

Drowning/Submersion Injuries

Adult & Pediatric

4.1

Trauma Protocol 4.1

SUBMERSION: When a patient goes under the water immediately, has a hypoxic cardiac arrest and then cools down. Prognosis considered dismal.

IMMERSION: Patients are in the water with head above water and they continue to breathe while they cool down before they eventually arrest. Prognosis can be good with patients surviving after prolonged CPR.

EMT STANDING ORDERS

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- Routine Patient Care.
- Victims with only respiratory arrest usually respond after a few artificial breaths are given.
 - Give a few breaths and check for a pulse.
 - Anticipate vomiting.
- For patients in cardiac arrest, provide immediate CPR.
 - Utilize the sequence ABC, not CAB, i.e. start with airway and breathing before compressions.
- Routine stabilization of the cervical spine in the absence of circumstances that suggest a spinal injury is not recommended.
- Assess temperature, if unresponsive, obtain esophageal or rectal temperature.
- Due to extremely poor prognosis, providers may consider withholding or terminating resuscitation efforts when:
 - A clear history of prolonged submersion (without prior prolonged immersion), greater than 20 minutes (children may survive despite extended submersion) **OR**
 - Esophageal or rectal temperature is greater than 32°C (89.6° F) with asystole documented in 2 leads **OR**
 - Meets Termination of Resuscitation Criteria, see [Resuscitation Initiation and Termination Protocol 8.16](#).
 - Consider hypothermia, see [Hypothermia Protocol 2.10](#).
 - Do not delay urgent procedures such as airway management and IV access. Although hypothermic patients may exhibit cardiac irritability, do not delay necessary interventions.
- Conscious patients who survive any form of drowning are at risk of deterioration and should be transported to the hospital.

ADVANCED EMT/PARAMEDIC STANDING ORDERS

A/P

- Consider CPAP to supplement the patient's own respiratory effort.
- For unconscious patients in distress, consider early intubation.

Protocol Continues

4.1

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HYPOTHERMIA CHART

STAGE: I	Conscious, shivering
Core Temp	35 to 32°C
Treatment:	Warm environment and clothing, warm sweet drinks, and active movement (if possible)
STAGE: II	Impaired consciousness, not shivering
Core Temp	<32 to 28°C
Treatment:	Cardiac monitoring, minimal and cautious movements to avoid arrhythmias, horizontal position and immobilization, full-body insulation, active external and minimally invasive rewarming techniques (warm environment; chemical, electrical, or forced- air heating packs or blankets; warm parenteral fluids)
STAGE: III	Unconscious, not shivering, vital signs present
Core Temp	<28 to 24°C
Treatment:	Stage II management plus airway management as required; ECMO or CPB in cases with cardiac instability that is refractory to medical management
STAGE: IV	No vital signs
Core Temp	<24°C
Treatment:	Stage II and III management plus CPR and up to three doses of epinephrine (at an intravenous or intraosseous dose of 1 mg) and defibrillation, with further dosing guided by clinical response; rewarming with ECMO or CPB (if available) or CPR with active external and alternative internal rewarming

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PEARLS

- Patients with Stage III or IV hypothermia may benefit from treatment at a facility capable of ExtraCorporeal Membrane Oxygenation (ECMO) or CardioPulmonary Bypass (CPB). Consider air medical transport.
- In hypothermic patients, low levels of ETCO₂ may not be a useful predictor of outcome, due to reduced metabolism.
- Oral and tympanic thermometers do not yield an accurate core temperature for severely hypothermic patients.
- Cold water offers enhanced survival only where the patient becomes cold prior to cardiac arrest.
- There is no need to clear the airway of aspirated water; only a modest amount of water is aspirated by most drowning victims, and aspirated water is rapidly absorbed into the central circulation.
- Unnecessary cervical spine immobilization can impede adequate opening of the airway and delay delivery of rescue breaths.