

# DROWNING OR SUBMERSION

## ALL PROVIDERS

- ☐ Focused history and physical exam
  - Blood glucose, core body temperature and oxygen saturation assessment.
  - Assess the scene for other environmental issues or possible toxins.
- ☐ Cardiac monitor, ETCO<sub>2</sub>, pulse oximetry monitoring, blood pressure when available.
- ☐ **Treatment Plan**
  - Safely remove patient from the water
  - Place patient supine
  - Remove wet clothing and wrap in blankets
  - Ensure patient warmth
  - If concern for spinal injury refer to *Spinal Motion Restriction Guideline*.
  - Scuba divers “Dive Computer” or Dive Log Book should be transported with the patient.
- ☐ **Key Considerations**
  - Airway maintenance is the primary consideration.
  - Unlike the “CAB” strategy used in standard cardiac arrest, patients suffering cardiac arrest from drowning require an “ABC” approach with emphasis prompt airway management and supplemental ventilations.
  - There can be co-existing conditions depending on the type of submersion injury including trauma, hypothermia, and intoxication.
  - Hypotension is associated with a worse outcome, monitor closely and treat with *Shock and Fluid Therapy Guideline*
  - Initiation of in-water ventilations may increase survival; however, in-water chest compressions are futile.
  - Submersion in cold water will often cause severe hypothermia, notify receiving hospital so that appropriate resources can be mobilized.
  - Pediatric cardiac arrest due to drowning and hypothermia (temperature <30 C/86 F): consider direct transport to Primary Children’s Medical Center and do NOT rewarm this patient.
  - Adult cardiac arrest due to drowning and hypothermia (temperature <30 C/86 F): consider direct transport to University of Utah Medical Center and do NOT rewarm this patient.

### ADULT

### PEDIATRIC (<15 years of Age)

NOTE: Pediatric weight based dosing should not exceed Adult dosing.

#### EMT

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- ☐ If breathing spontaneously apply oxygen at 15 LPM via non-rebreather mask to maintain oxygen saturations >95%
- ☐ Ventilate with BVM when apneic or exhibiting respiratory distress. Consider a nasal or oral airway
- ☐ Initiate 5 rescue breaths followed by 30 chest compressions, then use a 30:2 compression: ventilation ratio

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#### AEMT

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- ❑ Advanced airway, vascular access and fluid therapy
  - Albuterol 2.5 every 10 minutes via nebulization for bronchospasm/wheezing until symptoms subside
  - Reassess patient after each dose to determine need for additional dosing
- ❑ Consider CPAP in awake patients with respiratory distress

#### PARAMEDIC

- ⌚ **Epinephrine 2–10 mcg/min IV/IO** infusion for hypoperfusion. Titrate to maintain a SBP >100 mmHg
- ⌚ **Push Dose Epinephrine 10mcg** as needed to maintain a SBP >100 mmHg after fluid bolus
- ⌚ **Norepinephrine** initial dose: **0.05 – 1 mcg/kg/min IV/IO** for hypoperfusion. Titrate to maintain a SBP > 100 mmHg. For patients in refractory shock: 8-30 mcg/minute

- ❑ Advanced airway, vascular access and fluid therapy
  - Albuterol 2.5 every 10 minutes via nebulization for bronchospasm/wheezing until symptoms subside. Start with 1.25 mg if age <1yr
  - Reassess patient after each dose to determine need for additional dosing
- ❑ Consider CPAP in awake patients with respiratory distress

#### PARAMEDIC

- ⌚ **Epinephrine 0.1–1 mcg/kg/min IV/IO** infusion for hypoperfusion. Titrate to maintain a SBP >70 + (age in years x 2) mmHg
- ⌚ **Push Dose Epinephrine 1mcg/kg** as needed to maintain a SBP >70 + (age in years x 2) mmHg after fluid bolus
- ⌚ **Norepinephrine** initial dose: **0.05 - 0.1 mcg/kg/min**, titrate to max of 2 mcg/kg/min to maintain SBP >70 + (age in years x 2) mmHg