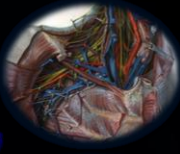


Adam's Apple, Eve's Jugular, & Everything In Between




Darrin M. Batty
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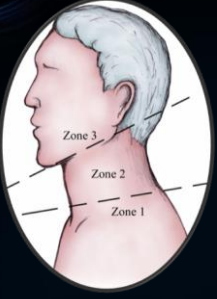
EMS Education



C-SPINE???



Zones of the Neck

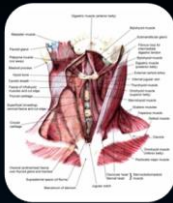


- Zone I - The base of the neck, is demarcated by the thoracic inlet inferiorly and the cricoid cartilage superiorly.
- Zone II - Encompasses the mid-portion of the neck and the region from the cricoid cartilage to the angle of the mandible.
- Zone III - Characterizes the superior aspect of the neck and is bounded by the angle of the mandible and the base of the skull.

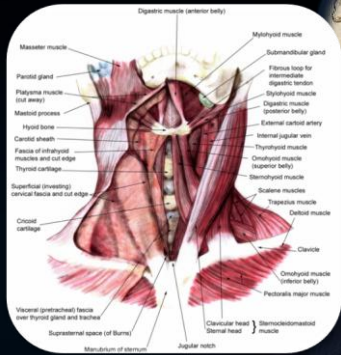
Zone III Injury



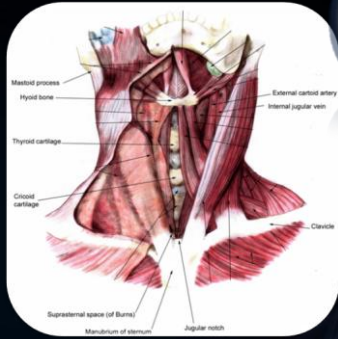
Knowledge Test



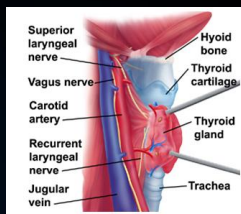
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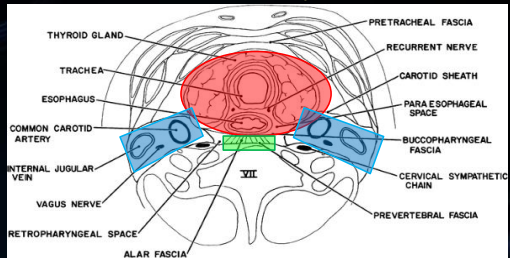
Anatomy



Anatomy



Anatomy



Pre-tracheal region (including the trachea, larynx, thyroid gland, and pericardium)
 Carotid sheath (enclosing the carotid artery, internal jugular vein, and vagus nerve)
 Pre-vertebral area (containing the pre-vertebral muscles, Phrenic nerve, brachial plexus, and axillary sheath)

Structures at Risk



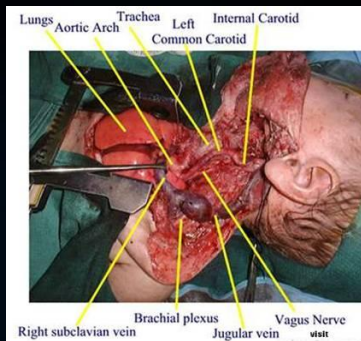
- Musculoskeletal - vertebral bodies; cervical muscles, tendons, and ligaments; clavicles; first and second ribs; and hyoid bone
- Neural - spinal cord, phrenic nerve, brachial plexus, recurrent laryngeal nerve, cranial nerves (specifically glossopharyngeal & hypoglossal)
- Vascular - carotid (common, internal, external) and vertebral arteries and the vertebral, brachiocephalic, and jugular (internal and external) veins

Structures at Risk



- Visceral - thoracic duct, esophagus and pharynx, and larynx and trachea.
- Glandular - thyroid, parathyroid, submandibular, and parotid glands.
- *Associated structures at risk of intrathoracic injuries - esophagus, tracheobronchial tree, lung, heart, and great vessels.*

Anatomy



Zednic



Malarchuk



Statistics

Neck trauma accounts for 5-10% of all serious traumatic injuries.

Approximately 3500 people die every year from neck trauma secondary to hanging, suicide, and accidents.



Statistics

Mortality/Morbidity

Initially missed cervical injuries secondary to neck trauma result in a mortality rate of greater than 15%.
10% of neck wounds lead to respiratory compromise.
Loss of the airway patency may occur precipitously, resulting in mortality rates as high as 33%.
Zone I injuries are associated with the highest morbidity and mortality rates.



Statistics

Gender

Trauma is more common among males than among females.

Age

Most people who experience neck trauma are adolescents and young adults.



Injury Categories

Blunt Force

- Hanging
- Strangulation
- Striking

• Penetrating

- GSW
- Knife
- impalement



History & Physical

Isolated injuries to the neck are the exception—multiple system injury and unexpected injury are the rule

Clinical manifestations may vary greatly.

The presence or absence of symptoms can be misleading, serving as a poor predictor of underlying damage.

- only 10% of patients with blunt vascular damage develop symptoms in the first hour.

- MOI
- Patient /bystander interview
 - Time
 - ETOH / Drugs?

What Else?

History & Physical

A standard approach (*Just as in all critical patients*)

- ABC first of course
- Expose and look
- Listen (bruit)
- Palpate (thrill)

Treatment occurs simultaneously with evaluation

Single examination is not sufficient (onset of Signs & symptoms may be delayed and progressive)

What are we looking for?

What are our cautions?



Clinical Finding By System

Airway / Tracheobronchial / Lung

- Voice Changes
- Hemoptysis
- Stridor
- Drooling
- Sucking, frothing or bubbling from a neck wound
- Subcutaneous emphysema
- Hoarseness
- Dyspnea / Tachypnea / Hypoxia
- Distortion of the normal anatomic appearance
- Pain on palpation or with coughing or swallowing
- Pain with tongue movement (injury to the epiglottis, hyoid bone, or laryngeal cartilage)
- Hyperresonance to percussion



Hyoid Fracture

- The hyoid is anchored by muscles from the anterior, posterior, and inferior directions
- Aids in tongue movement and swallowing.
- The hyoid bone provides attachment to the muscles of the floor of the mouth and the tongue above, the larynx below, and the epiglottis and pharynx behind.
- Due to its position, the hyoid bone is not susceptible to easy fracture



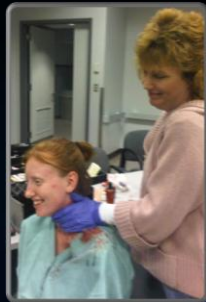
Clinical Finding By System

Vascular Injury

- Shock (with or without active Bleeding)
- Expanding Pulsatile hematoma
- Brisk bleeding
- Decreased pulses (radial, ulnar, Carotid, Temporal, facial)
- Carotid Bruit / Thrill
- Hemothorax
- Air embolism
- CVA / TIA
- Ipsilateral headache
- Facial / neck pain
- Aphasia
- Contralateral Hemiparesis



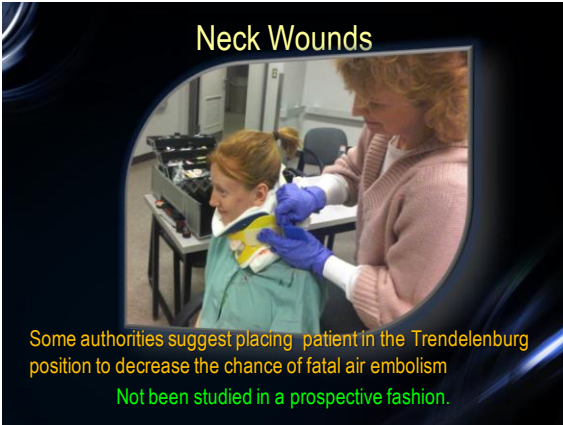
Neck Wounds



Neck Wounds



Neck Wounds

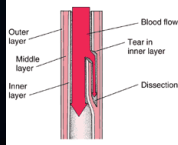


Case Study #1



Carotid Artery Dissection

- Artery experiences a tearing of the tunica intima
- pressurized blood is forced between the artery's layers, causing them to split.
- relatively rare in the overall trauma picture
- much more common in school athletes



Carotid Artery Dissection

Mechanisms

- Neck strain or manipulation
- Neck hyperextension
- Neck hyperflexion
- Yoga positions
- Wrestling neckholds
- Football tackles
- Diving accidents
- Any injury where the neck is impacted or twisted.

Signs & Symptoms

- Blurred vision
- Blindness
- Headache
- Pulsatile tinnitus (ringing in the ears)
- Loss of taste sensation or difficulty swallowing
- Visual field disturbances

Clinical Finding By System

Cranial Nerve Injury

- Facial nerve (**cranial nerve VII**) - Drooping of the corner of the mouth
- Glossopharyngeal nerve (**cranial nerve IX**) - Dysphagia (altered gag reflex)
- Vagus nerve (**cranial nerve X**) - Hoarseness (weak voice)
- Spinal accessory nerve (**cranial nerve XI**) - Inability to shrug a shoulder and to laterally rotate the chin to the opposite shoulder
- Hypoglossal nerve (**cranial nerve XII**) - Deviation of the tongue with protrusion



Hanging / Near Hanging

hanging is defined as a form of strangulation

15% of all suicides or approximately 4000 deaths yearly

Typical vs. atypical

Typical - point of suspension is central over the occiput

Complete vs. incomplete

Considered complete if the whole body is suspended

Judicial vs. suicidal

Judicial hanging - victim drops a distance equal to his or her height

Accidental (rare)

- Autoerotic hanging syndrome or clothes caught in machinery



Hanging / Near Hanging

Judicial hangings

- cervical dislocation disruption of the spinal cord as the cause of death

Suicidal hangings

- Form of strangulation
- compression of nerves and vessels in the neck
- Death from cerebral anoxia
- Occlusion of upper airway by constriction of the neck is thought to be rare
- closure of the airway caused by upward displacement of tongue and epiglottis
- Cardiac arrest from pressure on the vagus nerve



Strangulation

- 10% of all violent deaths (most survive)
- Minimal visible external findings
- Slow but significant compressive forces
 - Laryngeal Fracture
 - Upper airway edema
 - Vocal chord injury
- Classic Signs & Symptoms
 - Subconjunctival hemorrhage (petechiae)
 - Raspy voice and sore throat
 - Neck pain and swelling
 - Dyspnea and difficulty swallowing



Strangulation



- Four types of strangulation
 - Hanging
 - Manual (**throttling**) – use of bare hands
 - Chokehold (**sleeper hold**) – Elbow bend compression
 - Ligature (**garroting**) – use of a chord-like object
 - **Clothing, rope, belt, wire**

Case Study #2



Treatment

- Hematomas and laryngotracheal injuries both necessitate and complicate initial airway management.
 - Even common bag-valve-mask techniques may worsen injuries and distort anatomy by dissection of air into the surrounding tissues.
- Indications for airway management in the field
 - long transport times with an unstable or potentially unstable patient
 - stridor or severe respiratory distress, apnea, and impending cardiopulmonary arrest.

Treatment



- Orotracheal intubation
 - Allows for direct assessment of the airway and placement of the airway with the fewest complications.
- Prehospital cricothyrotomy
 - Indicated only with failed orotracheal intubation
 - Entrapment at scene with the need for a secure airway
 - Significant maxillofacial trauma in patients requiring airway

Thank You



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