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Original Research Article

Epidemiological study of cervical spine injury in a tertiary care center in South India

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ABSTRACT

Background: Cervical spine injuries, according to severity can leave victims with long standing neck pain or varying degrees of weaknesses. The purpose of this study is to determine the epidemiological pattern of cervical spine injury in our hospital so that comparison may be made with other institutions and guidance regarding management may be formulated for the betterment of patients.
Methods: This cross-sectional longitudinal study was conducted in Government Medical College, Thiruvananthapuram and included all patients admitted with clinical or radiological evidence of cervical spine injury, over a period of three months. Semi-structured questionnaire was used to collect socio demographic data and details regarding mechanism of injury. Data was analyzed using SPSS.
Results: Out of 452 patients enrolled, 69.7% were males and 30.3% were females. Patients were the most commonly between 30-60 years of age (52.4%). Majority (56.1%) had hospital stays lasting less than 10 days. Most common mechanism of injury was road traffic accidents (46.6%). Neck pain was the most common symptom and cervical spine straightening was the most common radiological abnormality. The severity of injuries was more severe in patients who were not restrained by seat belt or using a helmet.
Conclusion: Road traffic accidents are the most common cause for cervical spine injuries and majority of patients required only symptomatic care.

Keywords: Epidemiology, Cervical spine injury, Kerala, India

INTRODUCTION

Cervical spine injury is a significant cause of morbidity and mortality affecting mainly the economically productive group of the population. It is a cause of significant financial burden on the victim, family and the health care system. An epidemiological assessment is required to study the pattern of injuries in our population so that preventive strategies as well as cost effective care can be planned.

About 2.4% of all blunt trauma victims suffer cervical spine trauma.[1] Certain demographic factors such as age greater than 65 years, male sex and white ethnicity are known to be associated more with cervical spine injuries.[2] The most commonly injured levels in the sub-axial cervical spine is C6 and C7.[1] About 4 to 30% of cervical spine injuries are missed.[3,4,] The most common reason cited for missed injuries is an inadequate radiographic examination.[5] Odontoid, teardrop, facet and hangman's fractures are the most common injuries that are missed.[6] Despite these common patterns, clinically significant

instability can exist even in the absence of obvious bony fractures.

Evaluation of suspected cervical spine injury consists of a combination of information from the history, clinical examination and radiographic evaluation to predict the presence of instability, identify neurological deficits and guide the need for intervention. During evaluation, patients should be maintained in a supine position with rigid collar immobilization or other stable neutral immobilization, while standard advanced trauma life support protocols are performed. 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.[6,7]

Clinical protocols for determining the need for radiography have been developed, such as the National Emergency X-Radiography Utilization Study (NEXUS) low risk criteria and the Canadian C-spine Rule (CCR), which are used to aid in emergency room triage. A recent large prospective cohort study demonstrated superiority of the CCR over the NEXUS criteria with regard to sensitivity/ specificity and reducing the incidence of unwarranted radiography.[8] Once the initial trauma evaluation has been performed, it is imperative that an appropriate radiographic evaluation be obtained.

Although relatively inexpensive and easy to obtain, they provided poor visualization of the craniocervical and cervicothoracic junction and resulted in missed injury rates of 15-30% in some studies.[5]

METHODS

The study has a cross sectional, longitudinal design. The study population consisted of all patients (blanket study) admitted with cervical spine injury and the study setting was all surgical wards of Government Medical College, Thiruvananthapuram. Patients who were unwilling to join the study were exempted. The study period was 3 months (Oct 2019-Dec 2019). Semi-structured questionnaire was used to collect socio-demographic details. This study was done after obtaining Institute ethical committee (IEC) clearance and taking consent from the study subjects.

Patient details were collected at the time of admission. Data was entered in excel sheets and analyzed using Statistical Package for the Social Sciences (SPSS) software. All qualitative variables were expressed as proportion and quantitative variables in mean and standard deviation (SD).

RESULTS

Out of 452 subjects, 69.7% were males and the remaining (30.29%) were females. Majority of the study population were of the age group 30-60 years (52.43%), followed by those less than 30 years (31.4%). Only 16.15% of the subjects were older than 60 years. 38.27% were manual labourers, 24% were unemployed, 17% were skilled workers, 12% students and 7% were professionals. Majority (56%) were admitted for less than ten days, 30% were admitted for 10-15 days, and 13% for greater than 15 days. The most common mechanism of injury was road traffic accidents (46.67%), 28% had falls, 12% assaults, and 2% had unknown mechanisms of injury. Two wheelers were involved in 264 subjects and out of these 66% had not used protective helmets. 73% were riding on the two-wheeler, while the remaining were pillion riders. 86 subjects were travelling in four wheelers at the times of injury, out of which 32.5% failed to use seat belt restraints.

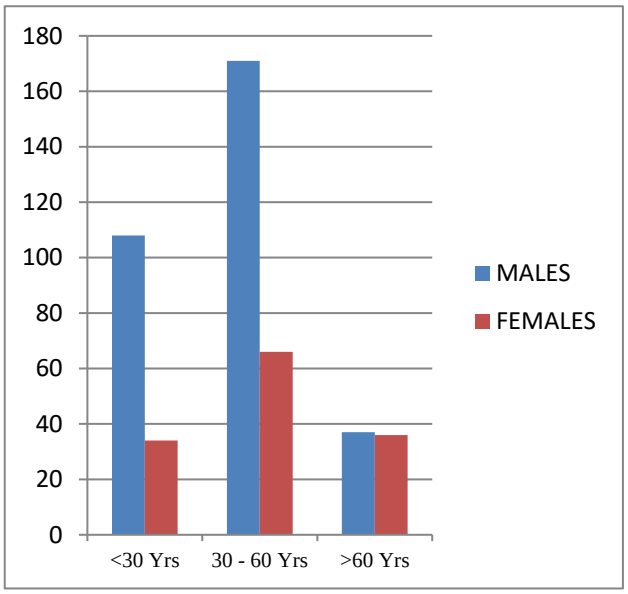

Figure 1: Number of subjects in each age group, according to gender.

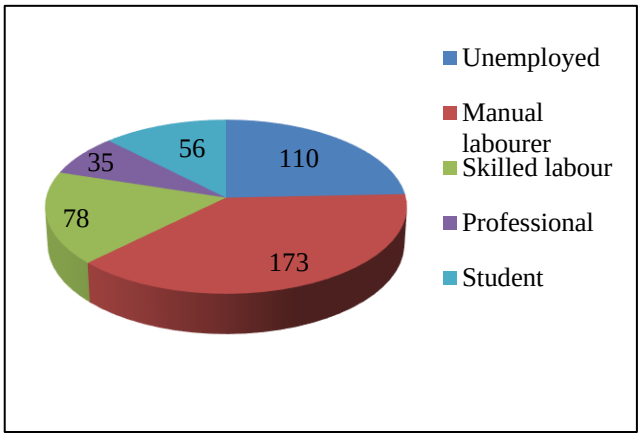

Figure 2: Study subjects according to occupation.

Of all the patients admitted, 326 (72%) had Glasgow coma scale (GCS) >13, 82 (18.14%) had GCS ranging between 9-13, and the remaining (9.73%) had GCS <8. 135 patients (29.86%) were admitted to Intensive care unit (ICU) and

of these 91 (71.11%) required ventilator support. Head injury was the most common associated injury (90%). Other associated injuries included long bone fractures, clavicle fractures, fractures or other spine levels, pelvis, and ribs. A small number of patients (6.41% and 7.07%) had associated chest and abdominal injuries. Single breath count (SBC) was normal in 352 patients. 59 patients had quadriplegia, 27 had paraplegia and the remaining had no weakness.

Table 1: Number of days of admission of the study subjects.

Days of admission	Number of subjects	Percentage of subjects
<10	254	56.19
10-15	137	30.30
>15	61	13.49

Table 2: Different mechanisms of trauma of study subjects.

Mechanism of injury	Number of subjects	Percentage of subjects
Road traffic accident (another vehicle involved)	253	46.67
Fall from vehicle	97	21.46
Assault	58	12.83
Fall from height	32	7.07
Unknown mechanism	12	2.65

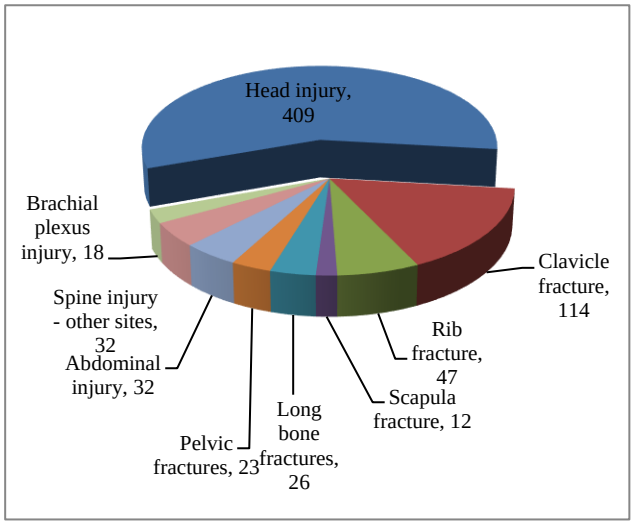

Figure 3: Associated injuries and the number of study subjects.

The most common finding was straightening on cervical spine X ray. This was the most common finding in CT as well. The most common finding on MRI was cord contusion. C5-6 level was most commonly involved, and C2-3 the least. About 57 patients (12.61%) underwent surgical intervention, the most common of which was. Anterior cervical discectomy and fusion (ACDF). 3.31% of patients died. No subject had injury to vertebral artery.

Table 3: Various findings on CT cervical spine and the number of subjects.

Findings on CT	Number of subjects
C1	18
C2	8
AAD	5
Straightening	354
Compression fracture	24
Osteophyte fracture	63
Listhesis	37
Posterior elements involvement	51

Table 4: Involved level of cervical spine and the number of subjects.

Level involved	Number of subjects
C1-2	35
C2-3	6
C3-4	12
C4-5	72
C5-6	122
C6-7	23
C7-t1	9

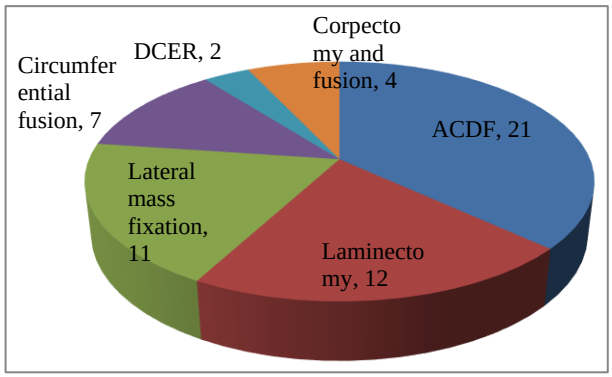

Figure 4: Various surgical procedures done and the number of subjects.

DISCUSSION

This study analyzed patients admitted with cervical spine injury in our institute. As in all other previous studies, the majority of our patients were males (69.27%).[9] However there was no relation between gender and pattern of injury or management (p value >0.5). 30-60 years was the most frequently involved group in our study. However, according to Yadollahi et al it was 20-40. Our analysis showed that age, and mechanism of injury were significant predictors of patients' neurological status upon evaluation (p value <0.05). Majority of our patients were manual labourers. The most common mechanism of injury was

road traffic accidents (46.67%) in our study. Falls were the most common mechanism, Fredo et al also showed that majority of the patients (79%) were neurologically intact, similar to our study (71.09%).[12] In our study mortality was 3.31%, but according to Jerzy et al it was 16.7%.[11]

This study showed that a combined effort is required to achieve goal of near normal rehabilitation of cervical spine injury patients.

CONCLUSION

Cervical spine injury is a potentially crippling condition and proper care followed by rehabilitation is required to achieve near normal end result for the victims.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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