Drowning

History
- Submersion in water regardless of depth
- Possible history of trauma
  - Slammed into shore wave break
- Duration of submersion / immersion
- Temperature of water or possibility of hypothermia

Signs and Symptoms
- Unresponsive
- Mental status changes
- Decreased or absent vital signs
- Foaming / Vomiting
- Coughing, Wheezing, Rales, Rhonchi, Stridor
- Apnea

Differential
- Trauma
- Pre-existing medical problem
  - Hypoglycemia
  - Cardiac Dysrhythmia
- Pressure injury (SCUBA diving)
  - Barotrauma
  - Decompression sickness
- Post-immersion syndrome

Awake and Alert

- Supplemental Oxygen ***as tolerated***
- Spinal Motions Restriction Procedure WTP 2/Protocol TB 8 ***if indicated***
- Remove wet clothing Dry / Warm Patient
- Monitor and Reassess
- **Encourage transport and evaluation even if asymptomatic or with minimal symptoms** *Asymptomatic drowning patients (refusing transport) should be instructed to seek medical care/ call 911 if they develop any symptoms within 6 hours*
- IV / IO Access Protocol UP 6 ***if indicated***
- P Cardiac Monitor ***as indicated***

Awake but with AMS

- 5 Breaths via BVM ***as tolerated***
- Supplemental Oxygen ***as tolerated***
- Age Appropriate Airway Protocol(s) 1-7 ***as indicated***
- Spinal Motion Restriction Procedure WTP 2/ Protocol TB 8 ***if indicated***
- Altered Mental Status Protocol UP 4 ***as indicated***
- Remove wet clothing Dry / Warm Patient
- IV / IO Access Protocol UP 6
- P Cardiac Monitor

→ Age Appropriate Airway Protocol(s) AR 1 - 7 ***as indicated***

Unresponsive

- 5 Breaths via BVM ***as tolerated***

Pulse
- YES → Age Appropriate Airway Protocol(s) 1-7 ***as indicated***
- NO → Exit to Age Appropriate Cardiac Arrest Protocol(s) AC 3 / PC 4 Airway Protocol(s) AR 1 - 7 Spinal Motion Restriction Protocol TB 8 ***as indicated***

Notify Destination or Contact Medical Control

Dive Accident / Barotrauma
Divers Alert Network
1-919-684-9111

Hyperbaric Chamber located at Duke University Trauma Center

Toxic-Environmental Protocol Section

Pearls
- **Recommended Exam: Respiratory, Mental status, Trauma Survey, Skin, Neuro**
- **Drowning is the process of experiencing respiratory impairment (any respiratory symptom) from submersion / immersion in a liquid.**
- **Begin with BVM ventilations, if patient does not tolerate then apply appropriate mode of supplemental oxygen.**
- **Ensure scene safety. Drowning is a leading cause of death among would-be rescuers.**
- **When feasible, only appropriately trained and certified rescuers should remove patients from areas of danger.**
- **Regardless of water temperature – resuscitate all patients with known submersion time of ≤ 25 minutes.**
- **Regardless of water temperature – If submersion time ≥ 1 hour consider moving to recovery phase instead of rescue.**
- **Foam is usually present in airway and may be copious, DO NOT waste time attempting to suction. Ventilate with BVM through foam (suction water and vomit only when present.)**
- **Cardiac arrest in drowning is caused by hypoxia, airway and ventilation are equally important to high-quality CPR.**
- **Encourage transport of all symptomatic patients (cough, foam, dyspnea, abnormal lung sounds, hypoxia) due to potential worsening over the next 6 hours.**
- Predicting prognosis in prehospital setting is difficult and does not correlate with mental status. Unless obvious death, transport.
- Hypothermia is often associated with drowning and submersion injuries even with warm ambient conditions.
- Drowning patient typically has <1 – 3 mL/kg of water in lungs (does not require suction) Primary treatment is reversal of hypoxia.
- Spinal motion restriction is usually unnecessary. When indicated it should not interrupt ventilation, oxygenation and / or CPR.