

CONTRIBUTION OF COMPUTED TOMOGRAPHY IMAGING IN CERVICAL SPINE TRAUMA

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Introduction

- * Morbidity and mortality resulting from cervical spine injury depend on the mechanism of injury and its level. They are higher in case of higher levels of cervical spine injury, and the craniocervical junction injuries have the highest mortality.
- * The fracture predictivity of standard radiograph is low when the severity of the cervical injury is high, and MDCT has replaced radiography as the initial imaging modality with much higher sensitivity to evaluate suspected cervical spine injuries.
- * Multidetector CT provides a faster and more comprehensive display of spinal anatomy than does radiography.
- * CT was used as a problem-solving tool for inadequately shown segments of the spine, typically the craniocervical and cervicothoracic junctions.
- * Protocols that are based on imaging the whole cervical spine, allow for multiplanar display, two and three dimensional reformats by using reformatted images from the axial data set.
- * Previously, the most commonly used classifications of cervical fractures were those of Allen-Ferguson (68) and the AO. More recently, the SLIC classification (69) has added neurological status as another factor to consider.

Aim of the work

The aim of this work was directed to study the contribution of CT and CTA (if clinically indicated) imaging in cervical spine trauma.

Subjects and Methods

Patients:

This study was carried out on twenty five patients of both genders who presented by recent cervical spine trauma.

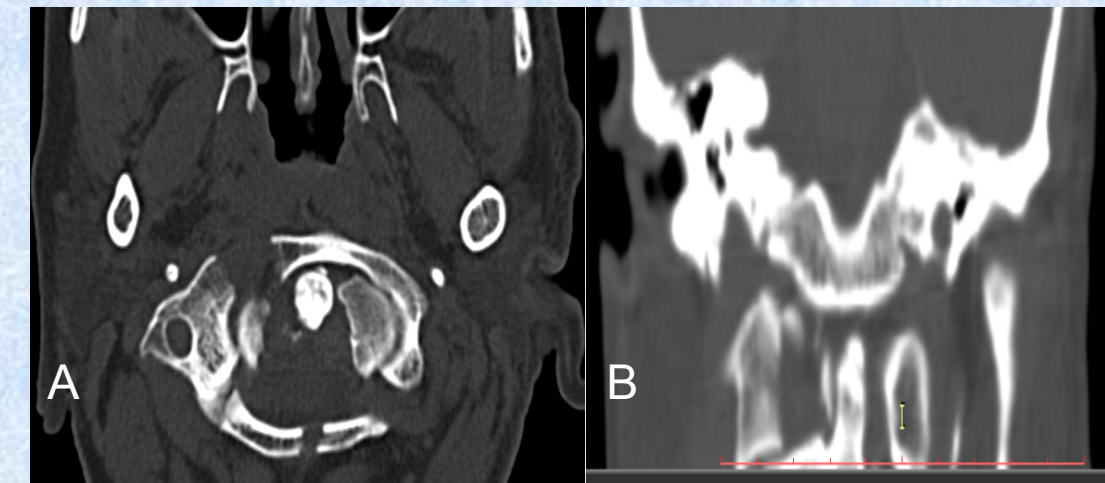
Methods:

All patients were subjected to:

- * Full history taking.
- * Thorough clinical and neurological examination.
- * Multi-detector CT examination of cervical spine
- * The non-enhanced CT images were acquired using multidetector machine in axial plane and were reconstructed in coronal and sagittal planes
- * Volume acquisition techniques allow reconstructions in the axis of all anatomical parts of cervical vertebrae: vertebral body, vertebral arch, facet joints, etc.

Results

- * Our study included 25 patients, there were 20 males and 5 female patients representing (80%) and (20%) respectively.
- * The peak incidence was in the age group (20 - < 30) years representing 32%, followed by the age group (30 - < 40) years representing 28%.
- * It was found that the mechanism of trauma was either falling from height in 3 patients representing 12% or road traffic accident in 22 patients representing 88%.
- * All patients presented with neck pain and limitation of neck movement while 4 patients (16%) presented with associated neurological deficit.
- * In this study the most common cause of neurological deficit was posterior retropulsion of a bony fragment from the vertebrae followed by vertebral subluxation.
- * In our study it was found that 8 patients (32%) had multiple level affection of the cervical spines, while 17 patients (68%) had only single level affection.
- * The second cervical vertebra was the most commonly affected (11 patients), 5 of them had odontoid fracture. Followed by seventh cervical vertebra fracture which was reported in 6 patients (24%).
- * The most common finding was fracture of cervical vertebra/ vertebrae and was found in 19 patients (76%) followed by fracture of cervical vertebra/ vertebrae accompanied by vertebral subluxation found in 5 patients (20%). While cervical vertebral subluxation without any fracture was found in one patient (4%).
- * The studied patients were classified according to the three-column theory into 11 patients (44%) with stable injury and 14 patients (56%) with unstable injury.
- * Co-existent findings other than cervical spine injuries were found in 8 patients.



- A: Axial CT scan of the atlas vertebra showing comminuted fractures of the anterior and posterior arches (Jefferson's fracture).
- B: Coronal reformatted CT image demonstrates comminuted fracture of the atlas.

Conclusion

- * Multidetector CT helps in proper detection, delineation and evaluation of cervical spine fractures in trauma setting.
- * Multidetector CT helps in detection of injury in other regions of the body concurrently.
- * The use of CT with multiplanar reconstruction increases the detectability of cervical injuries.