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Original Research

Evaluation of Fracture of Cervical Vertebrae using CT scan

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***ABSTRACT*:**
Background: Injuries to the cervical spine occur in approximately 4% of trauma patients. The present study was conducted to assess fracture of cervical vertebrae using CT scan. **Materials & Methods:** The present study was conducted on 110 adult of both genders which were referred to the department for CT scan. All patients were evaluated for cervical neck pain, presence of neurological deficit, reduced level of consciousness. A careful physical examination was performed and CT scan was taken. **Results:** Out of 110 patients, males were 72 and females were 38. Age group 20-30 years had 10, 30-40 had 35, 40-50 had 24, 50-60 had 18, 60-70 had 13 and >70 had 10 patients. The difference was significant (P< 0.05). Grade A was seen in 54, grade B in 40, grade C in 12, grade D in 4 and grade E in nil patients. The difference was significant (P< 0.05). Mode of injury was RTA in 60, violence in 25, fall in 15 and sports injury in 10. **Conclusion:** There is increase in number of road traffic accidents and chances of fracture of cervical vertebrae are in rise. There was male predominance as compared to females.
Key words: CT scan, Frankel, Trauma

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INTRODUCTION

Injuries to the cervical spine occur in approximately 4% of trauma patients, including 8% of patients who are unconscious or obtunded, and 3% of alert trauma presentations.[1] Failure in detecting cervical spine injury in an efficient and timely manner in the acute clinical setting can result in catastrophic consequences involving permanent neurologic sequelae.[2] As a result, clinical assessment and radiographic screening protocols exist in order to expedite the identification of primary cervical spine injury promptly, and to protect the patient against secondary injury which may have the potential to compromise spinal integrity.[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.[4] 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]

Several diagnostic methods are used to identify such lesions, from physical examination to more sophisticated imaging tests, such as computed tomography (CT) and magnetic resonance imaging (MRI), CT being the most used feature, allowing to characterize the presence or absence of injury to the cervical spinal column in most cases.[6] Like all diagnostic methods, CT has limitations, has its costs and its indication criteria are not strictly accurate, possibly leading the physician to indicate it unnecessarily or fail to indicate it, hampering the accurate diagnosis of an important lesion.[7] The present study was conducted to assess fracture of cervical vertebrae using CT scan.

MATERIALS & METHODS

The present study was conducted in the department of Radiodiagnosis. It comprised of 110 adult of both genders which were referred to the department for CT scan. All were emergency patients who got injury of cervical spine due to various causes. All were informed and written consent was obtained from relatives or family members. Ethical approval was obtained prior to the study from ethical committee.

General data such as name, age, gender etc. was recorded. All patients were evaluated for cervical neck pain, presence of neurological deficit, reduced level of consciousness, intoxication by alcohol etc. A careful physical examination was performed and CT scan was taken using Tesla 1.6 machine. Frankel grading based on level of paralysis, motor function etc. was recorded. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 110		
Gender	**Males**	**Females**
Number	72	38

Table I shows that out of 110 patients, males were 72 and females were 38.

Table II Age wise distribution of patients

Age group (Years)	Number of patients	P value
20-30	10	0.01
30-40	35	
40-50	24	
50-60	18	
60-70	13	
>70	10	

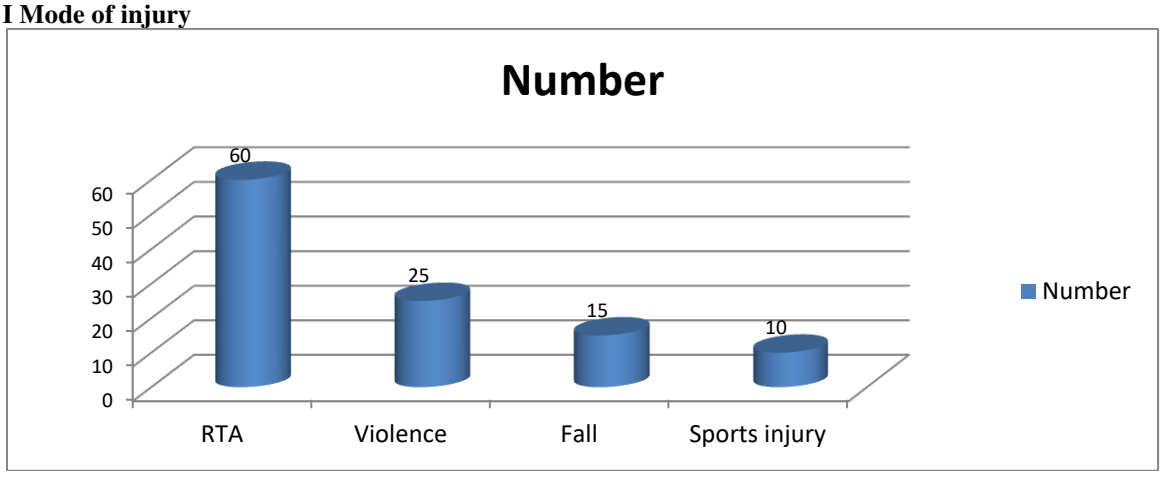
Table II, graph I shows that age group 20-30 years had 10, 30-40 had 35, 40-50 had 24, 50-60 had 18, 60-70 had 13 and >70 had 10 patients. The difference was significant (P< 0.05).

Table III Classification of patients based on Frankel grading

Grade	Number	P value
A (Complete paralysis)	54	0.05
B (Sensory function only below the injury level)	40	
C (Incomplete motor function below injury level)	12	
D (Fair to good motor function below injury level)	4	
E (Normal function)	0	

Table III shows that grade A was seen in 54, grade B in 40, grade C in 12, grade D in 4 and grade E in nil patients. The difference was significant (P< 0.05).

Graph I Mode of injury



Graph II shows that mode of injury was RTA in 60, violence in 25, fall in 15 and sports injury in 10.

DISCUSSION

Traumatic injuries account for more than 3.2 million deaths and more than 312 million injured annually worldwide.[8] For every death due to trauma there are 20 hospital admissions, 235 medical consultations and 465 emergencies consultations. 7,800 people annually suffer spinal cord injuries due to trauma to the spine, the cervical spine representing nearly half (48.7%) of these victims. In Europe, trauma is also the leading cause of death in people up to 40 years of age.[9] The present study was conducted to assess fracture of cervical vertebrae using CT scan.

In this study, out of 110 patients, males were 72 and females were 38. Age group 20-30 years had 10, 30-40 had 35, 40-50 had 24, 50-60 had 18, 60-70 had 13 and >70 had 10 patients. A et al[10] conducted a study in which computed tomography was performed in 1572 (51%) patients. There was 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 had 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.

We found that Frankel grade A was seen in 54, grade B in 40, grade C in 12, grade D in 4 and grade E in nil patients. The mode of injury was RTA in 60, violence in 25, fall in 15 and sports injury in 10. B et al[11] found that out of 15 patients, 5 patients sustained vertical fall, axial-load injuries in the thoracolumbar junction region; two others suffered missile injury to the spine. CT provided more information than plain films in all these patients due to its superior imaging of bony detail and its ability to assess soft-tissue damage. In 4 patients, conventional tomography was done but contributed no additional information. 8 other patients sustained complex fractures of the cervical spine. In all but one, the combination of plain films and CT allowed complete evaluation of the injury. In 1 patient, conventional tomography showed an additional linear fracture one vertebral level below the main region of injury. Schneider et al[12] assessed the epidemiology, mechanism of trauma, transportation of victims, intra-hospital care 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. There was predominance (79%) of male victims in both groups. The severity of trauma (ISS, RTS, TRISS) was higher in Group II than in Group I. Group II did not differ from group I as for the distribution of the mechanisms of trauma such as collisions of cars, motorcycle accidents and falls from height. It was observed that 42.5% of the victims in group I presented, at initial assessment, the manifestation of traumatic brain injury (TBI), moderate or severe.

It is observed that CT allows complete, safe, rapid, easily interpretable evaluation of spine trauma patients in the acute setting.[13] Conventional tomography yields no additional clinically vital information in the acute evaluation of spine trauma, when plain films are abnormal. Its current ability to show finer bony detail than CT can be reserved for evaluating equivocal plain film and CT findings or more complete evaluation (if indicated) after the patient is clinically stable.[14] Traumatic injury of the cervical spinal cord is an extremely worrying problem in trauma patient care throughout the world due to the high risk of death and severe sequelae that result in serious permanent limitations, both physical, social and professional. In addition, it causes large health system expenditures, both with prolonged hospitalization and treatment.[15]

CONCLUSION

Authors found that there is increase in number of road traffic accidents and chances of fracture of cervical vertebrae are in rise. There was male predominance as compared to females.

REFERENCES

1. Burt CW. Injury-related visits to hospital emergency departments: United States, 1992. Advanced Data 1995; 261(1).
2. Samuel JC, Akinkuoto A, Vilaveces A, charles AG, Lee CN, Hoffman IF, et al. Epidemiology of Injuries at a tertiary care center in Malawi. World J Surg 2009; 33(9):1836-41.
3. Burt CW, Fingerhut LA. Injury visits to hospital emergency departments: United States, 1992-95. National Center for Health Statistics. Vital Health Stat 1998; 13(131).
4. SÆreide K. Three decades (1978-2008) of Advanced Trauma Life Support (ATLS) practice revised and evidence revisited. Scand J Trauma Resusc Emerg Med 2008;16:19.
5. Vives MJ, Kishan S, Asghar J, Peng B, Reiter MF, Milo S, et al. Spinal injuries in pedestrians struck by motor vehicles. J Spinal Disord Tech 2008; 21(4):281-7.
6. Driscoll P, Wardrope J. ATLS: past, present, and future. Emerg Med J 2005; 22(1):2-3.
7. Mattox KL. Trauma Line 2000. A history of change and a vision for the future. Bull Am Coll Surg 2000; 85(11):24-34.
8. Lenehan B, Boran S, Street J, Higgins T, McCormack D, Poynton AR. Demographics of acute admissions to a National Spinal Injuries Unit. Eur Spine J 2009; 18(7):938-42.
9. Krochmal P. Clinical criteria to rule out cervical-spine injury. N Engl J Med 2000; 343(18):1338-9.
10. Fujimura Y, Nishi Y, Chiba K, Kobayashi K. Prognosis of neurological deficits associated with upper cervical spine injuries. Paraplegia. 1995; 33(4):195-202.
11. Del Curto D, Tamaoki MJ, Martins DE, Puertas EB, Belloti JC. Surgical approaches for cervical spine facet dislocations in adults. Cochrane Database Syst Rev. 2014;(10):CD008129.
12. Kraus JF, Franti CE, Riggins RS, Richards D, Borhani NO. Incidence of traumatic spinal cord lesions. J Chron Dis. 1975;28(9):471-92.
13. Vaccaro AR, Falatyn SP, Balderston RA, Northrup BE, Cotler JM. Magnetic resonance evaluation of the intervertebral disc,

spinal ligaments, spinal cord before and after closed traction reduction of cervical spine dislocations. Spine 1999;24(12):1210-7.
14. Schneider RC, Cherry G, Pantek H. The syndrome of acute central cervical spinal cord injury, with special reference to the mechanisms involved in hyperextension injuries of the cervical spine. J Neurosurg. 1954;11:546–77.
15. Bagley LJ. Imaging of spinal trauma. Radiol Clin North Am 2006; 44(1):1-12.