

Asphyxia -III

STRANGULATION AND

POSITIONAL ASPHYXIA

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OBJECTIVES

At the end of this lecture the students should be able to:

- Know the mechanisms of death and autopsy findings of ligature and manual strangulation
- Identify the principle of positional asphyxia
- Know the various modes of positional asphyxia



Strangulation

- Pressure on the neck by the application of hands or ligature.
- The mode of strangulation is determined by the nature of injuries.



Ligature strangulation

- Neck compression achieved by application of ligature around the neck.
- Manner
 - Most are homicidal
 - Some are suicidal and
 - Can have accidents among children.



External examination

Ligature

- Wide variety :
 - Cords, wires, ropes and belts, soft fabrics (scarves/ties) and even a flexible rod like cane
- Perimeter of the loop may be smaller due to tightening.



Ligature strangulation

- Secured with a knot or the noose is tightened with rod in it.



- Constriction may be all or part of the circumference of the neck
- In majority around the full circumference
- may be several turns are wound around.



Ligature mark

- Appearance depend on the nature and the texture
- Pronounced pattern in the cord- imprint on the neck.
- Soft fabric used-Difficult to interpret marks
 - There may be sharply defined marks which may be interpreted as caused by narrow cord or wire.



Ligature mark ctd.

- Broad flat band –no marks/intermittent 1 or 2 linear marks.
- The mark may be abraded, brown and dried to a parchment like consistency after death.
- There may be a narrow red zone around the mark due to lateral displacement of blood.
- Mark may be slightly wider, narrower or of same width as the actual ligature.



Position of the ligature mark

- usually encircle the neck horizontally
- No rise unless the killer is pulling upwards.
- No gap
- Placed at a lower level



- When single turn- cross over point with overlap
- Mark of the knot-When the knot is tied.
- Wound several times around - each loop may be represented
- Narrow wire—can lacerate the skin.



Other external findings

- Scratches and fingernail marks on the neck
 - due to victims attempts of pulling away the ligature.
- Above the ligature:
 - Puffy
 - Oedematous
 - Congested
 - Cyanotic and haemorrhagic
- Below the ligature is pale.
- Petechial haemorrhages in face, eyelids and conjunctivae.
- Bleeding from ear and nose



Internal examination

- Soft tissue haemorrhages under the ligature mark.
- Deep damage in strap muscles but less than in manual strangulation
- Laryngeal injuries -less severe than manual strangulation
 - Hyoid bone and thyroid horns-fracture
- Focal carotid intimal damage.



Mechanism of death

- Often due to occlusion of veins with 'classic asphyxia signs'



Manual strangulation

- Common method of homicide.
- Usually the victims are weak and smaller in size
- Seen in domestic homicides, sex related murders and child killing.



External examination

Neck injuries

- Bruising on the neck:
 - Discoid bruises to confluent bruises
 - Discoid bruises from finger pads- 1-2cm in size
 - Longer irregular bruises when fingers skid



Bruising

- Bruising on the neck:
 - Cluster at the sides of the neck often high up under the angle of the jaw.
 - They may be distributed anywhere on the neck, face and upper chest (Due to the struggle)



Abrasions

- Scratches from fingernails of the victim or assailant
- If the pressure is static small (1cm) straight or curved (semi-lunar) marks
- When nails skid down longer linear marks.
- Defense scratches : linear parallel lines grouped together



Other external findings

- Petechial haemorrhages in face, eyelids and conjunctivae.
- Congestion and oedema of the face



Internal examination

- Bruises in the soft tissues and muscles of the neck.
 - May be superficial and confined to the dermis only.
 - Muscle bruises - may not always correspond to the external bruises.
 - There may be infiltrated blood or frank haematomas
 - Bleeding over the front and sides of the larynx.
- **Do not** - over interpret posterior laryngeal haemorrhages (Prinsloo and Gordon artefacts)

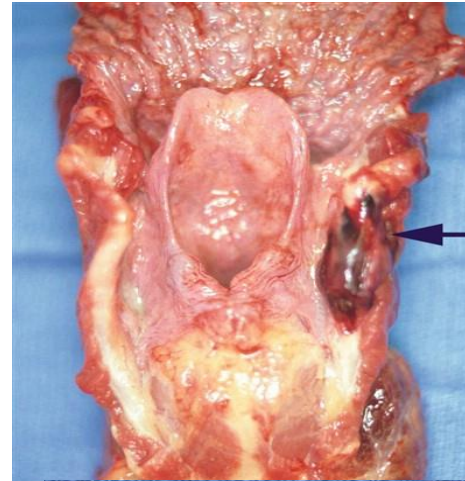


Injury to larynx

- Commonest- Damage to superior horns of the thyroid cartilage and greater cornuae of hyoid
- Splitting of the ala of the thyroid cartilage also may be seen
- Cricoid cartilage may also be fractured
- Indicates pressure applied to neck.



Laryngeal fractures



Be cautious

- Don't interpret natural joints as a fracture (more medial than fractures and non haemorrhagic)
- Be cautious about postmortem fractures
- Haemorrhage is important in distinguishing.
- Isolated fracture of the laryngeal horn - of little value.



Carotid arteries

- Rarely there may be intimal tears.



Mugging (Arm locks)

- Mugging-
 - throttling by pressure from an arm hold around the throat
 - attack usually from behind.
- Autopsy:
 - Features of ligature strangulation with a broad object.



Mugging



Mugging



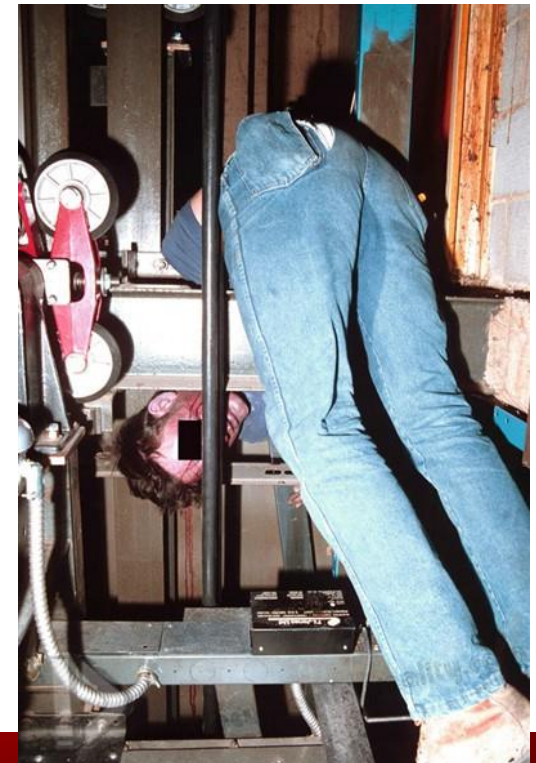
Positional asphyxia

- Rapid anoxial death that occurs as a result of
 - external compression of the body or
 - gravitational or postural effects on - impair breathing at neck or chest wall.
- It can be divided in to 3
 - Traumatic/crush asphyxia
 - Postural asphyxia
 - Restraint asphyxia



Traumatic asphyxia

- Chest and usually abdomen are compressed by a large external force.
- Classic signs of asphyxia are extremely demonstrated.
- Chest expansion and diaphragmatic lowering - prevented



Incidents could be

- Burial in earth following collapse of excavations
- Pinned under an overturned vehicle,
- Fallen timber or masonry
- Crushing in crowds
- Trapping between 2 objects (vehicle and a wall)
- Sexual intercourse with an overweight person while being incapacitated with alcohol



Autopsy findings

- Marked congestion and cyanosis
 - congestion of the face, neck and shoulders down to the thoracic inlet
- Conjunctivae grossly congested and haemorrhagic.
- Oedema, congestion and the petechiae of face, lips and scalp.
- Copious bleeding from ears and nostrils



Autopsy findings

- May have local bruises and abrasions
- Injuries to the chest wall
- Internally congestion is less marked
- lungs are dark, heavy with subpleural petechiae.



Postural asphyxia

- Occurs when the gravitational force of the body precludes breathing
- No external force inhibiting respiration.



Incidents

- Collapses and becomes unconscious in a position that impairs breathing:

- Neck hyper flexion/extension
- Prone and head down position
- Wedging between fixed structures

Most commonly following ethanol intoxication

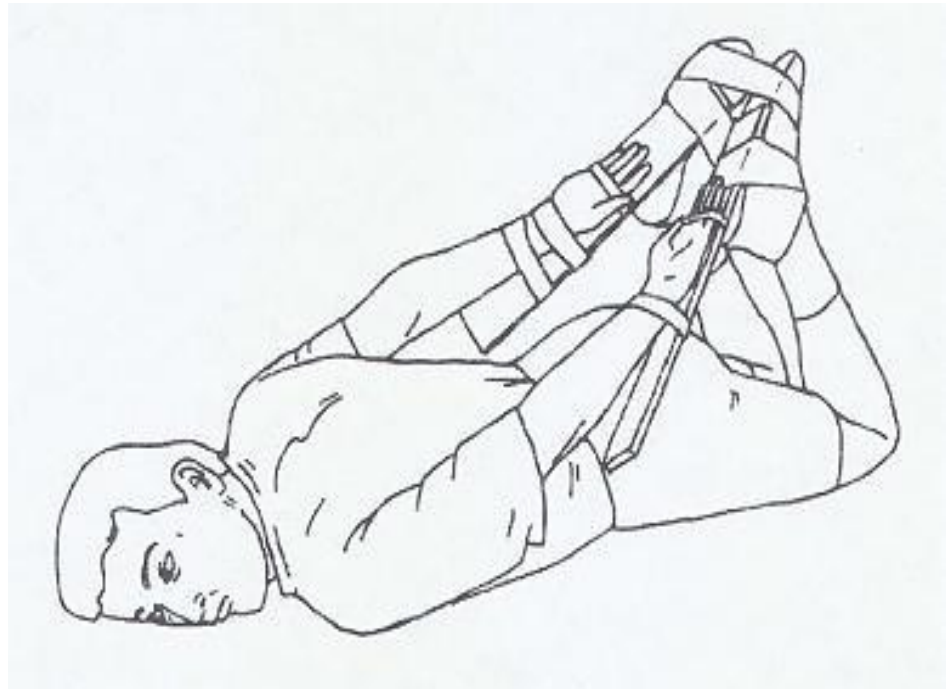
- Hogtying in prone position
 - (victim is placed on prone position while the wrists and ankles are tied together)



Wedged between



Hogtying in prone position



AUTOPSY DIAGNOSIS

- No distinct pathological finding.
- May have direct injury to neck or chest.
- Distribution of postmortem hypostasis gives clues to the position
- Scene and toxicology are key diagnostic findings.



Restraint asphyxia

- Occurs during physical restraint in prone position by another party in agitated state.
- Controversial area
- Mechanism could be anoxial or sudden cardiac arrhythmia related to agitated state
 - (excited delirium from cocaine intoxication or acute psychiatric decompensation)



physical restraint in prone position



Summary

- Fatal pressure on the neck could be applied in many ways.
- Occlusions to the airway, vasculature, and neurological effects in isolation or in combination are identified as mechanisms of death in pressure on the neck.
- There are 5 characteristic pathologies associated with neck compression in common.
- There are specific features which are helpful in distinguishing the mode of application of pressure.
- Incidents could be homicidal, accidental or suicidal.
- Positional asphyxia is rapid anoxia due to external compression of torso.
- The mode could be traumatic asphyxia, postural asphyxia or restraint asphyxia.



A wide waterfall cascading over a rocky ledge into a pool of water, with a forested background and a cloudy sky.

Thank you!