HEAD TRUAMA

- Presented by: Dr Meshkini Ali
- Prof. Neurosurgery Dep.
- TUOMS

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

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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; 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)

T: IV cannulas in situ, O_2 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
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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; O_2 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; O_2 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; O_2 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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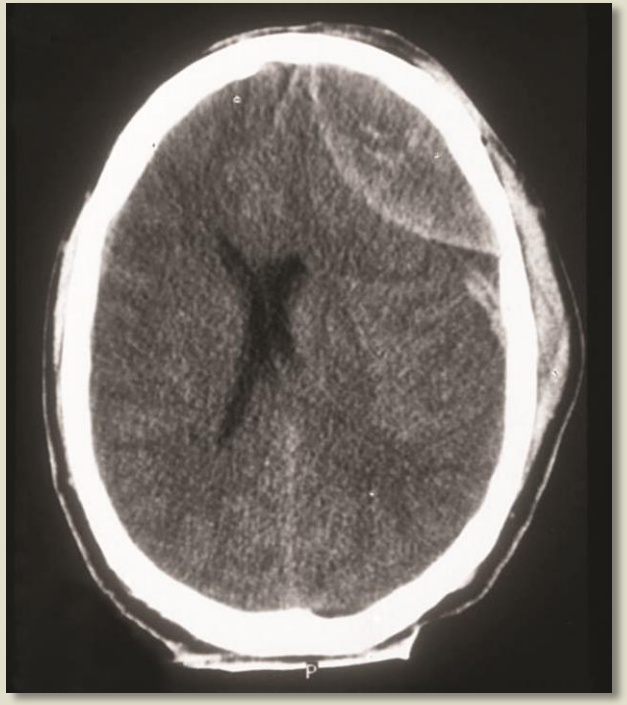
Discussion Questions

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



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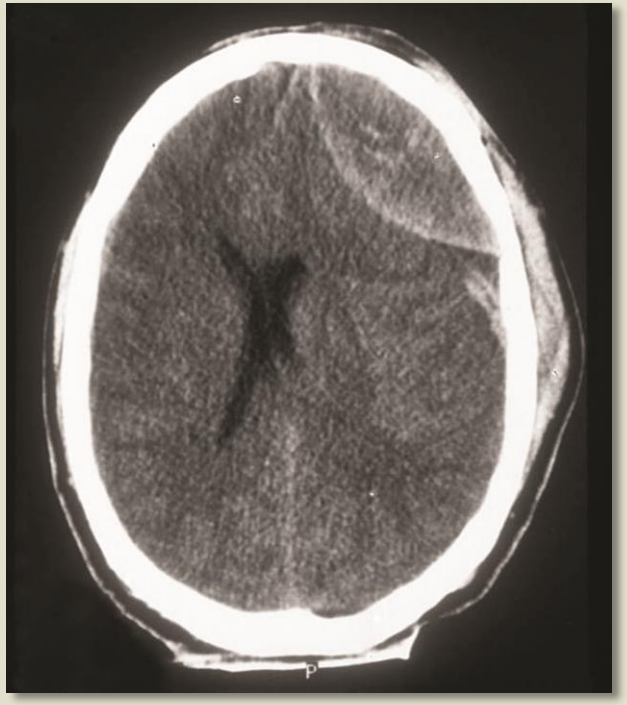
Discussion Questions

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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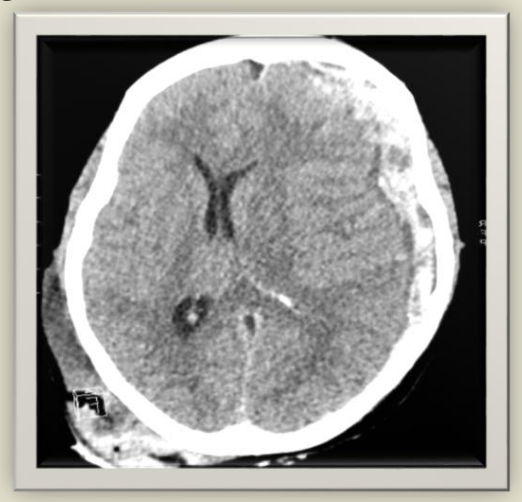
Case Scenario Progression

- ✓ 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 $PaCO_2$ 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