   d. Severe head injury – Elevate head of bed 30 degrees
5. Transport destination specific to head trauma
   a. Preferential transport to highest level of care within trauma system:
      i. GCS 3–13, P (pain) or U (unresponsive) on AVPU scale
      ii. Penetrating head trauma
      iii. Open or depressed skull fracture

Patient Safety Considerations

1. Do not hyperventilate patients: Maintain all patients in $EtCO_2$ range of 35–45 mmHg
2. Assume concomitant cervical spine injury in patients with moderate/severe head injury
3. **Geriatric Consideration:** Elderly patients with ankylosing spondylitis or severe kyphosis should be padded and immobilized in a position of comfort and may not tolerate a cervical collar
4. **Pediatric Consideration:** Children have disproportionately larger heads. When securing pediatric patients to a spine board, the board should have a recess for the head, or the body should be elevated approximately 1–2 cm to accommodate the larger head size and avoid neck flexion when immobilized

Notes/Educational Pearls

Key Considerations

1. Head injury severity guideline:
   a. **Mild**: GCS 14–15/AVPU = (A)
   b. **Moderate**: GCS 9–13/AVPU = (V)
   c. **Severe**: GCS 3–8/AVPU = (P) or (U)
2. Important that clinicians be specifically trained in accurate neurologic status assessment [See Appendix VII. Neurologic Status Assessment]
3. If endotracheal intubation or invasive airways are used, continuous waveform capnography is required to document proper tube placement and assure proper ventilation rate and minute volume (preventing both hyperventilation [too fast] and overventilation [too much])
4. Herniation is difficult to diagnose in the prehospital setting. Hyperventilation results in vasoconstriction which further decreases blood flow to the brain and worsens the secondary brain injury.

Pertinent Assessment Findings

1. Neurologic status assessment findings
2. Pupils
3. Trauma findings on physical exam

Quality Improvement

Associated NEMSIS Protocol(s) (eProtocol.01) *(for additional information, go to www.nemsis.org)*

- 9914101 – Injury - Head

Key Documentation Elements

- High-flow oxygen with non-rebreather (NRB) mask
- Airway status and management
- $EtCO_2$ monitored and documented for all traumatic brain injury (TBI) patients with advanced airway and strict avoidance of hyperventilation, overventilation, and hypocapnia)