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IMPALED KNIFE IN NECK ZONE I – A CASE REPORT

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Abstract
Penetrating neck injuries are uncommon yet potentially fatal surgical emergencies due to the density of vital neurovascular and aerodigestive structures within a confined anatomical space. We present a rare case of a deeply impacted (approximately 15 cm) knife impalement injury in Zone I of the neck, successfully managed through meticulous surgical planning and multidisciplinary coordination. The case underscores the principle of controlled removal under direct vision and highlights the preservation of all major cervical structures, including the carotid artery, jugular vein, recurrent laryngeal nerve, vertebral arteries, spinal cord, and brachial plexus.

INTRODUCTION

Penetrating neck injuries (PNI) account for approximately 5–10 % of all traumatic injuries presenting to emergency departments (1, 2, 3). These injuries are potentially life-threatening due to the presence of critical vascular, respiratory, and neurological structures within a compact region (2, 4).

Among PNIs, impaled knife injuries are particularly challenging, as the retained object may tamponade vital vessels and premature removal can be catastrophic (5, 6).

Management strategies for PNIs have evolved from mandatory exploration to selective surgical intervention guided by hemodynamic stability and imaging (3, 5, 7). Although CT angiography has revolutionized assessment, cases with a retained foreign object still require surgical exploration under direct vision (6, 8, 9).

Case Presentation

A 40-year-old male presented to the Emergency Department of Jinnah Postgraduate Medical Centre (JPMC), Karachi, with a stab injury to the

right side of the neck (Zone I) . The knife was serrated and visibly impaled approximately 15 cm deep into the anterior neck (Figure 1).

On arrival, the patient was hemodynamically stable (GCS 15/15) with palpable pulses and no sensory or motor deficit in the ipsilateral upper limb.

Figure 1: Knife impaled in right side of neck (Zone I) on presentation

Radiological evaluation (X-ray lateral soft-tissue neck view) revealed the knife traversing obliquely across the neck, with its tip approaching the contralateral surface (Figure 2). CT scan was deferred due to the in-situ knife and the risk of dislodgement

Figure 2: X-ray lateral view showing direction and depth of knife impalement

Surgical Challenge

Zone I injuries involve the common carotid artery, internal jugular vein, subclavian vessels, trachea, and vertebral arteries (2, 7). In this patient, the impaled knife posed a risk of catastrophic hemorrhage if manipulated or removed blindly.

Operative Approach

Under general anesthesia, the patient was positioned supine with neck extension. A right vertical cervical incision was made, and

meticulous dissection was performed around the knife under direct vision (Figure 3,4).

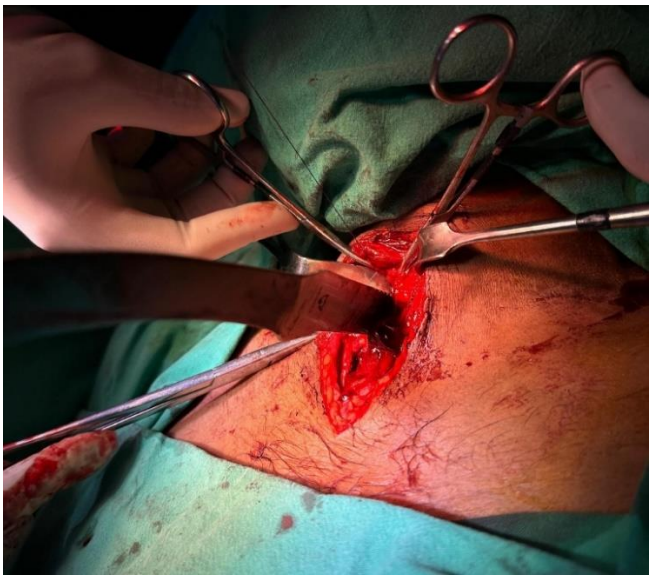

Figure 3: Intraoperative knife position

Figure.4 knife post removal

Intraoperative findings:

Complete transection of the anterior jugular vein

Laceration lower pole of right thyroid gland and multiple small venous and arterial tributaries

Internal jugular vein, Common carotid artery, and vertebral arteries intact Knife located between major vascular bundles, millimeters from the internal carotid artery and internal jugular vein No injury to spinal cord or brachial plexus

The knife was carefully removed after obtaining full vascular control. Hemostasis was achieved, bleeding points ligated, and the wound was irrigated and closed in layers.

Outcome

The patient was extubated on table and shifted to the Surgical ICU for monitoring.
Recovery was uneventful, with no neurological deficit, airway compromise, dysphonia, or active bleeding. Tracheostomy was avoided. The patient was discharged in stable condition on postoperative day 3 .

Discussion

The Roon and Christensen (1979) three-zone classification of PNI remains a useful guide for surgical management (7). Zone I injuries are the most challenging due to limited surgical exposure and proximity to vital vascular structures (2, 5).
As emphasized in prior reports (1, 4, 6), foreign objects must never be removed in the emergency department. They may be tamponading a major vessel, and uncontrolled removal can lead to massive bleeding. Definitive management requires controlled surgical exploration and removal under direct vision (especially serrated knife),with vascular instruments and transfusion support available (3, 8).
Multidisciplinary collaboration among thoracic,ENT, vascular, neurosurgery , and anesthetic teams is essential for airway and hemodynamic stability (3, 9). In this case, careful planning and stepwise exposure allowed safe removal without vascular or neurological injury.
This case reinforces the fundamental trauma principle: "Do not remove the impaled object until surgical control is established."

Conclusion

Penetrating neck injuries with retained knives represent one of the most dangerous forms of cervical trauma.
This case demonstrates that controlled surgical exploration under direct vision and multidisciplinary teamwork are vital for preventing catastrophic outcomes.
Successful preservation of the carotid artery, jugular vein, vertebral arteries, spinal cord, and brachial plexus validated the effectiveness of meticulous operative management.
Declarations

Conflict of Interest: None declared.
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Consent: Informed consent was obtained from the patient's guardian for publication of this case.
Ethical Approval: Not applicable for single case report under institutional policy.

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