

The Correlation of CT measurements with Transverse Atlantal Ligament Integrity in Craniovertebral Junction Injuries

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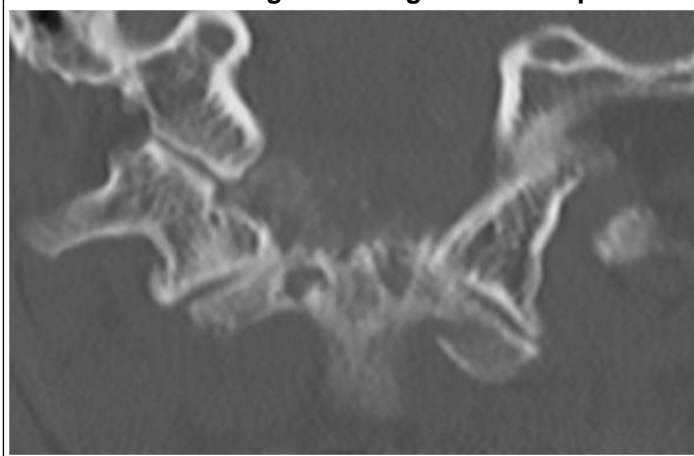
Introduction

Craniovertebral junction (CVJ) injuries are common in the setting of trauma. CVJ injuries complicated by transverse atlantal ligament (TAL) disruption often require surgical stabilization. Measurements such as the Atlantodental Interval (ADI) as well as the Rule of Spence have been described to help clinicians identify TAL disruption. This study sought to evaluate the reliability of these measurements in the clinical setting using CT.

Methods

A retrospective review of patients who presented to the BNI from 2004-2011 with CVJ injuries was performed. Patients' records were evaluated for demographics, mechanism and location of CVJ injury, classification of injury, treatment, and Japanese Orthopedic Association Score at time of injury and at follow-up. The evaluation of transverse atlantal ligament (TAL) integrity was performed with MRI. Multiple measurements were made in attempts to identify TAL disruption on CT scan.

Patient with Odontoid Fracture and TAL Disruption but Normal Overhang According to Rule of Spence



Results

Of 125 patients identified, 40 (32%) suffered atlas fractures, 59 (47.2%) odontoid fractures, 32 (25.6%) axis fractures, and 4 (3.2%) condyle fractures. TAL disruption on MRI was documented in 11 cases (8.8%). The average ADI for TAL injury was 1.81 mm (range 0.9-3.9 mm). 9 patients (81%) with TAL injury had an ADI < 3mm. 10 patients (91%) with TAL injury did not demonstrate total overhang of the C1 lateral masses on C2 to be greater than 7mm. Neither Atlantodental Interval, Average Lateral mass diameter of C1 measured in the coronal plane (ALD1), Average Lateral mass diameter of C2 measured in the coronal plane (ALD2), ALD1-ALD2, nor ALD1/ALD2 correlated with TAL integrity.

Conclusions

Patients with CVJ injuries and TAL rupture can have relatively good recovery with the proper treatment. Unfortunately, at this point there is no sensitive measurement method on CT, including the ADI interval or the Rule of Spence, that can reliably indicate transverse atlantal ligament integrity.

Learning Objectives

To evaluate current CT measurements for transverse ligament integrity in the clinical setting

References

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