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Original Research

Evaluation of diagnostic ability of Computed tomography scan in assessment of cervical spine injury

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ABSTRACT:

Background: Traumatic cervical spine injuries represent a threat for individuals as it is responsible for the highest rate of early mortality. The present study was conducted to evaluate diagnostic ability of Computed tomography scan in assessment of cervical spine injury. **Materials & Methods:** 170 patients with cervical spine injury of both genders were selected and CT scan was obtained. Frankel grading was followed. **Results:** Out of 170 patients, males were 110 and females were 60. The mechanism of trauma was RTA in 80, violence in 40, fall in 30 and sports injury in 20. Grade I was seen in 80, grade II in 50, grade III in 32, grade IV in 8 and grade E in none. The difference was significant (P< 0.05). **Conclusion:** CT scan found to be effective in assessing traumatic injuries to cervical spine. It provides god visualization, especially for craniocervical and cervicothoracic regions, which often causes problems in conventional radiographic strategies

Key words: Cervical spine, CT scan, Frankel, traumatic injury.

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INTRODUCTION

The annual incidence of trauma reported spinal fractures ranges between 0.019% and 0.088% and for spinal cord injury, it ranges from 35 to 53/pillion individuals. Between 19% and 51% of spinal trauma cases involve injuries to the cervical spine. The early mortality rate in spinal trauma is the highest among those with cervical spine injuries. The documentation of trauma injuries is a key to prevent and manage trauma.[1,2] The epidemiology of traumatic cervical spine fractures is not well known among the general population. Imaging has an important role in the management of spinal trauma.

Most spinal injuries are due to Road Traffic Accidents (RTA) and sports injuries. Injuries in this region may produce neurologic defects, sometimes severe and fatal.[3]

Characteristic cervical spine injury patterns which are commonly missed include odontoid, teardrop, facet and hangman's fractures.[4] Despite these common patterns, it has been recognized that even in the absence of fractures, clinically significant instability can exist. Spinal cord injury without radiographic abnormality has been found to occur in 0.08% of adults with blunt cervical spine trauma. When injuries are missed on initial assessment, a delay in diagnosis occurs that puts the patient at risk for progressive instability and neurologic deterioration.[5]

Imaging has an important role in the management of spinal trauma. Spine CT has very good sensitivity, specificity and good diagnostic accuracy in picking up spinal fractures but is inadequate in detecting purely ligamentous injury. CT evaluation is more complicated in patients with severe degenerative disease. Traumatic

and Non traumatic disc herniation appear identical on MRI.[6] The present study was conducted to evaluate diagnostic ability of Computed tomography scan in assessment of cervical spine injury.

MATERIALS & METHODS

The present study was conducted among 170 patients with cervical spine injury of both genders. Patients' demographic data such as name, age, gender etc. was recorded. Patients with neck pain, presence of neurological deficit, reduced level of consciousness, intoxication by alcohol and other illicit drugs and increased tension in the muscles of the neck were selected. All underwent CT scan using Tesla 1.6 (16 slices).

Frankel grading such as:-

Grade A: Complete paralysis

Grade B: Sensory function only below the injury level,

Grade C: Incomplete motor function below injury level,

Grade D: Fair to good motor function below injury level and

Grade E: Normal function was followed. Results thus obtained were subjected to statistical analysis.

P value < 0.05 was considered significant.

RESULTS

Graph I Distribution of patients

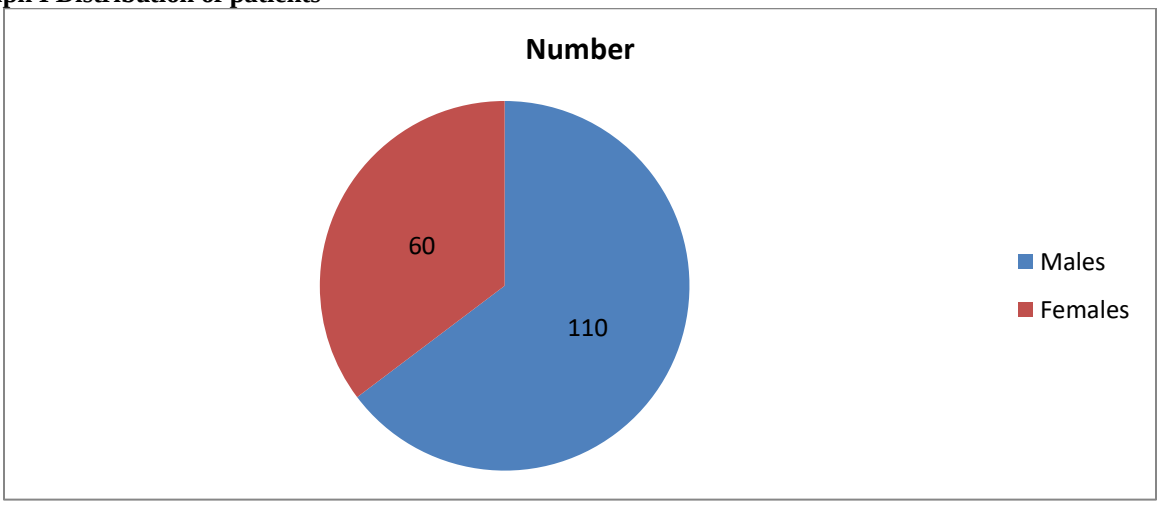

Table I shows that out of 170 patients, males were 110 and females were 60.

Table I Age wise distribution of patients

Age group (Years)	Number of patients	P value
10-20 years	20	0.001
20-30 years	44	
30-40 years	60	
40-50 years	30	
>50	10	

Table I shows that age group 10-20 years had 20, 20-30 years had 44, 30-40 years had 60, 40-50 years had 30 and >50 years had 10 patients. The difference was significant (P< 0.05).

Table II Etiology of trauma in patients

Reason	Number
RTA	80
Violence	40
Fall	30
Sports injury	20

Table II shows that mechanism of trauma was RTA in 80, violence in 40, fall in 30 and sports injury in 20. The difference was significant (P< 0.05).

Table III Assessment of Frankel Grading

Frankel Grading	Number	P value
A	80	0.05
B	50	
C	32	
D	8	
E	0	

Table III shows that grade I was seen in 80, grade II in 50, grade III in 32, grade IV in 8 and grade E in none. The difference was significant (P< 0.05).

DISCUSSION:

Imaging rational in spinal trauma is to characterize the type of injury, diagnose the traumatic abnormality, evaluate the state of the spinal cord and surrounding structures, estimate the severity, damaged stability, and potential spinal instability. The recommended approach as the first step is to use diagnostic modalities with high sensitivity and availability but moderate specificity as a primary screening tool. For the second and third step, suspected injuries can be classified using modalities of higher diagnostic value and lower availability, the clinical algorithm is recommended in case of the cervical spine to sort outpatients with a very low probability of cervical spine injury and then performing imaging on other patients.[7,8]

The "standard of care" in imaging of the spine in trauma patients is constantly changing with the increasing availability of new technology.[7] Multidetector helical computed tomography (CT) allows the spine to be imaged more accurately and expeditiously than previously. MRI also has an important role in the imaging algorithm. There have been multiple studies investigating the necessity of imaging in trauma of the cervical spine.[8] The general goal of these guidelines is to accurately predict which patients are at risk of cervical spine fractures, avoiding the potentially disastrous consequences of not diagnosing a cervical spine fracture. The secondary benefit of such guidelines is to reduce unnecessary examinations.[9] The present study was conducted to evaluate diagnostic ability of Computed tomography scan in assessment of cervical spine injury.

In present study, out of 170 patients, males were 110 and females were 60. Age group 10-20 years had 20, 20-30 years had 44, 30-40 years had 60, 40-50 years had 30 and >50 years had 10 patients.

Schneider et al[10] analyzed the epidemiology, mechanism of trauma, transportation of victims to the hospital, intra-hospital care, indication criteria for CT, diagnosis, treatment and evolution of the victims. The victims were divided into two groups: Group I - without cervical spine injury, Group II - with cervical spine injury. Computed tomography was performed in 1572 (51%) patients, with male predominance (79%) and mean age of 38.53 years in Group I and 37.60 years in Group II. The distribution of trauma mechanisms was similar in both groups. Lesions found included: 53 fractures, eight vertebral listeses and eight spinal cord injuries. Sequelae included: paraplegia in three cases, quadriplegia in eight and brain injury in five. There were seven deaths in Group II and 240 in Group I. The average length of hospital stay was 11 days for Group I and 26.2 days for Group II.

The immediate clinical examination of the spine should include inspection and palpation of the spine, as well as a complete neurological examination. In addition, a cranial nerve examination should always be performed. Cranial nerve (CN) palsies related to CNs VI, VII, IX, X, XI and XII can occur in association with upper cervical spine injuries.[11]

Study demonstrated that mechanism of trauma was RTA in 80, violence in 40, fall in 30 and sports injury in 20. Present study showed that grade I was seen in 80, grade II in 50, grade III in 32, grade IV in 8 and grade E in none. Ganesan et al[12] in their study 50 patients with acute spinal injury was taken up for evaluation with CT and MRI. Out of 50 patients, 32 patients had fractures and it was clearly visualized in CT when compared to MRI. MRI is the best technique to visualize these lesions, to diagnose if they are hemorrhagic or not, to detect and determine the cause of spinal cord compression.

Biffl et al found that fifty-two patients were treated with surgery during 2013 and 2014. All patients classified as Frankel A and B developed respiratory failure. Patients classified as Frankel A, B, and C had significantly higher rates for postoperative complications (P< 0.01) than patients classified as Frankel D and E, except for the rate of postoperative infections (p = 0.717). Hospitalization time was also longer in the first group (p< 0.01).[13]

A systematic review conducted by Abozaid suggested that CT is the primary option recommended for the whole cervical spine scan. It is available in the majority of trauma centers and proved high diagnostic value for most of the disco-ligamentous and bony injuries. The sensitivity for cervical spine lesions and any unstable lesion is 87.5% and 100%, respectively, compared with magnetic resonance imaging (MRI) as the gold standard. CT provides god visualization, especially for craniocervical and cervicothoracic regions, which often

causes problems in conventional radiographic strategies.[14]

CONCLUSION

Computed Tomography scan found to be effective in assessing traumatic injuries to cervical spine. A radiograph was found a critical step in the management of these cases.

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