



Medical Direction and Practices Board

WHITE PAPER

Drowning

GENERAL POINTS

- Drowning – Primary respiratory impairment from submersion or immersion in a liquid medium. Generally involves loss of consciousness. Mechanism involves reflex inspiration of fluid, leading to hypoxemia by aspiration or laryngospasm
- Non-fatal drowning – At least temporary survival following aspiration or laryngospasm.
- Outdated terms:
 - Near drowning
 - Dry drowning
 - Wet drowning
 - Secondary drowning
- Shallow water blackout – Caused by hyperventilation prior to underwater swimming. Cerebral hypoxia occurs before CO₂ levels trigger urge to breath.
- Loss of coordination and ability to swim is a significant factor in cold water drowning. This is the purpose of life jackets.
- No significant difference in field management for salt water vs. fresh water drowning.
- Cold water is protective to some degree, and survival after prolonged submersion is possible. Current guidelines recommend the following:
 - 1) If water temperature is estimated to be less than 43 ° F and submerged:
 - a. Less than 90 minutes - initiate full resuscitation
 - b. Greater than 90 minutes - consider not initiating resuscitation or termination of resuscitation
 - 2) If water temperature is estimated to be greater than 43 ° F and submerged:
 - a. Less than 30 minutes - initiate full resuscitation
 - b. Greater than 30 minutes - consider not initiating resuscitation or termination of resuscitation¹
- Coexisting illness or injury is common in drowning patients.

FIELD MANGEMENT

- Early ventilation is important, and CPR priorities in the drowning victim differ somewhat from those in the typical adult cardiac arrest. Initially give two rescue breaths and observe result before starting chest compressions. These patients may require early and aggressive airway management, in contrast to victims of cardiac causes of arrest.
- Drowning victims are often also hypothermic, and assessment of pulses in the field setting can be difficult. If functional cardiac activity is present in moderate/severe hypothermia, cold hearts are irritable and ventricular fibrillation can result from rough contact or aggressive movement, including unnecessary chest compressions.
- If hypothermia is suspected, search for pulses for at least one minute before initiating chest compression. Two rescue breaths are safe and recommended during the one-minute pulse check, and might result in quick recovery. Any spontaneous movement or other signs of life indicates functional cardiac activity, even if pules are not able to be palpated in the field.
- Heimlich maneuver and other postural drainage techniques are not recommended.
- Spine immobilization can interfere with essential airway/breathing management. Immediate/routine spinal immobilization is not generally recommended for drowning victims unless signs of injury are present or mechanism suggests spinal trauma. The AHA Cardiac Arrest in Special Circumstances article states: “The reported incidence of cervical spine injury in drowning victims is low (0.009%). Unnecessary cervical spine immobilization can impede adequate opening of the airway and delay delivery of rescue breaths. Routine stabilization of the cervical spine in the absence of circumstances that suggest a spinal injury is not recommended (Class III, LOE B).”²
- If the drowning victim is pulseless after two rescue breaths, and after one-minute search for pulses if hypothermic, conventional AHA resuscitation guidelines apply. Prolonged resuscitation efforts might still be effective if the drowning patient is still hypothermic (below 32 C core).

REFERENCES

Tipton, M “A proposed decision-making guide for the search, rescue and resuscitation of submersion (head under) victims based on expert opinion” *Resuscitation* 82 (2011) 819–824

Vanden Hoek, T et al, “Part 12: Cardiac Arrest in Special Situations: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care” *Circulation* 2010;122;S829-S861