Original Article

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Usefulness of CT Scan in Diagnosis of Cervical Spine Injury

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Abstract

Background: Traumatic injuries account for more than 3.2 million deaths and more than 312 million injured annually worldwide. The present study was conducted to assess role of CT in diagnosis of cervical spine injury. **Subjects & Methods:** 85 patients with cervical spine injury of both genders were selected and CT scan was obtained. Frankel grading was followed. **Results:** Out of 85 patients, males were 55 and females were 30. The mechanism of trauma was RTA in 40, violence in 20, fall in 15 and sports injury in 10. Grade I was seen in 40, grade II in 25, grade III in 16, grade IV in 4 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.

Keywords: CT scan, Frankel, Spine injury.

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Introduction

Traumatic injuries account for more than 3.2 million deaths and more than 312 million injured annually worldwide.[1] In the United States of America (USA) more than 60 million people, mostly aged up to 40 years, are victims of traumatic injuries each year. Patients with Spine injuries are commonly seen in trauma and can be fatal, particularly if not identified in a short time.[2] 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]

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 assess role of CT in diagnosis of cervical spine injury.

Materials and Methods

The present study was conducted among 85 patients with cervical spine injury of both genders.

All were enrolled after they agreed to participate and gave their written consent.

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 such as 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

[Table 1] shows that out of 85 patients, males were 55 and females were 30.

Table 1: Distribution of patients

Total- 85		
Gender	**Males**	**Females**
Number	55	30

Table 2: Age wise distribution of patients

Age group (Years)	Number of patients	P value
10-20 years	10	0.041
20-30 years	22	
30-40 years	30	
40-50 years	15	
>50	5	

[Table 2] shows that age group 10-20 years had 10, 20-30 years had 22, 30-40 years had 30, 40-50 years had 15 and >50 years had 5 patients. The difference was significant (P< 0.05).

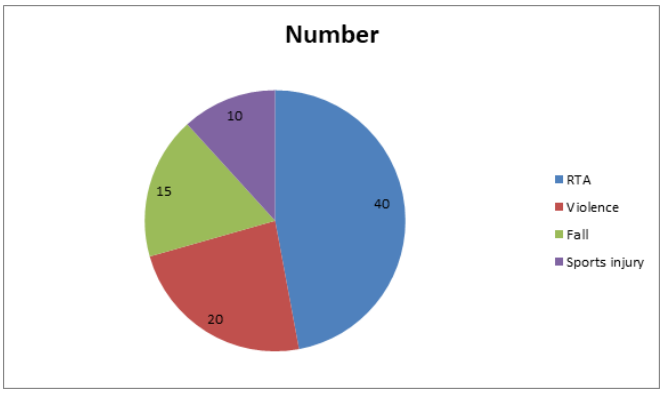

Figure 1: Etiology of trauma in patients

[Figure 1] shows that mechanism of trauma was RTA in 40, violence in 20, fall in 15 and sports injury in 10. The difference was significant (P< 0.05).

Table 3: Assessment of Frankel Grading

Frankel Grading	Number	P value
A	40	0.05
B	25	
C	16	
D	4	
E	0	

[Table 3] shows that grade I was seen in 40, grade II in 25, grade III in 16, grade IV in 4 and grade E in none. The difference was significant (P< 0.05).

Discussion

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 assess role of CT in diagnosis of cervical spine injury.

In present study, out of 85 patients, males were 55 and females were 30. Age group 10-20 years had 10, 20-30 years had 22, 30-40 years had 30, 40-50 years had 15 and >50 years had 5 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]

We observed that mechanism of trauma was RTA in 40, violence in 20, fall in 15 and sports injury in 10. We observed that grade I was seen in 40, grade II in 25, grade III in 16, grade IV in 4 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. Conclusion: While CT is considered adequate in evaluating stable and unstable spinal injuries especially bony elements. Thus, it is recommended that CT and MRI are complementary to each other in evaluation of spine injuries.

Conclusion

Authors found that CT scan found to be effective in assessing traumatic injuries to cervical spine.

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