


Brain Injury Course


Acute Spinal Cord Injury

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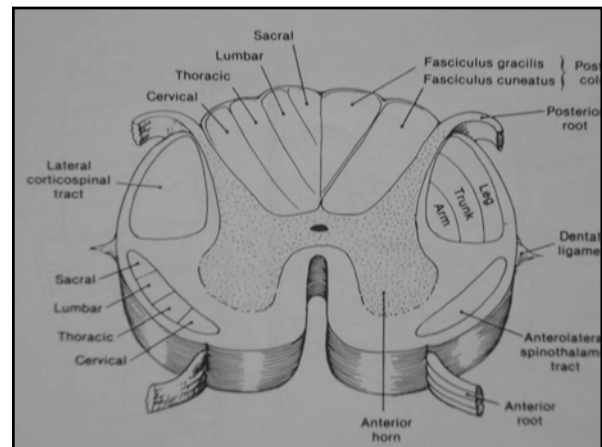
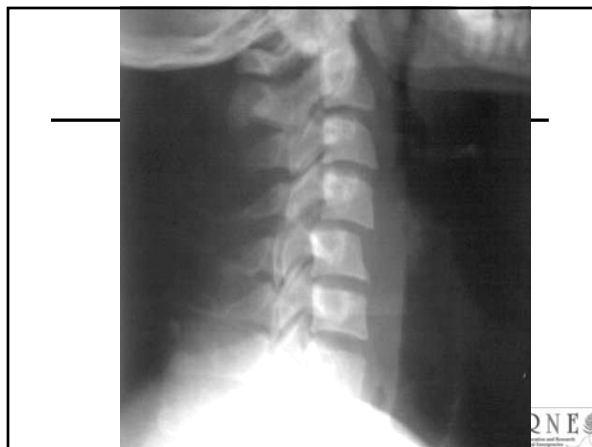

Objectives

- Review the clinical presentation of patients with acute spinal trauma
- Present the grading scales used in describing acute spinal cord injury
- Discuss the management strategies for spinal cord trauma
- Introduce the potential late sequelae of spinal cord injury



Case Study: Spinal Cord Injury

- 16 yo male
- Trampoline for his birthday
- Brought EMS; 2 IV's, backboard, C-collar
- Nasal intubation in the field
- VS: P 128; BP 90/55
- Alert
- No spontaneous movement or reflexes



SCI: Subtypes

- **Complete:** complete transection of motor and sensory tracts
- **Incomplete:**
 - > **Central Cord Syndrome**
 - > **Anterior Cord Syndrome**
 - > **Posterior Cord Syndrome**
 - > **Brown Sequard Syndrome**



Neurologic Examination

- Document all findings
- Level of consciousness
- Motor strength
- Sensation to light touch and pinprick
- Diaphragm, abdominal, and sphincter function
- DTRs, plantar reflexes, sacral reflexes
- Position sense
- Sacral sparing (perineal sensation, sphincter tone)



MOTOR KEY MUSCLES

SENSORY KEY SENSORY POINTS

Legend:
 0 = total paralysis
 1 = palpable or visible contraction
 2 = active movement - gravity assisted
 3 = active movement - against gravity
 4 = active movement - against some resistance
 5 = active movement - against full resistance
 NT = not testable

Legend:
 0 = absent
 1 = impaired
 2 = normal
 NT = not testable

Legend:
 □ Voluntary anal contraction (Yes/No)
 □ Any anal sensation (Yes/No)

TOTALS: MOTOR SCORE (0-100), PIN PRICK SCORE (0-112), LIGHT TOUCH SCORE (0-112)

LOGICAL FLS: SENSORY MOTOR, COMPLETE OR INCOMPLETE?, ZONE OF PARTIAL PRESERVATION, ASIA IMPAIRMENT SCALE

ASIA Impairment Scale

- **A: Complete**
- **B: Incomplete: Sensory, but no motor function below neurological level**
- **C: Incomplete: Motor function preserved below level; muscle grade < 3**
- **D: Incomplete: Motor function preserved below level: muscle grade > 3**
- **E: Normal**



Complete Cord

- **No sensation**
- **Flaccid paralysis**
- **Initially areflexia**
 - > **Hyperreflexia, spasticity, positive planter reflex (days to months)**
- **<5% chance of functional recovery if no improvement within 24 hours**



Traumatic SCI: Management

- **ABC's: Treat / prevent hypoxia and hypotension**
- **Stabilize the spine to prevent additional mechanical injury**
- **R/O other serious injuries**
- **Careful neurological examination: level of neurological impairment**
- **Imaging**
- **Neuroprotective pharmacotherapy?**
- **Early rehabilitation**



**Guidelines for the Management of
Acute Cervical Spine and SCI.**
Neurosurg 2002;50 (suppl) :1-200

- Evidence based practice guideline
- 22 chapters
- Chapter on pharmacologic therapy most controversial
 - > 17 pages of editorial commentary in the preface



**IX. Pharmacological Therapy after
Acute Cervical Spinal Cord Injury**

- Recommendations: Corticosteroids
 - > Standards / guidelines: None
 - > Options: Treatment with methylprednisolone for either 24 or 48 hours is recommended as an option in the treatment of patients with acute spinal cord injury within 12 hours of injury.
- B) GM-1 Ganglioside
 - > Standards / guidelines: None
 - > Options: Treatment of acute spinal cord injury patients with GM-1 ganglioside is an option for treatment without clear evidence of clinical benefit or harm.



Mortality

- Mortality is highest in the first year after injury
- Persons sustaining paraplegia at age 20 have an average subsequent life expectancy of 44 years
- Leading cause of death are pneumonia, PE
 - > Renal failure is no longer a leading cause of death



Conclusions

- Management of acute SCI: prevent additional injury and provide supportive care
- Role of methylprednisolone in SCI is questionable
- Acute SCI above T7 - low sympathetic activity; chronic SCI - high sympathetic activity
- Pneumonia, PE, and sepsis are the most common causes of death on patients with chronic SCI

