



Low Velocity, High Stakes: Multidisciplinary Management of a Transfixing Transcarotid Arrow Injury



Devon C. Freudenberger, MD, Patrick D. Melmer, MD, FACS

Division of Acute Care Surgical Services, Virginia Commonwealth University Health System
Richmond, Virginia, USA

Introduction

- Penetrating neck trauma accounts for a small but high-risk subset of injuries¹
- The neck contains densely packed critical neurovascular and aerodigestive structures^{1,2}
- Low-velocity impalement injuries are uncommon but pose unique mechanical, surgical, and multidisciplinary care challenges³
- These injuries typically create well-defined wound tracts in contrast to ballistic injuries³

Case Presentation

- 16-year-old male arrived to the ED via EMS as a trauma team activation
- Sustained a low velocity, close-range, transfixing carbon fiber arrow injury to Zone II of the right neck
- Reported transient right upper extremity weakness which had resolved
- Hemodynamically stable with an audible bruit, but no expanding hematoma or active hemorrhage



Figure 1. Right neck transfixing arrow injury

Methods

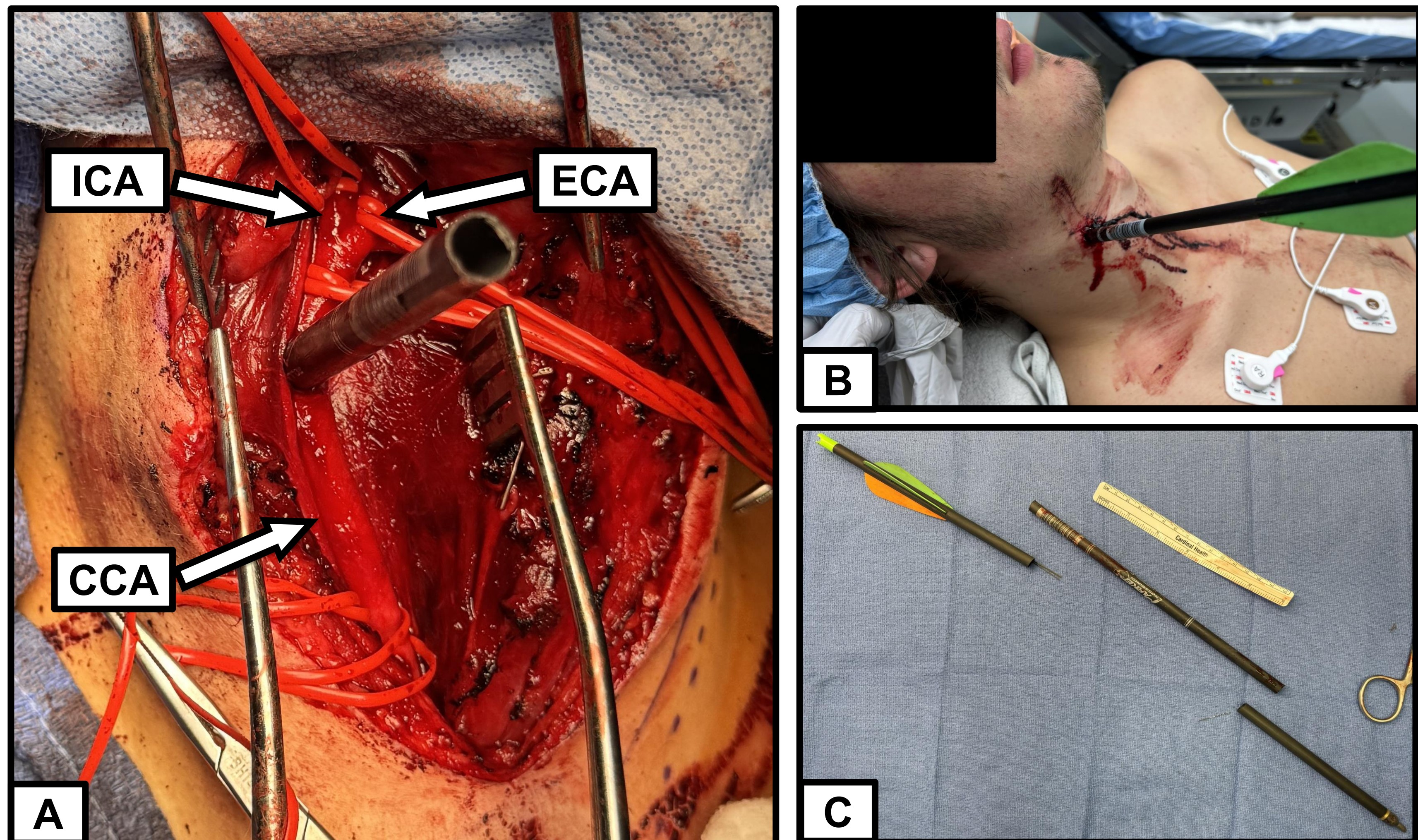


Figure 2. (A) Carotid exposure with arrow transecting common carotid artery
(B) Patient positioned after transecting distal segment of arrow (C) Arrow removed in its entirety

- Controlled transfer to the operating room with strict maintenance of cervical stability; arrowhead and tail transected using a motorized sternal saw to facilitate safe supine positioning and intubation
- Neck exploration revealed a complete through-and-through injury to the common carotid artery with absent distal flow; the internal jugular vein was nonviable and thus surgically ligated
- Proximal and distal control of the common, internal, and external carotid arteries achieved with identification and preservation of the hypoglossal and vagus nerves
- Arrow shaft removed; common carotid reconstructed with reversed greater saphenous vein interposition graft in collaboration with vascular surgery
- Bronchoscopy and EGD demonstrated no evidence of aerodigestive tract injury

Results

- Extubated on POD#1; discharged home on POD#5 on aspirin 81 mg with no neurologic sequelae
- Three-month neck CT angiogram demonstrated patent reconstruction
- At follow-up, patient remains well without neurologic deficits

References

1. Nowicki JL, et al. Penetrating neck trauma: a contemporary review of management strategies. *World J Otorhinolaryngol Head Neck Surg.* 2020;6(2):81–89.
2. DiMaio VJM. *Gunshot Wounds: Practical Aspects of Firearms, Ballistics, and Forensic Techniques.* 3rd ed. CRC Press; 2016.
3. Choi JS, et al. Low-velocity impalement injuries: principles of management and outcome. *Trauma Case Rep.* 2019;24:100250.

Key Takeaways

- **Low-velocity arrow injuries may tamponade major vascular injury, masking true severity**
- **Multidisciplinary coordination is critical for safe airway control and operative management**
- **Controlled modification and extraction of impaled objects is essential**
- **Early vascular control and definitive repair can result in excellent outcomes**