



*AAST Acute Care Surgery Didactic Curriculum*

## **Spine and Spinal Cord Injury**

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### Highlights:

- **Evaluation:** Computed Tomography (CT) imaging of the spine is the gold standard for diagnosis of spinal column fractures. Additional imaging with magnetic resonance imaging (MRI) should be obtained for patients with discordant physical exam and CT findings (eg normal CT scan with neurologic deficits or pain out of proportion), there is concern for spinal instability and/or spinal cord injury, or when operative intervention is planned.
- **Spinal Cord Injury Classification:** Spinal cord injuries are classified as complete or incomplete and can be further subtyped using the American Spinal Injury Association (ASIA) scoring system.
  - **Complete (ASIA A):** There is no motor or sensory function below the level of injury and no sacral sparing.
  - **Incomplete (ASIA B-D):** There is preserved voluntary anal contraction, non-zero perineal sensory scores, and often a preserved bulbocavernosus reflex as well as various degrees of motor function and sensation caudal to the level of injury. Examples include central cord syndrome, anterior cord syndrome, and Brown-Sequard injuries.
  - **Spinal shock:** There is a transient loss of complete spinal cord function below the level of injury despite fairly unremarkable imaging. There is a gradual return of reflexes, generally beginning with the bulbocavernosus reflex, over a period of hours to days. This is due to a physiological rather than a mechanical process.
- **Blood Pressure Augmentation:** The American Association for Neurological Surgeons recommends that MAP should be maintained above 85-90 mmHg for 7 days after injury to improve spinal cord perfusion and to limit secondary injury. This recommendation is based on limited data and remains an area of investigation. If there is no evidence of neurologic improvement after 72 hours or if there is evidence of complete spinal cord transection, blood pressure augmentation should be stopped. Blood pressure augmentation must be balanced with vasopressor-related adverse outcomes.
- **Corticosteroids:** There is no role for treatment with steroids in penetrating spinal cord injury. There remains a lack of consensus regarding corticosteroid use in blunt thoracic spinal cord injury, however, the majority of guidelines recommend against routine use of methylprednisolone. There is some data that shows that patients treated with methylprednisolone within 8 hours of injury have improvement in ASIA motor scores but the long-term benefits remain questionable. Steroid treatment is also associated with

higher rates of infection, respiratory compromise, gastrointestinal hemorrhage, and death.

- **Operative Management:** Surgical intervention is aimed at limiting secondary injury through decompression, fracture reduction, mechanical stabilization, and correction of deformities. The data remains mixed regarding timing of operative intervention; however, the majority of studies show improved neurologic function when surgery is performed within 24 hours. This improvement occurred primarily in patients with incomplete spinal cord injuries, but one study showed improvement in 40% of patients with complete spinal cord injuries. Evidence also suggests decreased complication rates (eg pneumonia, pressure ulcers, and UTI) with early (<24 hours) operative intervention. If the patient has a declining neurological exam, operative decompression should be pursued emergently.
- **Venous Thromboembolism (VTE) Prophylaxis:** Low-molecular weight heparin should be initiated within 72 hours of injury but discussions should be held with the Neurosurgery or Orthopedic spine surgeons about starting prophylaxis sooner, if clinically appropriate. Low molecular weight heparin compared to unfractionated heparin has reduced DVT, VTE, and mortality rates and there is no significant difference in the formation of postoperative epidural hematomas between the two agents. Removable IVC filters should only be used when there is a contraindication to or failure of pharmacologic prophylaxis. Given that the majority of VTE events occur within the first 8 weeks after spinal cord injury, at least 8 weeks of pharmacologic prophylaxis is recommended by the Spinal Cord Consortium.