PENETRATING NECK TRAUMA MANAGEMENT

PATIENT WITH PENETRATING NECK TRAUMA

TRAUMA ATTEND IF SIGNIFICANT INJURY SUSPECTED

STANDARD INITIAL ABCDE ASSESSMENT

SPECIFIC PENETRATING NECK TRAUMA ASSESSMENT:
- airway / vascular / oesophageal / neurological "AVON" clinical examination
- platysma assessment
- zone of neck classification

"HIGH RISK"
- Airway compromise
- Significant haemorrhage
- Obvious vascular injury

Potentially life threatening

- Secure airway
- Direct pressure to control bleeding
- Immediate General Surgical assessment
- Erect CXR if able
- Involve ENT, Vascular and Anaesthetics early
- Early multi-disciplinary surgical exploration in OT
- Consider oesophagoscopy/bronchoscopy in OT
- Consider CT angiogram of neck prior to OT only if airway secured with haemorrhage controlled & surgeon present

"INTERMEDIATE RISK"
- "Suspicious" clinical examination *1
  AND/OR
- Platysma clinically breached

"LOW RISK"
- "Normal" clinical examination *1
  AND
- Platysma not breached

- Observe closely
- Early surgical assessment
- Erect CXR
- CT angiogram of neck
- ENT/Vascular consult
- Planned multi-disciplinary surgical exploration in OT
- Consider oesophagoscopy/bronchoscopy
- Consider CT head/chest

*1 Clinical Examination is most reliable in assessing Zone II injuries and requires an alert co-operative patient. Patients with altered LOC or with Zone I or III injuries should be treated with a higher index of suspicion

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PENETRATING NECK TRAUMA

ANATOMICAL ASSESSMENT

Platysma
The important structures of the neck all lie below the platysma. If the platysma has not been breached then no significant penetration has occurred. However, the platysma may be difficult to identify and significant blunt injuries are still possible. Systematic clinical assessment is therefore essential even if the platysma has not been penetrated clinically.

Neck Zones
The neck is divided into the following zones for clinical descriptive purposes. Note that the location of the entry wound may not reflect which direction the knife or bullet has gone and several zones may be involved.

| Zone 1 | clavicle and cricoid (nb. associated lung/upper limb injury) |
| Zone II | cricoid to angle of jaw |
| Zone III | angle of jaw to base of skull (nb. associated head injury) |

Zone 1 and Zone III are relatively difficult to assess clinically. Zone I also includes structures that mandate the careful assessment of the thorax and upper limbs, whilst Zone III injuries require careful assessment of the head and neurological function. Zone II is relatively easy to access and clinical assessment is more reliable at excluding significant injury.

Neck Triangles
The anterior triangle bounded by the midline, mandible and sternocleidomastoid and contains the vital structures of the neck. The posterior triangle bounded by the sternocleidomastoid, clavicle and trapezius has relatively few vital structures.

CLINICAL ASSESSMENT

Systematic 'AVON' clinical assessment is important to identify evidence of underlying injury. The following features should be routinely assessed.

| AIRWAY | Speech (altered) |
| | Stridor |
| | Shortness of breath |
| | Bubbling wound |
| | Subcutaneous emphysema |
| | Surgical crepitus |
| | Haemoptysis |
| | Pneumothorax |

| VASCULAR | Bleeding (nb don't start and stop with direct pressure only) |
| | Haematoma - expanding or pulsatile |
| | Bruits |
| | Carotid injury = Horner syndrome |
| | Unilateral absent radial pulse |
| | Arterial – brachial index (<0.9) |

| OESOPHAGEAL | Pain on swallowing |
| | Haematemeses |

| NEUROLOGICAL | Higher centres |
| | Cranial nerves |
| | Horner's syndrome |
| | Recurrent laryngeal |
| | Brachial plexus (upper limbs!) |
| | Long tract signs |
SPECIFIC INVESTIGATIONS

Surgical Exploration

Remains the gold standard for most penetrating injuries. However ‘surgical exploration’ of a complex neck wound may require a combined approach of general, ENT, and vascular surgeons. Even then subtle injuries may be missed. The most common injuries missed are oesophageal injuries, which is why routine oesophagoscopy is advocated by some experts.

Oesophagoscopy / Bronchoscopy

Routine oesophagoscopy recommended if significant penetrating injury has occurred. Bronchoscopy should be performed if airway injury is suspected.

CT Angiogram of Neck

Currently regarded as the "gold standard" initial investigation for patients not requiring immediate OT for airway or bleeding problems. May still need oesophagoscopy and bronchoscopy.

CT Head and CT Chest

A low threshold for adjunctive investigation should be used in Zone 1 and Zone III injuries

CXR

A routine erect CXR is advisable for all patients to exclude a pneumothorax / haemorrhage

“PEARLS”

▲ If in doubt secure the airway early
▲ RSI is probably the safest technique for most patients
▲ Always 'prep the neck' prior to RSI
▲ Fibreoptic techniques are ineffective if the patient is bleeding
▲ If the trachea is exposed secure with artery forceps and insert an ETT
▲ Control bleeding with direct pressure
▲ Do not 'blindly' probe wounds or clamp vessels
▲ Remember knives and bullets may go in any direction
▲ Cervical spine injuries are rare in isolated penetrating trauma

SUMMARY

- Secure the airway and stop any bleeding with direct pressure
- Systematic clinical assessment
- Anatomical classification
- Urgent multi-disciplinary surgical exploration for unstable patients
- Planned multi-disciplinary surgical exploration for most stable patients if platysma breached
- Adjunctive use of CT angiogram of neck and erect CXR
- Consider oesophagoscopy and bronchoscopy in conjunction with surgical exploration

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BLUNT NECK TRAUMA PEARLS

OVERVIEW

The approach to blunt neck trauma is similar to that of penetrating neck trauma. The clinical assessment required is the same. The priorities are initial ABCDE resuscitation, followed by systematic 'AVON' assessment with appropriate use of medical imaging as required.

SPECIFIC INJURIES - 'PEARLS'

Clothesline Injury

- look for local tenderness, surgical crepitus, surgical emphysema and altered voice
- have a high index of suspicion about clinical deterioration (similar to burns)
- a tracheal tear is the most significant complication and difficult to treat
- if significant tracheal injury is suspected involve anaesthetics and ENT early and plan for early gaseous induction in OT

Seatbelt Sign

- seatbelt signs have a weak association with vascular injury
- routine CT/Doppler are not indicated if clinical examination is normal

Carotid Artery Injury

- suspicious clinical signs include bruit/ horner / stroke
- physical signs are usually present but the patients are typically unconscious making detection difficult
- CT angio of head and neck

Vertebral Artery Injury

- may present following relatively minor trauma
- typically present with headache / neck pain / brainstem signs
- CT angio of head and neck

Hanging / Strangulation

- cervical spine vertebral injuries are relatively rare in these patients
- airway injury and delayed pulmonary oedema are more common
- initial and delayed CXR at 6 hrs indicated
- 'professionals break necks amateurs asphyxiate'

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