Management of Patients With Neurologic Trauma

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Acceleration
WHIPLASH INJURIES OF THE HEAD AND NECK

Hyperextension

Intervertebral disk
Vertebral artery
Cervical sympathetic chain
Spinous process

Muscle injury

Scalene muscles
Splenius capitis muscle
Sternocleidomastoid muscle
Muscle tear

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Pathophysiology of Traumatic Brain Injury

1. Brain suffers traumatic injury
2. Brain swelling or bleeding increases intracranial volume
3. Rigid cranium allows no room for expansion of contents so intracranial pressure increases
4. Pressure on blood vessels within the brain causes blood flow to the brain to slow
5. Cerebral hypoxia and ischemia occur
6. Intracranial pressure continues to rise. Brain may herniate
7. Cerebral blood flow ceases
Basilar Fractures Allow CSF to Leak From the Nose and Ears

Figure 57-14, pp. 1482
Initial Management of the Severe Head Injury Patient

Also see Table 57-9, pp. 1484 for emergency management.

* Only in the presence of signs of herniation or progressive neurologic deterioration not attributable to extracranial factors.

(ATLS = Advanced Trauma Life Support).
WARNING SIGNS AFTER A HEAD INJURY
(The First 24 Hours)

* Changes in LOC
  - Drowsiness
  - Confusion
  - Difficult to Arouse

* Pupils slow to react or unequal

* Seizures

* Bleeding or water drainage from nose or ears

* Visual Problems
  - Loss of sensation to any extremity

* Slurred Speech

* Projectile Vomiting

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Location of Subdural, Intracerebral, & Epidural Hemorrhages

Figure 57-15, pp.1483
The Glasgow Coma Scale is a tool for assessing a patient’s response to stimuli. Scores range from 3 (deep coma) to 15 (normal).

<table>
<thead>
<tr>
<th>Eye opening response</th>
<th>Spontaneous 4</th>
<th>To voice 3</th>
<th>To pain 2</th>
<th>None 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Best verbal response</td>
<td>Oriented 5</td>
<td>Confused 4</td>
<td>Inappropriate words 3</td>
<td>Incomprehensible sounds 2</td>
</tr>
<tr>
<td>Best motor response</td>
<td>Obeys command 6</td>
<td>Localizes pain 5</td>
<td>Withdraws 4</td>
<td>Flexion 3</td>
</tr>
<tr>
<td>Total</td>
<td>3 to 15</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 61-5, pp. 1591

(A, B, and C from Copstead LC, Banasik JL. Pathophysiology, ed 3, Philadelphia, 2005, Saunders.)
SPINAL CORD INJURY
(Paralysis Below The Level Of Injury)

Injuries ↑ C-4 = Paralysis of respiratory muscles AND all four extremities. (Quadriplegia)

Higher the injury Greater the loss of function.

Temperature Regulation Problems ↓ Level of Injury...

Depend on the type and level of injury (Chart 63-7, pp. 2252)
Central cord syndrome

Anterior cord syndrome

Brown-Séquard syndrome

A, Anterior median fissure
B, Posterior median sulcus
C, Central cord
D, Anterior spinal artery

Gray matter
Compressed area of spinal cord

Figure 61-7, pp. 1592