

Near-Hanging Injuries

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Case: A 15 yo boy is found in his bedroom hanging from a rope attached to a light fixture. His breathing is labored and he is responsive only to pain. He is periodically extremely agitated and combative.

- AIRWAY
 - C-spine protection is essential before, during and following endotracheal intubation
 - C-spine injury is less likely in incomplete hanging (see below) and suicide attempts.
 - Indications for Intubation:
 - Signs of **airway obstruction** such as stridor.
 - Significant concern for *impending* **airway compromise** (eg, multiple fractures and subcutaneous emphysema).
 - Signs of **pulmonary insult**, such as respiratory distress, diffuse crackles, hypoxemia.

- Significant **alteration of mental status**.
 - GCS < 9, but also for agitation and combative behavior, which can be extremely dangerous.
- Standard RSI techniques should be employed, with a preference for hemodynamically neutral agents.
- Repeated unsuccessful attempts at endotracheal intubation should prompt surgical techniques.
 - Cricothyroidotomy should not be delayed when the patient is not receiving adequate ventilation and oxygen.
 - If children < 8 yo and when cricothyroidotomy is not possible due to anatomical distortion, percutaneous jet ventilation can be attempted.
- BREATHING
 - Look for signs of pulmonary edema/ARDS.
 - Management is according to ARDSNet protocol (eg, low tidal volumes and permissive hypercapnia).
- CIRCULATION
 - **Continuous cardiac monitoring** is critical because patients may suffer unpredictable and sudden onset dysrhythmias, as well as sympathetic surges that may require immediate intervention.
 - **Near-hanging injuries are unlikely to result in hypotension** without a concomitant traumatic injury or toxic ingestion/exposure.
 - Use isotonic or hypertonic IV fluids to treat hypotension or shock
 - **Be judicious with fluids** due to the risk of precipitating or exacerbating pulmonary and cerebral edema.
- DISABILITY
 - **Elevate the head of the bed** to 30 degrees.
 - Avoid mannitol due to its possible association with pulmonary edema?
- EXPOSURE
 - Completely expose the patient, looking for other signs of trauma.
 - Suicide notes, pill bottles, and other items may help direct further work-up and treatment.
- Clinical Presentation
 - Normal
 - Odynophagia
 - Dysphagia

- Dysphonia
- Stridor
- Dyspnea
- History
 - When?
 - Timing is important. If it has been several hours, the risk of edema is less but the neurological prognosis is worse.
 - Complete and incomplete hanging? Strangulation?
 - Strangulation is defined as asphyxia due to external pressure on the airway and vascular structures of the neck.
 - Hanging is the suspension of the body, with compression due to the body's own weight.
 - Complete hanging refers to cases where the patient's feet do not touch the ground (eg, judicial hangings).
 - Complete hangings are associated with a greater incidence of c-spine and other fractures.
 - Suicide?
 - Notes at the scene or on/around the patient?
 - Suicide attempts are most commonly incomplete near-hangings.
 - Fractures are less likely
 - **Consider co-morbid toxic ingestions/exposures.**
- Physical Examination
 - Airway, lung and neurological examinations are key.
 - Ligature marks
 - Tardieu spots
 - Petechiae on mucous membranes
 - Subconjunctival hemorrhage

PITFALLS ◆

- The absence of physical examination findings does not rule out the need for further evaluation; a concerning history alone should prompt a diagnostic workup.

- Diagnostic Testing
 - Imaging

- CXR (for signs of edema and aspiration)
- CT head (if any alteration of mental status)
- CT angiogram of the neck
- Carotid artery ultrasound (an alternative for assessing the carotid arteries when CT angiogram is not performed).

PERSPECTIVES

- Although some authors have argued for a more conservative approach to the evaluation of patients who are asymptomatic after a near-hanging or strangulation event, Dr. Inaba still feels that the data in support of this approach is limited by retrospective design. He still performs imaging (including CT angiography of the neck) on patients with a clear history of near-hanging.
- Toxicology screen (especially acetaminophen and ASA)
- Treatment

PEARLS

- Protocols that emphasize early attention to excellent supportive care have shown improvement of patient oriented outcomes.
- Steroids may be used for laryngeal edema.
- Antibiotics are not used routinely but may be used for patients with subcutaneous emphysema or aspiration.
- Anti-epileptic drugs may be used for patients with anoxic brain injury (eg, phenytoin)
- Prognosis

PEARLS

- In patients that do not suffer cardiac arrest, the prognosis is better than one might expect based on initial presentation.
- Several series demonstrate that a significant proportion of patients who present with profound neurological and cardiopulmonary insults can improve to discharge with a good neurological outcome.
- The prognosis is poor in patients who suffer cardiac arrest.
- Disposition
 - Symptomatic patients are generally admitted to an intensive care setting.
 - Patients who are asymptomatic with normal imaging may be discharged. It is not otherwise known how long they should be observed.

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