Hanging

Quick Guide:

Patients should be activated per their physiology and suspected injuries, which will most often be a full trauma given that the majority of suspected injuries include airway issues, level of consciousness/brain injury, and/or spinal cord injuries.

Trauma should be the admitting service to the appropriate level of care. If ICU admission is warranted, the appropriate critical care team should also be consulted (i.e Critical Care Surgery (CCS) for patients >12 yrs of age and Pediatric Critical Care Medicine (PCCM) for patients ≤12 yrs of age).

Terms/Classification [1]

-“Near-hanging” is a term for patients who have survived an attempted hanging (or at least long enough to reach the hospital).

-“Complete hanging” defines when a patient’s legs are fully suspended off the ground and the patient's bodyweight is fully suspended by the neck.

-“Incomplete hanging” defines when some part of the patient’s body is still on the ground and the body's full weight is not suspended off the ground.

-“Judicial hanging” classically refers to victims who fell at least the height of their body.

Epidemiology

-Hanging is the 2nd most common form of successful suicide in the US after firearms. In many areas without access to firearms, hanging is the most common form of successful suicide (England, Australia, New Zealand, also more relevant- in the US jail system)

-Highly lethal (around 70%) but also high survival in those who are rescued and reach the hospital alive (80-90% survival)

-Risk Factors: male, aged 15-44 years, history of drug or alcohol abuse, history of psychiatric illness

Pathophysiology of Injuries

Spine/Spinal Cord:

-In a judicial hanging, there will almost always be cervical spine injury. The head hyperextends, leading to fracture of the upper cervical spine ("hangman's fracture” of C2) and transection of the spinal cord.

-Cervical injuries in non-judicial hangings are rare. [2] One retrospective case review of near-hangings over a 10-year period found the incidence of cervical spine fracture to be as low as 5%. [3]

Vascular:

The major pathologic mechanism of death in hanging/strangulation is neck vessel occlusion, not airway obstruction. [1,4] Death ultimately results from cerebral hypoxia and global ischemia. The most implicated cause of death is venous obstruction. Obstruction of venous outflow from the brain leads to stagnant hypoxia and loss of consciousness in as little as 15 seconds. The risk of damage to the major arterial blood flow to the brain (such as carotid artery dissection) is rare, but should evaluated in patients. [4]

Cardiac:

Carotid body reflex-mediated cardiac dysrhythmias are reported and may account for a minor mechanism of death.

Pulmonary:

-Airway compromise plays less of a role in the immediate death of complete hanging/strangulation. However, it is a major cause of delayed mortality in near-hanging victims. [1,4] Airway edema can occur from mechanical trauma to the airway, which can make intubation difficult. Tracheal stenosis can develop later in the hospital course. The hyoid bone can fracture, and injuries to the cricoid or thyroid cartilage can also occur. [5]

-Significant pulmonary edema occurs through two mechanisms:

1) Neurogenic: centrally mediated, massive sympathetic discharge; often in association with serious brain injury.

2) Post-obstructive: strangulation causes marked negative intrapleural pressure, generated by forceful inspiratory effort against extra-thoracic obstruction; when the obstruction is removed, there is a rapid onset pulmonary edema leading to ARDS.

-Aspiration pneumonitis/pneumonia can cause later sequela of near-hanging injury.

Physical Examination

-"Ligature marks" or abrasions, lacerations, contusions, bruising, edema of the neck

-Tardieu spots (petechiae/ecchymoses) of skin or eyes

-Severe pain on gentle palpation of the larynx (laryngeal fracture)

-Respiratory signs: cough, stridor, dysphonia/muffled voice, aphonia

-Varying levels of respiratory distress

-Hypoxemia

-Mental status changes

Early Management/Stabilization

-Patients should be activated per their physiology and suspected injuries, which will most often be a full trauma

-Evaluate ABCs as always (primary and secondary survey per ATLS protocol)

-Routine immobilization of the cervical spine is recommended

-Patients who have symptoms such as odynophagia, hoarseness, neurologic changes, or dyspnea may require sudden emergent intubation

-Judicious and cautious fluid resuscitation - avoid large fluid volume resuscitation and consider early pressors, as fluids increase the risk/severity of ARDS and cerebral edema

-Monitor for cardiac arrhythmias

-Comatose patients should be assumed to have cerebral edema with elevated ICP and medically managed as such

-Non-intubated patients with pulmonary edema may benefit from noninvasive positive end-expiratory pressure ventilation

-Patients with symptoms of laryngeal or tracheal injury (e.g. dyspnea, dysphonia, aphonia, or odynophagia), should undergo laryngobronchoscopy with ENT [4,6]

Imaging

- Chest x-ray

- Non-contrast CT Head

- CT C-spine

- CTA neck and Head

- Can consider additional CTs (i.e. Trauma “pan scan”) if patient is unconscious, physical exams warrants, or history is concerning for additional injuries or if history is uncertain

Disposition

Trauma should be the admitting service to the appropriate level of care:

-Admit critically ill patients to the ICU with either CCS or PCCM consultation

-Admit patients without ICU needs to the Trauma service

-Even if the initial presentation is clinically benign, all near-hanging victims should be observed for 24 hours, given the potential risk of delayed neurologic, airway, and pulmonary complications [7, 8]

-Psychiatry consult on all suspected intentional cases

-Emphasize strict return precautions as well as education about possible delayed respiratory and neurologic dysfunction when discharging patients

Author and last update

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