



HEAD TRAUMA

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HEAD TRAUMA

The primary goal of treatment for patients with suspected traumatic brain injury is to prevent secondary brain injury.

HEAD TRAUMA

Objectives

By the end of this interactive discussion, you will be able to:

- ✓ Recognize the GCS score that corresponds to a severe head injury and indicates a comatose patient.
- ✓ Identify the different types of intracranial bleeding seen on CT that are associated with traumatic brain injury.
- ✓ Discuss the role of supplemental oxygen and systolic blood pressure maintenance in limiting secondary brain injury.
- ✓ Describe the management of intracranial hypertension associated with the mass effect of blood or brain swelling.
- ✓ Discuss the indications for early, rapid transfer to a center equipped to manage a patient with brain injury.

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Case Scenario

M: 23-year-old male, fell from bicycle, hitting head on curb; no helmet

I: 10 cm laceration to the L temporal-parietal region

S: Initially able to say his name. HR 115; BP 100/60; O₂ sat 88%; GCS 12 (E3V3M6)

Two hours after transport to local hospital, patient has sonorous respirations; HR 120; BP 100/70; GCS 6 (E2V1M3)

T: IV cannulas in situ, O₂ via nasal prongs, 200mLs crystalloid infused

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Discussion Question

1. What are the initial priorities in the management of this patient?

Case Details

M	23-year-old male, fell from bicycle, hitting head on curb; no helmet
I	10 cm laceration to the L temporal-parietal region
S	Initially able to say his name. HR 115; BP 100/60; O ₂ sat 88%; GCS 12 (E3V3M6) Two hours after transport to local hospital, patient has sonorous respirations; HR 120; BP 100/70; GCS 6 (E2V1M3)
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Discussion Question

2. What are the signs that the patient's injury is progressing?

Case Details

M	23-year-old male, fell from bicycle, hitting head on curb; no helmet
I	10 cm laceration to the L temporal-parietal region
S	Initially able to say his name. HR 115; BP 100/60; O ₂ sat 88%; GCS 12 (E3V3M6) Two hours after transport to local hospital, patient has sonorous respirations; HR 120; BP 100/70; GCS 6 (E2V1M3)
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Case Scenario Progression

- Patient intubated
- Given 1 L normal saline
- Vital signs: HR 100; BP 100/70; O₂ Sat 94%



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Discussion Question

1. How do you monitor this patient's neurological status

- Patient intubated
- Given 1 L normal saline
- Vital signs: HR 100; BP 100/70; O₂ Sat 94%

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Discussion Question

2. What other injuries and physical exam findings may suggest cranial and intracranial injury?

- Patient intubated
- Given 1 L normal saline
- Vital signs: HR 100; BP 100/70; O₂ Sat 94%

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Case Scenario Progression

- ❖ Head, c-spine and abdominal CTs performed.
- ❖ Head CT: temporal bone fracture, epidural hematoma, 1 cm of midline shift
- ❖ C-spine normal

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Discussion Questions

1. What types of intracranial hemorrhage can be identified on CT scan?



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Discussion Questions

2. What CT scan findings are indicative of severe head injury that may require intervention?

- ❖ Head, c-spine and abdominal CTs performed.
- ❖ Head CT: temporal bone fracture, epidural hematoma, 1 cm of midline shift
- ❖ C-spine normal





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Case Scenario Progression

- Thoracoabdominal CT scan normal
- Initial management includes:
 - elevating the head of bed
 - sedation with short-acting medications
 - frequent neurological examinations

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Discussion Question:

1. What are the initial management options for this patient with severe brain injury and how do these differ from mild and moderate brain injury?

- Thoracoabdominal CT scan normal
- Initial management includes:
 - elevating the head of bed
 - sedation with short-acting medications
 - frequent neurological examinations

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Discussion Question:

2. What are the indications for transferring a patient with a head injury to a center with a higher level of care?

- Thoracoabdominal CT scan normal
- Initial management includes:
 - elevating the head of bed
 - sedation with short-acting medications
 - frequent neurological examinations

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Case Scenario Progression

- ✓ Neuro exam shows progression to extensor posturing.
- ✓ Repeat CT scan shows new subdural hematoma with associated mass effect and midline shift.
- ✓ Herniation appears imminent without treatment.
- ✓ Patient requires a higher level of care and rapid transfer to neurosurgeon



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Discussion Question:

1. What are the initial treatment options that may protect the brain from ongoing swelling?

- Neuro exam shows progression to extensor posturing.
- Repeat CT scan shows new subdural hematoma with associated mass effect and midline shift.
- Herniation appears imminent without treatment.
- Patient requires a higher level of care and rapid transfer to neurosurgeon.

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Case Scenario Conclusion

- Neurosurgeon recommends 0.5 g/kg mannitol and adjusting PaCO₂ to 30 to 35 mm Hg.
- Patient is immediately transported for emergency craniotomy.
- Patient underwent successful evacuation of his intracranial hematoma.
- He was discharged to a rehabilitation center for ongoing therapy.

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Any Questions?

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Review Objectives

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Key Learning Points

- GCS score is an objective, reproducible measurement of brain injury severity.
- GCS of 8 or less is considered severe and indicative of a comatose patient.
- Consider a CT scan of the head for any trauma patient with suspected traumatic brain injury.
- Initial management of intracranial hypertension includes:
 - elevation of the head of bed
 - sedation
 - selective administration of mannitol and hypertonic saline

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Key Learning Points

- Minimize secondary brain injury by:
 - adequate oxygenation (supplemental oxygen)
 - ensuring brain perfusion: SBP > 100 mm Hg (age 50-69) or > 110 mm Hg (15 - 49 and older than 70)
- If no neurosurgical capability, consider early, rapid transfer



Thanks for your kind attention