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Protective Effect of Previous Spine Surgery in Traumatic Cervical Spinal Cord Injury: A Case Report

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Case Description

Setting: Major academic and referral center with Level I adult trauma

Disclosure: None

A 39-year-old female with previous C5-7 anterior cervical discectomy and fusion (ACDF) in 2017 presented following a fall from 20 feet while hiking. She was life flighted to an outside hospital and found to have multiple cervical spine fractures including bilateral C7 pars interarticularis fractures with anterior displacement of superior articular facets, with fracture extending through bilateral C7 pedicles, right C7 transverse process, and to the posterior inferior C7 vertebral body, which were surgically repaired with extension of her previous fusion from C4-T2 fusion and C7 laminectomy. Imaging also showed retropulsion of osseous fragments in the spinal canal at the lower C7 level deforming the ventral cord contour, and cord edema/injury at C7-T1. On evaluation, she had right lower extremity monoparesis with 0/5 on manual muscle testing, bilateral clonus, urinary retention, and severe constipation. She initially had decreased sensation at T4 dermatome and below that returned to normal within 48 hours.

Assessment/Results

The patient was evaluated by orthopedic spine surgery who determined the residual weakness was likely related to initial cord compression and no further surgical intervention was indicated. She was transferred to the inpatient rehabilitation unit requiring moderate-maximal assistance with bed mobility and transfers, and moderate assistance to walk 2 steps in the parallel bars. She was ultimately discharged home with the ability to walk 250 feet at a modified independent level with a right lower extremity Ankle-Foot Orthosis. Her bowel and bladder function returned to normal.

Discussion

Fractures through previous ACDF are rare and require significant force. It is known that degenerative changes and instability tend to occur adjacent to a prior fused segment. This patient had an unusual presentation with dramatic functional recovery as the forces were concentrated at the inferior part of her previous fusion. Additionally, she had evidence of corticospinal tract involvement without spinothalamic involvement relating to the fragments affecting only the ventral cord.

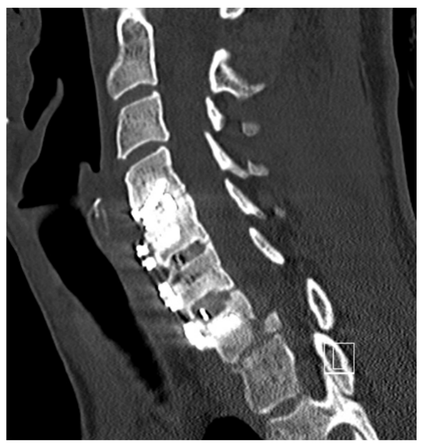

Figure 1. Sagittal CT cervical spine showing previous ACDF C4-C7, bilateral C7 pars interarticularis fractures with anterior displacement of superior articular facets, mild anterolisthesis and subtle kyphosis at C7-T1, and retropulsion of osseous fragments into the spinal canal at the lower aspect of C7 narrowing the ventral spinal cord.

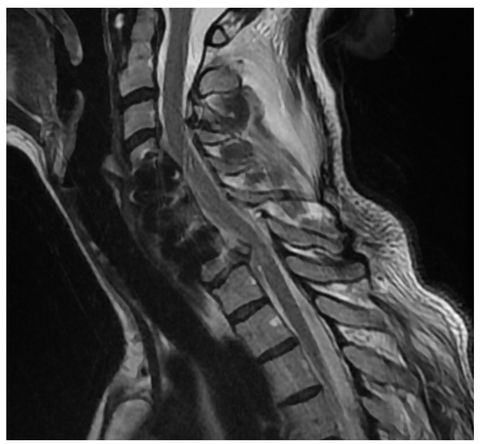

Figure 2. Sagittal MRI cervical spine showing multiple cervical spine fractures along with T2 signal hyperintensity within the spinal cord at C7 and T1 compatible with cord edema and cord injury.

Conclusion

This case implies that the patient's previous ACDF may have provided a "protective effect" as the injury was below the levels of her previous spine surgery and only damaged the ventral cord. Without this, the patient may have been more susceptible to a higher level of injury and damage to further anatomic regions of the cord with greater functional deficits.

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