.

Abstract

Introduction: Penetrating neck injuries (PNIs) from firearms are life-threatening emergencies due to the risk of airway compromise and major hemorrhage. Laryngeal trauma, though uncommon, adds further complexity and can be fatal without prompt intervention.

Case Presentations:

Case 1: A 44-year-old male sustained a gunshot wound to the anterior neck. Imaging revealed fractures and displacement of the right thyroid cartilage, soft tissue hematomas, and subcutaneous emphysema, with an exit wound in the left submandibular area. The patient exhibited stridor, dysphonia, and active bleeding. Emergency airway stabilization and surgical repair led to a full recovery of respiratory and vocal function.

Case 2: A 40-year-old male presented with a trans-neck gunshot wound exiting through the left scapulothoracic region. He had associated clavicular and humeral fractures and signs of hemorrhagic shock. Immediate airway management via intubation and tracheostomy, along with hemodynamic stabilization, resulted in a favorable outcome after 14 days in intensive care.

Successful management of PNIs involving the larynx necessitates a rapid, multidisciplinary approach. Imaging, airway protection, and timely surgical intervention are crucial for preserving laryngeal function.

Conclusion: Firearm-related PNIs with laryngeal involvement demand immediate, coordinated care. These cases highlight the importance of early airway control, accurate diagnosis, and surgical expertise in optimizing outcomes and preserving vital functions.

Keywords: Penetrating neck injury, laryngeal injury, gunshot wound, airway management, cricoid fracture, thyroid cartilage, emergency surgery, multidisciplinary care

Introduction

Gunshot penetrating neck injuries are operative emergencies, primarily due to the high risk of airway compromise and

devastating hemorrhage. Of these, laryngeal injury, while uncommon, is particularly hazardous and requires early intervention. [1, 2]

The incidence of such injuries significantly increases during periods of war and social unrest. High-energy mechanisms, including road traffic crashes, sports, physical violence, and firearm violence, typically cause traumatic injuries to the larynx. Although non-traumatic causes are possible, they are much less common. [2, 3]

Though only a tiny percentage of emergency room admissions are due to traumatic laryngeal injury, between one in 14,000 and one in 30,000, the result may be disastrous. Mortality rates if the cricoid cartilage is involved are between 1% and 40%. [3, 4]

The average age of the patients is usually 34-37 years. The presentation is variable as to the location, severity, and mechanism of injury, requiring accurate diagnosis and

Original article, no submission or publication in advance or in parallel

* Corresponding author:

Prof. Agron Dogjani M.D., Ph.D., FACS, FISS, FICS,

✉ agrondogjani@yahoo.com

1 Otorhinolaryngology Service, University Hospital of Trauma, Tirana, ALBANIA

2 General Surgery Service, University Hospital of Trauma, Tirana, ALBANIA

3 Radiology Service, University Hospital of Trauma, Tirana, ALBANIA

4 Department of Epidemiology, University Hospital of Trauma, Tirana, ALBANIA

prompt intervention to prevent death and permanent loss of function. [4, 5, 6]

It aims to emphasize the significance of early diagnosis, swift action, and synchronized multidisciplinary care by presenting two cases of laryngeal trauma due to firearms.

Case Presentations

The first case involved a 44-year-old male who presented with a gunshot wound to the anterior neck.

The entrance wound was located lateral to the right sternocleidomastoid muscle above the external jugular vein, with active hemorrhage. The exit wound was situated in the left submandibular region.

The patient exhibited severe respiratory distress with stridor, impaired phonation, a blood-filled oral cavity, and significant neck pain. Immediate intubation was performed to secure the airway.

Imaging studies, including head and neck CT scans, revealed multiple displaced fractures of the right thyroid cartilage lamina, soft tissue edema, and hematoma at the right supraglottic and true vocal cord levels, and free air anterior and lateral to the thyroid cartilage. (Fig.1)

CT angiography identified an injury to the right internal and external jugular veins, and a chest CT showed contusions in the lower lobe of the right lung. The patient underwent surgical intervention. Vascular surgeons ligated the damaged jugular veins to control hemorrhage. ENT surgeons performed a median tracheostomy, reconstructed the fragmented thyroid cartilage using internal stenting, and repaired soft tissue injuries. Postoperative care in the intensive care unit included antibiotic therapy, corticosteroids, anticoagulants, stomach protectors, vitamin supplementation, and parenteral nutrition.

The patient remained in a medically induced coma for five days, during which his condition improved and laboratory values normalized.

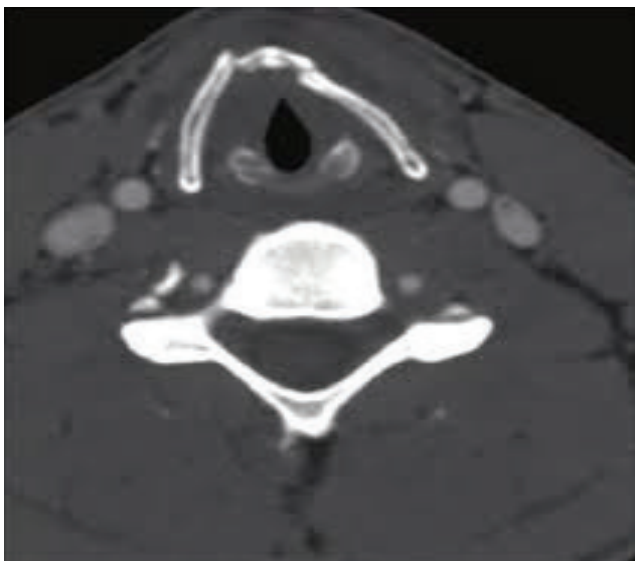


Figure 1. Imaging studies, including head and neck CT scans

On the fifteenth day of hospitalization, the patient experienced gastrointestinal bleeding. An endoscopic evaluation revealed gastric adenocarcinoma, necessitating transfer to another institution for oncologic treatment. Before discharge from the trauma center, the patient demonstrated intact voice function and satisfactory respiratory and swallowing capacity.

The second case involved a 40-year-old male with a gunshot wound entering at the level of the right cricothyroid cartilage (Figure 2) and exiting at the left scapulothoracic region (Figure 3). The injury was associated with fractures of the left clavicle, humeral head, and ankle.

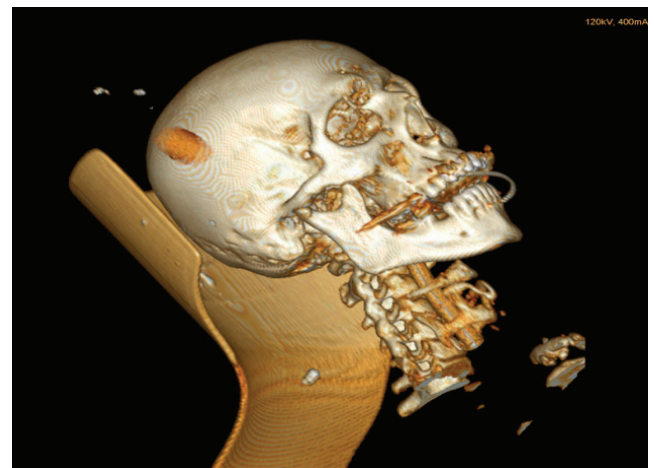


Figure 2. Gunshot wounds entry point at the right cricothyroid, with the exit point

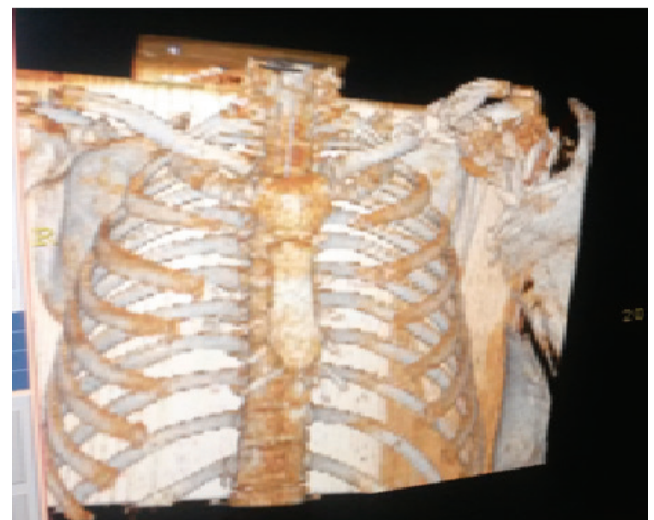


Figure 3: Gunshot wounds, exit point at the left Scapulothoracic region.

On arrival, the patient was in a state of shock and had significant neck pain, subcutaneous emphysema bilaterally at the supraclavicular level, and impaired communication. Emergency intubation was performed. Initial imaging confirmed fragmented injuries to the cricoid and thyroid cartilages and the presence of subcutaneous air around

the larynx. The entrance and exit wounds were surgically debrided and stabilized. At the family's request, the patient was transferred to a private hospital, where no definitive surgical treatment was performed.

Two days later, he returned to the trauma hospital and was admitted to the intensive care unit.

Subsequent surgical management included a median tracheostomy and reconstruction of the cricoid and thyroid cartilages using an internal stent. Postoperative treatment included antibiotic therapy, corticosteroids, anticoagulants, stomach protectors, vitamin supplementation, and parenteral nutrition. The patient remained in the ICU for ten days and showed clinical improvement, with normalization of laboratory values.

Upon discharge after fourteen days, the patient exhibited preserved laryngeal function. A follow-up fibro Naso-laryngoscopy revealed a mobile larynx with mild edema, hyperemia, and anterior commissure synechia with mucosal secretions.

Discussion

Penetrating laryngeal trauma necessitates immediate and coordinated treatment to limit mortality and preserve critical functions. Penetrating laryngeal injury is extremely difficult to diagnose because its presentation is variable and complex structures are at risk. [5 - 8]

CT scan and endoscopic exploration are diagnostic and planning modalities that cannot be omitted to assess the size of the injury and plan appropriate interventions.[9]

The airway must be secured early, most commonly by intubation or tracheostomy, as was successfully achieved in both cases. Surgical reconstruction of the cartilaginous framework and meticulous repair of the soft tissues are required to restore airway patency and laryngeal function. [9, 10] Both cases highlight the necessity of a multidisciplinary approach that includes ENT specialists, trauma surgeons, vascular surgeons, anesthesiologists, and intensivists. Delayed or inadequate care, as in the second case regarding initial management in a private clinic, can compromise patient outcomes. [11] The cases above also highlight that, with timely and adequate management, patients can recover with minimal sequelae to their voice, respiration, and swallowing. [12, 13, 14]

Penetrating neck injuries with laryngeal damage are complex and potentially life-threatening. [8, 9]

Early airway management, accurate imaging, and prompt surgical repair are crucial for achieving optimal outcomes. [10, 11] These cases demonstrate that a protocol-based and multidisciplinary approach ensures appropriate treatment, and patients recover with preserved vital laryngeal functions. Rapid diagnosis, surgical treatment, and systematic postoperative treatment are of primary concern in the management of these potentially lethal injuries. [15, 16]

Conclusion:

Penetrating neck injuries with laryngeal involvement require critical, cooperative treatment. These cases underscore the importance of early airway control, accurate diagnosis, and surgical expertise in optimizing outcomes and preserving vital functions.

COI Statement: This paper has yet to be submitted in parallel, presented fully or partially at a meeting, podium, or congress, published, or submitted for consideration beforehand.

This research received no specific funding from the public, commercial, or non-profit sectors. The authors declare that neither they nor their relatives or next of kin have any financial relationships with external companies that could be considered relevant or minor.

Disclosure: The authors declared no conflict of interest. No funding was received for this study.

References:

1. Nowicki, J. L., Stew, B., & Ooi, E. (2018). Penetrating neck injuries: a guide to evaluation and management. *Annals of the Royal College of Surgeons of England*, 100(1), 6–11. <https://doi.org/10.1308/rcsbull.2018.6>
2. Hamilton, J. M., Chan, T. G., & Moore, C. E. (2023). Penetrating Head and Neck Trauma: A Narrative Review of Evidence-Based Evaluation and Treatment Protocols. *Otolaryngologic clinics of North America*, 56(6), 1013–1025. <https://doi.org/10.1016/j.otc.2023.05.006>
3. Shiroff, A. M., Gale, S. C., Martin, N. D., Marchalik, D., Petrov, D., Ahmed, H. M., Rotondo, M. F., & Gracias, V. H. (2013). Penetrating neck trauma: a review of management strategies and discussion of the 'No Zone' approach. *The American Surgeon*, 79(1), 23–29. <https://doi.org/10.1177/000313481307900113>
4. Schaefer, S. D. (2014). Management of acute blunt and penetrating external laryngeal trauma. *The Laryngoscope*, 124(1), 233–244. <https://doi.org/10.1002/lary.24068>
5. Inaba, K., Branco, B. C., Menaker, J., Scalea, T. M., Crane, S., DuBose, J. J., Tung, L., Reddy, S., & Demetriades, D. (2012). Evaluation of multidetector computed tomography for penetrating neck injury: a prospective multicenter study. *The journal of trauma and acute care surgery*, 72(3), 576–804. <https://doi.org/10.1097/TA.0b013e31824badf7>
6. Dogjani, A., Vassiliu, P., Georgiou, C., et al. (2025). The 9th Albanian Congress of Trauma and Emergency Surgery. *Albanian Journal of Trauma and Emergency Surgery*, 9(2.9), 1-159. <https://doi.org/10.32391/ajtes.v9i2.9.508>
7. Kim, J. P., Cho, S. J., Son, H. Y., Park, J. J., & Woo, S. H. (2012). Analysis of clinical feature and management of laryngeal fracture: recent 22 case review. *Yonsei medical journal*, 53(5), 992–998. <https://doi.org/10.3349/ymj.2012.53.5.992>

8. Laher, N., Monzon, B., & Mauser, M. (2023). Results of Selective Non-Operative Management for Penetrating Neck Trauma in 594 Patients. *Albanian Journal of Trauma and Emergency Surgery*, 7(1), 1114–1119. <https://doi.org/10.32391/ajtes.v7i1.302>
9. Schaefer, S. D. (1992). The acute management of external laryngeal trauma. A 27-year experience. *Archives of otolaryngology--head & neck surgery*, 118(6), 598–604. <https://doi.org/10.1001/archotol.1992.01880060046013>
10. Dogjani, A., Bendo, H., Blloshmi, A. (2018). Management of Trauma Patients in Hospital Settings. *Albanian Journal of Trauma and Emergency Surgery*, 2(2.2), 12- 13. <https://doi.org/10.32391/ajtes.v2i2.2.155>
11. Moonsamy, P., Sachdeva, U. M., & Morse, C. R. (2018). Management of laryngotracheal trauma. *Annals of cardiothoracic surgery*, 7(2), 210–216. <https://doi.org/10.21037/acs.2018.03.03>
12. Francis, S., Gaspard, D. J., Rogers, N., & Stain, S. C. (2002). Diagnosis and management of laryngotracheal trauma. *Journal of the National Medical Association*, 94(1), 21–24.
13. Dogjani, S. A., Hasanaj, E. B., Matevossian, E., & Doll, D. (2014). Management of the blunt pediatric cervical trauma challenge for the trauma surgeon and the options of solving their emergency conditions (a case report). *Новосму хирурџии*, 22(4), 488-4 DOI: <http://dx.doi.org/10.18484/2305-0047.2014.4.488>
14. Dogjani, A. et al. (2012). Subcutaneous emphysema in the anterior coli area in a child with blunt chest trauma. 13th European Congress of Trauma and Emergency Surgery (ECTES 2012) - 12 - 15 May 2012. Basel, Switzerland. DOI: <https://doi.org/10.18484/2305-0047.2014.4.48>
15. Jalisi, S., & Zoccoli, M. (2011). Management of laryngeal fractures--a 10-year experience. *Journal of voice: official journal of the Voice Foundation*, 25(4), 473–479. <https://doi.org/10.1016/j.jvoice.2009.12.008>
16. Dogjani, A., et al. (2020). Politrauma, Challenges in Management. *Albanian Journal of Trauma and Emergency Surgery*, 4(2.4). <https://doi.org/10.32391/ajtes.v4i2.4.175>