

# EPIC vs ITLS Guidelines for Management of Traumatic Brain Injury

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The Excellence in Prehospital Injury Care TBI Project (EPIC) is based on Brain Trauma Foundation guidelines from 2000 (Gabriel, 2002) and 2008 (Badjatia, 2008). There are a few differences between ITLS standards and EPIC guidelines, as noted below:

- Hyperventilation:
  - ITLS: Hyperventilate only when cerebral herniation imminent, and only after correcting hypotension or hypoxia. Hyperventilation is defined as an ETCO<sub>2</sub> 30-35 and/or a rate of 20bpm. Never hyperventilate to ETCO<sub>2</sub> less than 30.
  - EPIC: NEVER Hyperventilate. Keep ETCO<sub>2</sub> at 40mmHg (range 35-45), or if ETCO<sub>2</sub> unavailable, ventilate adults and children age 15+ at 10bpm, children age 2-14 at 20bpm and infants age 0-24 months at 25bpm.

Rationale: Cerebral herniation is rare in the prehospital environment, is almost always fatal, and is difficult to accurately diagnose in the field. The severe brain trauma patient often has some degree of signs of cerebral herniation, but is at low risk of imminent herniation. However, the risk of secondary injury is real and very likely if the patient is ever hyperventilated. Hyperventilation will always happen if it is not meticulously prevented. EPIC guidelines call for never hyperventilating TBI patients.

- Oxygenation:
  - ITLS: High flow O<sub>2</sub>, Keep O<sub>2</sub> Sat>90% (>95% is good)
  - EPIC: Same

Rationale: Hyperoxygenation has never been proven to cause harm in the typically short care intervals of EMS calls. Hypoxia has been proven to cause harm, especially in an injured brain. Err on the side of hyperoxygenation until at the trauma center.

- Blood Pressure
  - ITLS: Keep B/P 110-120
  - EPIC: Keep B/P >90 (Stay Tuned)

Rationale: Isolated head injuries are seldom hypotensive, and usually will be above 120 systolic. However, multisystem trauma patients are more complicated. EPIC is expected to provide more insight into optimum blood pressure in a range of patients. Early results appear to show lower mortality with higher blood pressures, but the evidence is not enough to make changes to care at present.

- Blood Sugar
  - ITLS: Check and record it

- EPIC: Keep >70
- Standing Orders-variable, often keep>60.
- Advice: Follow Standing Orders/Medical Direction

Rationale: Hypoglycemia is damaging to injured brain cells. Blood sugar should be kept at an adequate level. The best minimum level has not been established. Check blood sugar and manage according to your medical direction or standing orders.

- Sedatives
  - ITLS: Use benzodiazepines with caution—they can cause hypotension and hypoxia
  - EPIC: Consistent. Consider ¼ normal dose.

Rationale: Sedatives used in the field often cause hypotension. Use the least amount of sedation possible, and add as necessary.

Badjatia, Neeraj, et al. "Guidelines for prehospital management of traumatic brain injury 2nd edition." *Prehospital Emergency Care* 12.s1 (2008): S1-S52.

Gabriel, Edward J., et al. "Guidelines for prehospital management of traumatic brain injury." *Journal of neurotrauma* 19.1 (2002): 111.