

ENT Emergencies

Injuries of the Neck

Registrar

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Neck Injuries

Blunt and Penetrating Trauma

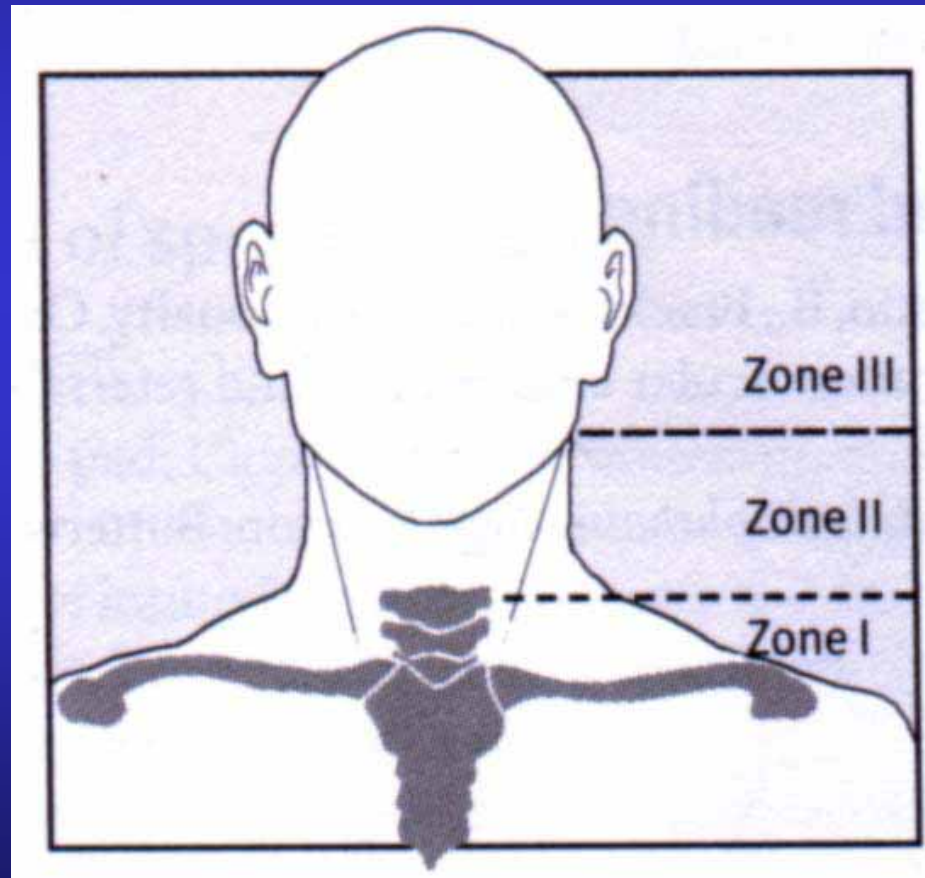
Blunt Injuries

- Blunt trauma – direct/indirect
- Trauma to larynx (hoarseness, stridor, crepitus, surgical emphysema) – potential airway obstruction due to swelling
- Fractured hyoid bone following strangulation may also cause significant soft tissue swelling
- Oedema of neck and face following asphyxiation
- Shearing forces may cause dissection of carotid arteries with neurological deficit
- Bony injuries with/without spinal cord injury
- Oesophagus trapped between larynx and vertebrae

Penetrating Injuries

- Defined as having penetrated the platysma muscle – potentially serious injury
- Classification:
 - posterior triangle (post. to SCM)
 - anterior triangle - zone I (below cricoid)
 - zone II
 - zone III (above angle of jaw)
- Smaller wounds usually associated with more extensive underlying damage (deeper)
- Stab wounds generally downward (not always), bullets tract in any direction

Zones of the Neck



Zone I

- Vascular: aortic arch, subclavian artery
- Nerve: brachial plexus, left recurrent laryngeal nerve, spinal cord, sympathetic trunk
- Respiratory: trachea, apex of lung
- Digestive: oesophagus
- Lymphatic: thoracic duct left

Zone II

- Vascular: carotid vessels, internal jugular
- Nerves: vagus, left recurrent laryngeal, phrenic
- Respiratory: trachea, larynx
- Digestive: oesophagus
- Thyroid gland

Zone III

- Vascular: carotid vessels, internal jugular
- Nerves: cranial nerves VII-XII
- Respiratory/Digestive: pharynx
- Parotid gland

Posterior triangle

- Vascular: vertebral and subclavian arteries
- Nerves: brachial plexus, spinal cord
- Respiratory: lung apex
- These injuries are generally less likely to cause damage to major structures

Clinical signs

- Neurological:

 - laryngeal – hoarseness, stridor

 - phrenic – abdominal breathing

 - sympathetic – ipsilateral Horner's

 - brachial plexus – function arm+hand

- Digestive:

 - oesophagus – odynophagia/dysphagia,

 - haematemesis, surgical emphysema

Clinical signs

- Respiratory:

- pneumothorax – surgical emphysema, decreased air entry, resonant to percussion, respiratory distress

- haemothorax – decreased air entry, dull to percussion, circulatory changes

- trachea/bronchus – ongoing leak
 - pneumothorax not resolving after insertion of ICD

Clinical signs

- **Vascular injury (hard signs):**
 - active arterial bleeding
 - pulsatile/expanding haematoma
 - bruit
 - absent pulses distal to injury – ischaemia
 - neurological deficit in distribution area (clinical picture of stroke if carotid artery involved)
 - difference in systolic BP in arms of >10mmHg
 - widened mediastinum on CXR
(>8cm at level of T4)

Zones of the Neck

- Position of the entry wound doesn't exclude injury to structures in other areas
- Posterior triangle injuries are less often associated with damage to major structures (but not excluded!)
- Injuries in Zone II can easily be explored and structures easily accessed during exploration – more conservative approach
- Structures in Zone I and III are difficult to reach/visualize intra-operatively – need more aggressive work-up and investigation to exclude serious injury

Special Investigations

- Indications for these special investigations are applied to each individual patient considering clinical picture and location of wound, and done only on suspicion of specific injuries
- C-spine X-ray if significant blunt trauma, mechanism of injury, or clinically indicated (not only bony elements, but also FB, surgical emphysema)
- CXR – to exclude haemo-/pneumothorax, evaluate mediastinum

Special Investigations

- In patient with dysphagia/odynophagia and surgical emphysema – barium swallow to exclude oesophageal injury (may be followed by endoscopy if injury demonstrated or inconclusive)
- In patient with airway obstruction, haemoptysis, change in voice or suspected laryngo-tracheal injury – laryngoscopy may be therapeutic and diagnostic
- Indirect (mirror) or flexible fibreoptic laryngoscopy
- Patients with suspected vascular injuries need arteriography (invasive procedure, formal consent required, involves sedation of patient)

Management

- These patients are divided into 2 large groups:
 - unstable patient who needs to go to theatre immediately
 - stable patient who can be investigated and observed first
- All patients are initially managed by ABC
- Secondary survey is carried out once the patient has been stabilized (there may be other injuries)
- If patient goes to theatre immediately – document that patient still needs full assessment once stabilized

Management

- **A (airway)** – compromise may be due directly to injury or secondary due to swelling and bleeding
 - attempt intubation
 - surgical airway may be necessary
 - with obvious open injury to airway – early tracheostomy is best
- **B (breathing)** – problems may arise from airway compromise or haemo-/pneumothorax
 - high flow O₂
 - ventilate
 - IC drain

Management

- **C (circulation)** – recognise early stages of shock (tachycardia, narrowed pulse pressure, agitation)
If patient had already lost most of circulating volume before arriving at hospital – no active bleeding may be present
 - pressure on the wound
 - IV access (big lines)
 - fluid resuscitation
 - emergency blood (packed cells)
 - permissive hypotension (systolic 80mmHg)
 - look for other sources of blood loss

Management

- **D (disability)** – neurological deficit may be due to vascular injury, nerve damage or spinal cord injury
 - assess
 - prevent further injury/deterioration
- **E (exposure)** – other injuries may be present
 - secondary survey (full exposure)
 - keep warm
- Stable patients with no obvious structural damage or normal special investigations are observed for 24 hrs (repeat CXR 6-12 hrs)

Who/When to transfer ?

- Patients who are stable but are suspected to have underlying damage on clinical grounds – discuss with receiving hospital (will need investigations)
- Patients who are initially stable, but don't improve/deteriorate after period of observation
- Patients who arrive shocked or decompensate soon after arrival – transfer urgently after proper resuscitation and initial stabilization
- Remember principal of permissive hypotension – prevent re-bleed in ambulance

WOUND PENETRATING PLATYSMA

A B C D E
Assessment & management of life threats

Unstable → **SURGERY**

Stable ↓

Secondary survey

Absolute indication → **SURGERY**

Stable ↓

CLASSIFICATION + RELEVANT INVESTIGATIONS

Posterior triangle

Anterior Triangle

ZONE I	ZONE II	ZONE III
Investigations: Injury	Investigations: Injury	Investigations: Injury
Arteriogram: Aortic arch Subclavian art Innominate art	Arteriogram: Carotid vessels	Arteriogram: Carotid vessels
Bronchoscopy: Trachea	Bronchoscopy: Trachea Larynx	Laryngoscopy: Pharynx
CXR: Apex lung	Endoscopy: Oesophagus	Sialogram: Parotid gland
Endoscopy: Oesophagus	CXR: Phrenic nerve	Clinical: CN VII–XII Int. Jug. V
CT Scan: Spinal cord	Clinical: Recc. Lar. N Int. Jug. V Thyroid	
Clinical: Left Recc. Lar. N Brachial plexus Sympathetic trunk Thoracic duct		