Acute Traumatic Central Cord Syndrome After Minor Trauma

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Introduction

- Initially described in the literature in 1893 as a case of “concussion of the spine,” acute traumatic central cord syndrome (ATCCS) has remained the most common cause of incomplete spinal cord injury.
- Hyperextension injury to the neck (figure 1) leading to ischemia, hemorrhage, or necrosis within the central region of the spinal cord results in the distinctive pattern of neurological findings seen.
- It is characterized by weakness that predominantly affects the upper extremities with variable sensory and bladder affection below the level of the lesion (figure 2).
- Although literature supports both conservative and surgical intervention, there is currently no high-level evidence to guide management decisions.

Case Presentation

- A 50-year-old male with a past medical history significant for cervical spondylosis and coronary artery disease who presented with significant upper extremity pain, weakness and a burning sensation hours after a hyperextension injury to his neck in the setting of a minor fall from ground level.
- On admission, he was found to be hypertensive and tachycardic with otherwise normal vital signs.
- Neurological exam revealed significantly decreased motor strength in the upper extremities in comparison with the lower extremities, with diminished sensation and notable allodynia also localized to the upper extremities. Clonus and hyperreflexia were also evident in bilateral lower extremities.
- Imaging studies revealed multilevel cervical spondylosis superimposed on a congenitally narrow canal causing stenosis with cord flattening and neural foraminal narrowing most significant from C3 through C7 (figure 3, 4).
- There was also significant edema seen within the spinal cord at the same levels.
- On admission, he had a full trauma assessment, and was placed in a cervical collar.
- Neurosurgery was emergently consulted, and he was started on Decadron 2mg q6h along with gabapentin 300mg BID.
- After 2 days on Decadron, the patient reported slight improvement in upper extremity function.
- On the 5th hospital day, he underwent posterior cervical decompression and fusion of C3-C7 (figure 5).
- After the surgery, the Decadron was tapered, the cervical collar was removed, and the patient started working with physical and occupational therapy with notable improvement in his upper extremity function daily.

Therapeutic Challenges

- No high-level evidence to guide treatment decisions.
- Recovery ability to ambulate - 87%
- Recovery functional independence - 80%
- Have persistent neuropathic pain - 47%
- Depends on the mechanism and morphology of the spinal injury
- Training Bias
- Time-Sensitive

Prognosis

- Some degree of motor and sensory recovery is common depending on many prognostic factors
- Recovery occurs in an ascending fashion (motor leg function → bladder control → arms → hands)
- Recovery plateaus after 1-2 years
- Many experience persistent weakness, autonomic dysfunction, and neuropathic pain

Discussion

- The variation in injury pattern is associated with the morphology and biomechanical difference between the young and old in the degree of cervical spondylosis, baseline cervical stenosis and spinal flexibility.
- Multidisciplinary care with neurosurgeons or orthopedic surgeons early on is important.
- Immobilization of the cervical spine and ICU admission for continuous monitoring of vital signs is essential.
- Physical and occupation rehabilitation are essential in improving prognosis.

Future Considerations

- Additional studies are needed to determine:
  1. Whether medical or surgical management should be 1st line.
  2. Indications and timing of corticosteroids
  3. Indications and timing of surgery.

Conclusions

- ATCCS involves a widely heterogeneous patient population that until now has been treated with a “one size fits all” approach, with unpredictable success. The objective of this article is to emphasize the need for further research regarding the management of this well-recognized but challenging condition in order to identify patients who are likely to benefit from surgical versus conservative means and maximize recovery from an event that can potentially debilitate a patient’s life forever.

References