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Algorithmic Approach

- A. In a patient who has sustained significant trauma, especially if there is high suspicion for a head injury based on the mechanism of injury, advanced trauma life support (ATLS) protocol should be followed [1].
- B. After calculating the Glasgow Coma Score (GCS), traumatic brain injury (TBI) can be classified into mild, moderate, and severe. Patients with mild TBI have a GCS of 13–15 upon arrival to the emergency department, those with moderate TBI have a GCS of 9–12, and those with severe TBI have a GCS of 8 or less [2].
- C. In a patient with a GCS of 13–15, a complete neurological and mental status exam should be performed. If there is any report of loss of consciousness or amnesia reported, a computed tomography (CT) scan should be obtained to rule out a more significant brain injury. It is common for patients with moderate or severe TBI to present with a lucid interval, as seen with epidural hematoma, and subsequently decompensate rapidly [1].
- D. If the CT scan is negative for further injury, the patient with a normal neuro exam who has been observed for 4–6 h and without further concerns for neurologic injury can be discharged with instructions on symptoms which would prompt a return visit. If there are concerns for the patient despite a normal exam, 12–24 h of continued observation prior to discharge is appropriate [1].
- E. A patient with a GCS of 9–12 on presentation to the emergency department has a moderate TBI. These patients should also undergo a complete neurological and mental status exam along with a CT scan. These patients warrant admission to an intensive care unit for frequent neurological and mental status exams [1].
- F. If there is improvement in the patient's condition, the patient may be downgraded and neuro exams performed with less frequency. If the patient does not show any signs of improvement within 6–12 h, a CT scan should be repeated to rule out worsening of known lesions or the formation of new lesions [1].
- G. Nearly all patients with a moderate TBI will need some sort of rehab. Patients who have a severe TBI will need extensive rehab, assuming they recover from the inciting insult [1].
- H. Patients with a GCS of 8 or less have a severe TBI. Based on GCS alone, these patients are unable to properly protect their airway and should be intubated immediately.

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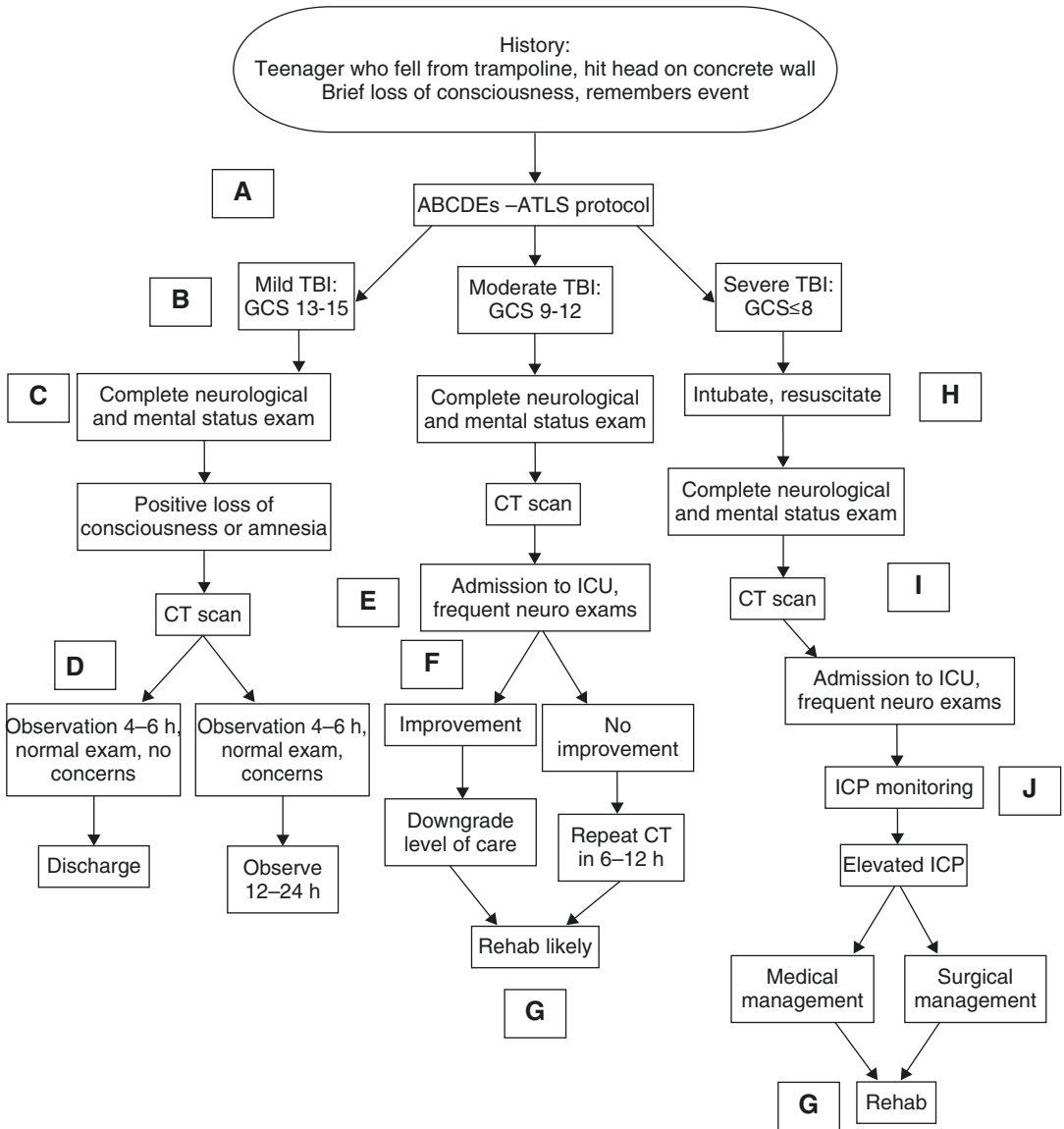
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Hyperventilation can be considered in the acute setting, maintaining PaCO₂ between 30 and 35 mm Hg. Patients also need to be adequately resuscitated, and the patient should also be properly assessed for any sources of ongoing bleeding which may lead to a hypovolemic state. It is critical to avoid hypotension (systolic blood pressure <90 mm Hg) and hypoxia (oxygen saturation <90%) to prevent further ischemic insult to the brain. Early neurosurgical consultation is advisable [1, 2].

I. If possible, prior to intubation, a complete neurological and mental status exam should be performed. This should not, however, dis-

tract from the ABCDEs. A CT scan should be performed as soon as the patient is stable enough to undergo the test. These patients also prompt an intensive care unit (ICU) admission with frequent neurological examinations [1].

J. Intracranial pressure (ICP) monitoring should be performed in patients with severe TBI. If ICP is found to be elevated (≥ 25 mm Hg), the patient can be managed medically with mannitol (0.5–1 g/kg) or hypertonic saline. If an epidural hematoma or subdural hematoma is responsible for the elevated ICP, surgical management with a decompressive craniectomy is necessary [1].



Algorithm 151.1

References

1. Decuyper M, Klimo P Jr. Spectrum of traumatic brain injury from mild to severe. *Surg Clin North Am.* 2012;92(4):939-57., ix. <https://doi.org/10.1016/j.suc.2012.04.005>.

2. Chesnut RM. Care of central nervous system injuries. *Surg Clin North Am.* 2007;87(1):119-56., vii. <https://doi.org/10.1016/j.suc.2006.09.018>.