Military Penetrating Neck Trauma at a Role 4 Hospital: A Six-Year Experience at the Queen Elizabeth Hospital Birmingham

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Introduction

Penetrating neck trauma (PNT) describes a penetrating neck injury that breaches platysma.⁽¹⁾ The incidence of PNT in military conflicts in Iraq and Afghanistan was 2% of all injuries to British servicemen and women.⁽²⁾ Unlike UK civilian PNT, military injuries are often due to high-velocity mechanisms such as blast injuries from improvised explosive devices (IEDs), grenades, and gunshot wounds.⁽²⁾ Mortality rates of 46% have been reported in military populations due to these high-velocity mechanisms of injury.⁽³⁾ The management of PNT has evolved from a zonal to a “no zone” approach that is based on clinical signs of injury rather than wound location (see Table 1).⁽¹⁾ Role 4 hospitals provide definitive medical and surgical care, usually in the patient’s country of origin, after damage-control care in the warzone.⁽⁵⁾

Soft Signs	Hard Signs
Venous ooze	Active haemorrhage
Non-expanding or non-pulsatile haematoma	Expanding or pulsatile haematoma
Dysphonia	Bruit or thrill in the area of injury
Dysphagia	Shock unresponsive to initial fluid resuscitation
Minor haemoptysis	Massive haemoptysis or haematemesis
Subcutaneous emphysema	Air bubbling through injury site

Table 1: Soft and hard signs of vascular and aerodigestive injuries in PNT.

Aims

- To report the experience of military PNT at a UK Role 4 hospital.
- To assess the degree of correlation between imaging reports and operative findings.

Methods

Study design: Retrospective case note review

Inclusion criteria:

- PNT sustained in a warzone

Exclusion criteria:

- Civilian PNT
- Blunt neck trauma

Potential cases between 1st January 2011 and 31st December 2017 identified by medical coding

2386 patient notes retrospectively assessed for inclusion

2374 cases excluded

12 military PNT cases included

155 data variables collected per case using warzone notes and Clinical Portal (A&E notes, imaging reports, operative reports, discharge letters, follow-up appointments)

Data analysis using IBM SPSS Statistics

Results

Patient Demographics:

11 (91.7%) patients were male and 1 (8.3%) was female. The median age was 25.7 years (range, 19.7 – 31.9 years). Ten patients were British military and two were non UK military.

Mechanism of Injury:

Physical Examination:

Most patients had no signs of vascular and aerodigestive injuries (see table below). Lower limb injuries were present in 50% of patients, likely due to the upward transmission of force in IED injuries.

Signs of Injury	No. Patients (%)
No signs	8 (66.6)
Soft signs	2 (16.7)
Unknown	2 (16.7)

Definitive Management:

5 patients underwent surgical exploration, 4 underwent foreign body removal, and 3 had their wounds sutured.

Imaging:

Imaging reports matched operative findings except in two patients where MDCTA neck studies failed to identify a parotid duct injury, and misjudged the depth of a metallic fragment because of artefact (Fig 1).

Figure 1: Image showing a normal quality MDCTA section (A) and one degraded by artefact from a metallic fragment (B) as shown by the red arrow.

Morbidity and Mortality:

Although survival was 100%, morbidity was significant. 75% of patients required a re-operation and one was discharged with a permanent tracheostomy.

Conclusion

Military PNT commonly affects young male patients following high-velocity mechanisms of injury. Patients that survive to reach Role 4 hospitals have excellent survival but significant chance of morbidity. The artefact from metallic fragments should be recognised as an important flaw of CT scans in military patients.

1. Nowicki JL, Stew B, Ooi E. Penetrating neck injuries: a guide to evaluation and management. Ann R Coll Surg Eng 2018;100(1):6-11. 2. Ministry of Defence Types of Injury Sustained by UK service Personnel on Op Herrick in Afghanistan. Feb 2016. 3. Ramasamy A, Hill AM, Clasper JC. Improvised explosive devices: pathophysiology, injury profiles and current medical management. J R Army Med Corps 2009;155(4):265-72. 4. North Atlantic Treaty Organisation. NATO Logistics Handbook. Senior NATO Logisticians’ Conference;1997;Brussels.