



## EPIDEMIOLOGICAL ANALYSIS OF DORSAL SPINE INJURIES IN WESTERN INDIA

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### ABSTRACT

**BACKGROUND:** To do epidemiological analysis of the patients with injuries of the spine involving dorsal vertebrae fractures including D1-D9 across western India. This is a cross sectional retrospective analysis of patient with spinal injuries who had D1-D9 level in Civil hospital from January 2018 to December 2019. Our study included 83 patients with detailed history and medical records were analyzed. **RESULTS:** 83 patients out of which 6:1 M:F ratio & max patients from 30-40 year age group, 53% injured from fall from height, RTA (38%), average injury to hospital delay was 5.7 days, 5 patients of lower limb injury, 2 of upper limb trauma 2 of chest injuries 2 with abdominal and pelvic trauma were associated injuries, average delay in surgery was 4.5 days. ASIA grade at admission was 47 (57%) grade A, 23(27%) grade B, 8(9%) from grade C, 5(7%) of grade D and 0(0%) from grade E. and 46(55%) patients managed conservatively, 37(45%) were managed surgically. The rehabilitation was taken up by 82 (97%) and status of the patient related to bedsores was no bedsores developed in 48 patients (58%) while < 10 cm bed sore developed in 19 patients((22%) and > 10cm bed sore developed in 16 patients(20%). **CONCLUSION :** Dorsal spine injuries with SCI required urgent and early recognition and specialized management protocols .The infrastructure in India needs to upgrade awareness, education, patient transportation networks, increase the number of tertiary spinal trauma units spine rehabilitation services might improve spine trauma care.

### KEYWORDS :

#### INTRODUCTION

Spinal column fracture are very serious injuries in all orthopedics fracture these injuries often causes serious consequences and are difficult to managed and need proper medical treatment as well as rehabilitation protocol because of spinal cord injuries usually associated with these fractures.

In elderly patient these fracture usually occurs due to osteoporosis with low energy injuries like trivial fall while in younger age group it occurs with as high energy trauma in RTA or with fall from height and usually associated with other major / abdominal organ injuries along with spinal cord injuries like seat belt injuries.

The incidence rate of TLF are ranging from 6.4–11.7/ million population per year in the United States[4-5]. However the epidemiological study of dorsal injuries in india is definitely different from that in United States. But india has little studies focus on epidemiological analysis of Dorsal injuries.

Our study involved a detailed analysis and description of patients, who were managed at civil hospital ,government spine institute and paraplegia rehabilitation center Ahmedabad gujrat which was established for providing health care service for such kind of patients subsets. We performed evaluation of most of factors that may influence appropriate management protocols and prognosis in the patients.

#### Material and method

This is a cross-sectional retrospective demographic analysis of patients, who were admitted and treated at our Spine Centre civil Hospital government spine institute Ahmedabad Gujrat, biggest spine center in western India during the period of feb 2018 to December 2019. We studied a total of 83 patients with dorsal spine fracture, who were managed either conservative mananer with DLSO & Rehabilitation or with operative manner in form short or long segment posterior stabilization with Pedicle screw fixation. Detailed information on epidemiological study was analyzed based on the medical records of patients suffering from dorsal fractures from D1 to

D9 level, including age, sex, marital status, education level, occupation, date of injury, cause of injury, level of injury, mode of injury, injury to hospital duration, hospitalization to surgery duration, ASIA score at time of injury and current time, Rehabilitation status, bed sore problems associated injuries , patients with vertebral fracture including D1-D9 excluding all other spine injuries, incomplete medical records were excluded.

#### Results

**Sex :** This study had 83 patients out of which there were 71 Male and 12 female (6:1 M:F ratio).

#### Age:

The maximum patients were from 30-40 year age group with average age is 37 year out of it average age of female was 38yrs while Male was 37yrs .

#### Mode of trauma:

mode of trauma in all patients , the most common cause was fall from height 44 patients (53%) ,while the next was RTA which was 32 patients(38%) while others 1 patient was Electric shock ,2 patients Hit by object 3 patients trivial Truama.

#### Occupation:

maximum patients belonged to Labour class i.e 63(75%) while others were Farmers ,Tailors, Students, housewives,peons and Teachers .

education level:2 patients were graduate 5 patients were having education upto 12<sup>th</sup> std and rest 76 patients had education upto or below 10<sup>th</sup> std.

monthly income:25 patients had income >5000 and rest 58 patients had income <5000

average injury to hospital days:Average of 5.7 days

mode of transfer to hospital:out of 83 patients 82 patients were transported by Ambulance while only 1 patient used their private vehicle for transport.

associate injuries: Lower limb Injuries were associated more than the upper limb injuries and head and chest abdo trauma with Dorsal spine Injuries

associate spine injuries: cervical spine injuries(21 patients) were associated more than the lumbar spine injuries.(8 patients) while rest 54 patients had isolated dorsal spine injuries

Average admission to surgery duration : was within 4 days  
management mode:

Out of 83 the total number of patients 46(55%) patients were managed conservatively With DLSSO brace, Rehabilitation protocol , and other remaining all 37(45%) patients were managed surgically by Posterior Fixation with pedicle screw fixation with.

Rehabilitation status: The rehabilitation protocol was taken up by 72 patients and significant recovery was seen.

#### Bedsore status

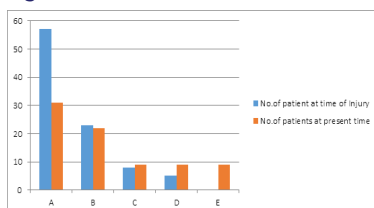
While taking rehabilitation , status of the patient related to bedsores was no bedsores developed in 48 patients (58%) while <10 cm bedsores developed in 19 patients(22%) and >10cm bedsores developed in 16 patients(20%) .

ASIA score (American spine Injuries Association):

**Table 1: comparison of ASIA grading**

ASIA GRADE	No of patient at time of injury	No of patient at current time
A	47(57%)	31(38%)
B	23(27%)	22(29%)
C	08(9%)	9(11%)
D	05(7%)	9(11%)
E	0(0%)	9(11%)

#### ASIA Grading



#### DISCUSSION

Spinal trauma plays a pivotal role in the field of orthopedics trauma. It is one of the most expensive surgery in present date. It lays high impact on government, society and the family of the patient. With the advances in the medical field with improved advanced technology based instrumentation.; treatment of the patient has greatly improved. Dorsal spine injuries due to any accident leads to inflammation, oedema, hemorrhage around the spinal cord that leads to neurological deficits. If the patient is not carefully transported that would lead to worsening of those neurological deficits that is inflicted by the primary injury. India is a country in which these injuries are not properly taken care of; leading to paraplegia that leads to person being burden on the family and ultimately burden over the economy of a country. For the management of such injuries many factors play important role with some of them being careful transport, timely evaluation, income of the patient, infrastructural availability, medical profile of the patient and type and mode of injury.

In our study we found out the following results that the adult males within age limits of 30-40 were the most commonly affected to the high energy traumatic spine injuries. The majority of the patients were males with Male to Female ratio

being 6:1 With maximum patients belonging to Labour class. These is the class that is maximally exposed to traumatic injuries because of the greater mobility and poor condition in developing country like India. Q wu et al (2019) study showed results 58.3% (77) were male and 41.7% (55) were female. Male-to-female ratio was 1.4:1 [11] which was very similar to our study. Most common mode of injury was fall from height 53%(44) followed by RTA 38%(32) which only some had trivial trauma, hit by any object or had electric shock in our study. Khurjekar et al. showed two most common injury mechanisms that comprised 96.7% injuries in our series included fall from height and road traffic accidents [12]. Previous studies conducted in Jordan and Nigeria indicated that road traffic accidents and fall from height were the most common modes of spine injuries [13-15].

In our study maximum patients belonged to Labour class 63%(75) in both sex groups while the other occupations being teacher, farmer, tailor, peon and housewife. When education and economic status of the patient was considered maximum patients belonged to below or upto 10th std and below Rs.5000 per month respectively. Therefore we can draw a conclusion that maximum patients with dorsal spine injuries belonged to lower socio-economic strata with low education levels showing that this is the population that is less aware about the severity of injury and the precautions to be taken regarding it. Khurjekar et al. showed More than one-third of the study patients in his study belonged to the lower socioeconomic with poorer populations might be prone to these injuries, due to lack of awareness and availability of proper safety measures and misconceptions regarding spine trauma and its management, lack of infrastructure and distance to tertiary care centre were major factors faced by the patients[12]. These patients faced the same difficulty to reach the tertiary centers like Civil Hospital Ahmedabad. Delay in presentation to a well-equipped spine center is another concern [16-18]. Average injury to hospital duration was 5.7 days, most patients came to hospital in less than 10 days from injury In the UK, the average delay is estimated at 5.5 days [19]. Another study in Nigeria indicates a delay of 7 days [20]. Another important observation was that though India is a developing country maximum patients were referred or directly transported via Ambulance in which though the doctors were not present, proper immobilization and stabilization of spine was taken care of. Therefore medical health workers play an important role in this transport chain and has to be educated regarding the management and consequences of such injuries. In our study an important observation that came up was that with dorsal spine injuries the other spine injury that was associated was cervical spine injury followed by Lumbar spine injury.

In our series associate injuries Lower limb Injuries were associated more than the upper limb injuries and head and chest abdominal Pelvic trauma with was also dorsal spine Injuries. 5(3%) patient of lower limb injury ,2 patient of upper limb trauma 2 patients of chest injuries 3 patients with abdominal and pelvic trauma Other studies indicated that pelvic fractures and lower limb injuries were the most commonly associated injuries in these situations [6,13,20,22,23]. In our study the 57% patients were with complete neurological injury and 43% had incomplete neurological injury. ASIA grade at time of admission was 57% grade A, 27% grade B, 9% from grade C, 7% of D and from 0% from grade E. and in 70 % patient Bladder bowel had involved and 30% without involvement. In follow up of about two year patients were examined for ASIA grade which showed improvement by rehabilitation as 38% ASIA A, 29% of ASIA B, 11% of grade C, 11% Grade D AND 11% of grade E. chung [22] and Pandey et al. [23] reported that 22.7% and 47. % patients with neurological deficit, respectively, had a complete impairment (ASIA A). Patients with incomplete neurological deficits require greater attention and earlier surgical

intervention to prevent further deterioration of neurological functions [24].

In our study 97% patients undergo rehabilitation and and 3% patients denied for taking rehabilitation protocol or left in a few days after starting protocol . Rehabilitated patient were followed which showed. % were bound to wheelchair,... % walk with major or minor support and.... % were doing independent walking at end of rehabilitation protocol .No bedsores developed in 58% patients while <10 cm bed sore developed in 22% patients and >10cm bed sore developed in only 20% patients. Thus in spinal injuries with significant neurological impact early and proper rehabilitation protocol can give significant functional improvement and chances of neurological recovery to some extent and decreases complication rate related to paraplegia.

## CONCLUSION

With these study we observed a large number of patients with serious dorsal spine injuries with SCI who required urgent and early recognition and specialized management protocols .The infrastructure in India is still compromised to proper handling of such injured patient causing permanent burden to community so to prevent spinal injuries, improve patients awareness and education about these injuries and improve patient transportation networks, increase the number and infrastructure of tertiary spinal trauma units, financial help by health scheme and comprehensive spine rehabilitation services might improve spine trauma care. Rehabilitating a paraplegic cannot be a sole responsibility of the government run institutions it's a shared duty of the fellow citizens and NGOs, if the patient is the sole breadwinner of the family the whole family is pushed behind many years which strains them financially and socially. India needs more vocational training centers and more employment opportunities for the "specially-abled" population in government and private organizations. It's as simple as saying they may not need donations and charity instead it's our responsibility to give them opportunities.

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