Original Research Article

Clinical study of early outcome of traumatic spine injured patients after 6 months/9 months/12 month at a tertiary hospital in Jammu region

Shubam Surmal[1], Bias Dev[2], Aamir Hussain Choudhary[3*], Tanuja Chambyal[4]

{[1,3]Post Graduate, [2]Assistant Professor, Department of Orthopaedics} {[4]Registrar, Department of Anaesthesia} Government Medical College Jammu, INDIA.
Email: draamirhussain13@gmail.com

Abstract

Background: Spine injuries remain one of the most devastating incidents that can happen to any individual. More than 90% of spinal cord injuries cases are traumatic and caused by incidences such as road traffic accidents, violence, sports or falls. Present study was aimed to study early outcome of traumatic spine injured patients after 6 months/9 months/12 month at a tertiary hospital in Jammu region. **Material and Methods:** Present study was a hospital based, prospective, observational study, conducted in patients with traumatic spine injuries attending OPD or admitted in emergency, willing to participate in study. **Results:** Out of 282 patients, most of the patients were in the age group 51-60 (29.43%) and 41-50(29.08%). Male to female ratio was 2.4:1. Out of 282 patients, 161 patients (57.09%) had no associated injuries. Common associated injuries were hemoperitoneum (9.57 %), head injury (9.22 %), fracture humerus (6.74 %) and fracture clavicle (6.38 %). Others were fracture calcaneum (2 patients), fracture tibia (4 patients), fracture forearm (3 patients), etc. Majority of spine fractures occurred at cervical (41.84%) followed by Lumbar (27.30%) followed by thoracic (19.50%) vertebral level. Out of 282 patients, 49.29% patients had neurodeficit present. On pre -operative assessment 50.71% patients had ASIA score of E, 15.60 had ASIA score of C, 12.06% had ASIA score of D, 13.48% had ASIA score of A and 8.16% had ASIA score of B. Mean of SLICS score was 3.66 and mean duration of TLICS score was 3.8. 74.11% patients were treated conservatively and 25.89% patients were operated. **Conclusion:** In present study, majority of spine fractures occurred at cervical (41.84%) followed by Lumbar (27.30%) followed by thoracic (19.50%) vertebral level. Out of 282 patients, 50.71% patients had no neurodeficit and 49.29% patients had neurodeficit.

Keywords: spine fractures, neurodeficit cervical spine injury, outcome

[*]**Address for Correspondence:**
Dr Aamir Choudhary, Post Graduate, Department of Orthopaedics, Government Medical College Jammu, INDIA.
Email: draamirhussain13@gmail.com

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INTRODUCTION

Spine injuries remain one of the most devastating incidents that can happen to any individual. This not only has multi spectral negative impacts to the affected individual but also has an ill effect on individual family members and nation as a whole. Etiologically, more than 90% of spinal cord injuries cases are traumatic and caused by incidences such as road traffic accidents, violence, sports or falls.[1] The United Nations has recently implemented the decade of actions for "Road Safety" with an aim of reducing this problem globally According to report by WHO, 82% of the victims with traumatic spine injuries are male with the majority of them, 56% in the age group of 16 - 30 years.[2] The age distribution is

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bimodal, with a first peak involving young adults and a second peak involving adults over the age of 60.[3] Spinal cord injuries are said to be complete when there is no functional modality distal to the level of lesion and incomplete when some modality for e.g. sensations motor power or reflexes is preserved.[4] Complete injuries have poor rates of neurological recovery; only 10% of such patients recover some modality of function whereas incomplete injuries have approximately 80% chances of neurological recovery. Outcome of spine injuries was assessed by ASIA SCORING (American Spinal Injury Association), Sub-axial Cervical Spine Injury Classification System (SLICS) and Thoraco-lumbar injury classification and severity score (TLICS).[5] Present study was aimed to study early outcome of traumatic spine injured patients after 6 months/9 months/12 month at a tertiary hospital in Jammu region.

MATERIAL AND METHODS

Present study was a hospital based, prospective, observational study, conducted in patients with traumatic spine injuries attending OPD or admitted in emergency, willing to participate in study. Study was conducted in OPD, casualty department and wards of Orthopedics, at Government Medical College , Jammu, India. Study was conducted for a period of 1 year (October 2019 to December 2020), under department of orthopedic surgery. Study approval was taken from institutional ethical committee. Non traumatic patients with spine ailments, traumatic spine injury cases not willing to participate were not considered for study. All the patients received in emergency room were managed according to ATLS protocol. This includes general examination of patients, identifying the associated injuries, carrying out primary and secondary surveys. When spinal injury was suspected a careful history pointed to the area of injury. Patient was log rolled for examination of the back. Note was made for any bruises, swellings and palpated for kyphotic angulations, step-off and point tenderness which was present in injuries to osteo-ligamentous complex. Radiological imaging (X rays, CT scan, and MRI) were done. After clinical and radiological examination patients further treatment options (operative/non operative) were planned. All patients admitted for surgical intervention would be assessed pre operatively with Complete Hemogram, Renal Function Tests/Liver function tests, Blood sugar levels (FBS and PP), PT/PTI/INR, Blood Grouping, Neurological Status as per American Spinal Injury Association (ASIA impairment scale), Pain –Back pain using Visual Analogue Scale (VAS), Imaging such as Radiographs-Cervical and Thoracolumbar spine (AP/Lat view)-Vertebral body height, NCCT of affected spine, MRI of affected spine. After fitness, patients underwent surgery at our center. Standard post-operative care was provided to all patients. Patients were discharged appropriately as per surgery protocol. Follow up was scheduled at 2,3,4 weeks and then after every 4 weeks till 1 year. Patients were studied for: Survivorship, Neurological status, Nutritional status, Complications like bed sores, urinary tract infections, upper respiratory tract infections and Sexual functions. Radiologically patient was reviewed for the deformity. Outcome of spine injuries was assessed by ASIA SCORING (American Spinal Injury Association) developed for essential minimum elements of neurological assessment for all patients with spinal injury

Grade A: Complete. No sensory or motor function is preserved in the sacral segments S4-S5.

Grade B: Incomplete. Sensory, but not motor function is preserved below the neurological level and include the sacral segments S4-S5.

Grade C: Incomplete. Motor function is preserved below the neurological level, and more than half of key muscles below the neurological level have a muscle grade less than 3 (Grade 0-2).

Grade D: Incomplete. Motor function is preserved below the neurological level and at least half of key muscles below the neurological level have a muscle grade greater than or equal to 3.

Grade E: Normal. Sensory and motor functions are normal.

Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Frequency, percentage, means and standard deviations (SD) was calculated for the continuous variables, while ratios and proportions were calculated for the categorical variables. Difference of proportions between qualitative variables were tested using chi- square test or Fisher exact test as applicable. P value less than 0.5 was considered as statistically significant.

RESULTS

Out of 282 patients, most of the patients were in the age group 51-60 (29.43%) and 41-50(29.08%).Youngest patient was 17 years and oldest 95 years. Mean age was 51.62 years. Majority of the patients were male (70.92%) while 29.08% patients were female. Male to female ratio was 2.4:1. Peak age in female patients was 51-60 years (31.71%) and in male patients was 41-50 years. The mean age in female was 55.06 years and in male was 50.21 years. Traumatic spine injuries in this study were caused by three modes, one being road traffic accidents (54.96%), second being fall from height

(43.26%) and third being assault (1.77%). Out of 282 patients, 161 patients (57.09%) had no associated injuries. Common associated injuries were hemoperitoneum (9.57 %), head injury (9.22 %), fracture humerus (6.74 %) and fracture clavicle (6.38 %). Others were fracture calcaneum (2 patients), fracture tibia (4 patients), fracture forearm (3 patients), etc.

Table 1: General characteristics

Characteristics	No. of cases (n=282)	Percentage
Age(years)		
≤20	4	1.42 %
21-30	13	4.61 %
31-40	24	8.51 %
41-50	82	29.08 %
51-60	83	29.43 %
61-70	55	19.50 %
>70	21	7.45 %
Mean ± SD	55.06 ± 13.62 years	
Gender		
Male	200	70.92 %
Female	82	29.08 %
Mode of injury		
Assault	5	1.77%
Fall from height	122	43.26%
RTA	155	54.96%
Associated injuries		
No associated injuries	161	57.09%
Hemoperitoneum	27	9.57%
Head injury	26	9.22%
Fracture humerus	19	6.74%
Fracture clavicle	18	6.38%

Majority of spine fractures occurred at cervical (41.84%) followed by Lumbar (27.30%) followed by thoracic (19.50%) vertebral level. Other injuries were 4.96% at both thoracic and lumbar vertebral level, 3.55% at both cervical and thoracic vertebral level, 2.13% at Lumbar and sacral vertebral level, 0.35% at both cervical and lumbar vertebral level, 0.35% at both cervical and sacral spine level.

Table 3: Distribution of injury level of study subjects.

Injury level	Frequency	Percentage
Cervical	118	41.84%
Cervical and Lumbar	1	0.35%
Cervical and sacral ala	1	0.35%
Cervical and thoracic	10	3.55%
Lumbar	77	27.30%
Lumbar and sacral ala	6	2.13%
Thoracic	55	19.50%
Thoracic and Lumbar	14	4.96%

Out of 282 patients, 50.71% patients had no Neurodeficit and 49.29% patients had Neurodeficit.
On pre -operative assessment 50.71% patients had ASIA score of E, 15.60 had ASIA score of C, 12.06% had ASIA score of D, 13.48% had ASIA score of A and 8.16% had ASIA score of B. Mean of SLICS score was 3.66 and mean duration of TLICS score was 3.8. 74.11% patients were treated conservatively and 25.89% patients were operated.

Table 4: Distribution of pre -operative assessment of study subjects.

Pre-operative assessment	No. of cases (n=282)	Percentage
Neurological status		
With neurodeficit	139	49.29%
Without neurodeficit	143	50.71%
ASIA score		
A	38	13.48%
B	23	8.16%
C	44	15.60%

D	34	12.06%
E	143	50.71%
SLICS		
Mean ± SD	3.66 ± 2.9	
Median(25th -75th percentile)	4(1-7)	
TLICS		
Mean ± SD	3.8 ± 2.43	
Median (25th -75th percentile)	4 (1-6)	
Management		
Operative management	73	25.89%
Treated conservatively	209	74.11%

Follow up ASIA score after 2 weeks in patients was A in 13.48% patients, B in 8.16%, C in 15.60%, D in 12.06, E in 50.71%. Follow up ASIA score after 3 months in patients was A in 8.27% patients, B in 5.12%, C in 5.91%, D in 14.57, E in 66.14%. Follow up ASIA score after 6 months in patients was A in 8.60% patients, B in 4.52%, C in 4.07%, D in 16.29, E in 66.52%. Follow up ASIA score after 9 months in patients was A in 8.22% patients, B in 6.85%, C in 4.11%, D in 19.86, E in 60.96%. Follow up ASIA score after 12 months in patients was A in 14.29 patients, C in 10%, D in 23.81, E in 61.90%.

Table 5: Distribution of follow up ASIA score of study subjects.

Follow up ASIA score	After 2 weeks	After 3 months	After 6 months	After 9 months	After 12 months
A	38 (13.48 %)	21 (8.27 %)	19 (8.60 %)	12 (8.22 %)	3 (14.29 %)
B	23 (8.16 %)	13 (5.12 %)	10 (4.52 %)	10 (6.85 %)	
C	44 (15.60 %)	15 (5.91 %)	9 (4.07 %)	6 (4.11 %)	5 (23.81 %)
D	34 (12.06 %)	37 (14.57 %)	36 (16.29 %)	29 (19.86 %)	
E	143 (50.71 %)	168 (66.14 %)	147 (66.52 %)	89 (60.96 %)	13 (61.90 %)

Total deaths in our study were 30 out of 282 patients. Patients survival was 84.68% in patients with cervical spine injury, 92.11% in patients with thoracic spine injury and 93.90% in lumbar spine injury. The mean day of death after treatment in cervical spine injury was 17.58, thoracic spine injury was 179.17 and lumbar spine injury was 167.

Table 6: Outcome after treatment

Patient survival	Cervical (n=124)	Thoracic (n=76)	Lumbar (n=82)	Total (n=282)
Mortality	19 (15.32%)	6 (7.89%)	5 (6.10%)	30 (10.65 %)
Day of death after treatment (Mean ± SD)	17.58 ± 28.42	179.17 ± 110.38	167 ± 93.38	74.8 ± 98.33

DISCUSSION

Traumatic spine injuries are common as well as important medical problem in today's world which our society is facing because of increased vehicular trauma as well as professions needing climbing, the entertainment and sports has added to the numbers. The spine injury besides a medical problem to the individual and health system is a social problem for society since it takes away the capacity to work, make the patient dependent on others not only for day to day mobility but also for the financial support. All these together has influence on the physical, psychosocial and financial well-being on individual, family and the society. In the series of Chamberlain JD *et al.*,[6] out of 932 patients, male to female ratio was 1.88:1. The mean age in tetraplegics was 53.5 years and in paraplegics was 43.8 years. Over all mean age was 48 years. Johansson *et al.*,[7] out of 346 patients, 72.3% were males and 27.7% were females. The mean age in this study was 58.9 years. Similar findings were noted in present study. Male predominance in our study is due to male dominant professions like climbing trees, doing labour works, driving etc., whereas most of females are limited to only house hold works. Ahuja *et al.*,[11] in a study of 313 patients, 182 patients were operated early and underwent surgery within 24 hours and 131 patients were operated after 24 hours. The primary end point was change in American Spinal Injury Impairment Scale (AIS) at the end of 6 months. The group who underwent surgery under 24 hours, 19.8% demonstrated a 2 or more grade improvement in AIS at 6 months, whereas 8.8% of patients show same improvement who had undergone surgery after 24 hours. Complications rate was 24.2% in early group and 30.5% in late group. In a study, 70% of patients initially diagnosed as ASIA A didn't convert, as did 90% with ASIA D. On the whole 68% of total patients didn't convert, while 30% of patients improved and 2% deteriorated.[9] Middendrop *et al.*,[10] in his series of 273 patients observed that ASIA A were 161, ASIA B were 37, ASIA C were 43, and ASIA D were 32. 42(26%) converted from ASIA A, 27(73%) from ASIA B, 32(75%) from ASIA C, 5(16%) from ASIA D. In present study, patients survival was 84.68% in patients with

cervical spine injury, 92.11% in patients with thoracic spine injury and 93.90% in lumbar spine injury. From above we can conclude that that higher is the level of injury, less is the percentage of survival. The mean day of death after treatment in cervical spine injury was 17.58, thoracic spine injury was 179.17 and lumbar spine injury was 167. In cervical spine injury, patients survival was 27.28% with preoperative ASIA A, 66.67% with ASIA B, 92.31% with ASIA C, 100% with ASIA D and 98.48% with ASIA E. In thoracic spine injury, patients survival was 75% with preoperative ASIA A, 71.43% with ASIA B, 94.12% with ASIA C, 100% with ASIA D and 100% with ASIA E. In lumbar spine injury, patients survival was 50% with preoperative ASIA A, 75% with ASIA B, 100% with ASIA C, 100% with ASIA D and 100% with ASIA E. In lumbar ASIA A were 8 patients out of which 4 died due to long standing bed sores. Choi JH *et al.*,[11] studied 80 patients, falls from heights were the most common cause of TSI, followed by road traffic accidents. 78% of the admitted patients underwent at least one surgical procedure. Without intra-operative imaging, 4 patients (6%) had wrong level surgery, and 1 patient (2%) had misplacement of pedicle screws. Sacral decubitus ulcers were the most common non-surgically related complication. Antibiotics were administered to >90% of patients. There were no in-hospital mortalities. Of the 60 spinal cord injury (SCI) patients, 32% (19/60) showed improvement in their ASIA grade at the time of discharge, and 52% (31/60) showed no change. At follow-up, 32% (19/60) of SCI patients reported improvement, and 8% (5/60) reported no change. However, 36 SCI patients (60%) were lost to follow-up. They concluded that despite significant limitations in medical resources, spine surgery in Cambodia appears promising with reasonable complication rates, no in-hospital mortality, and trends of clinical improvement. The overall surgical rate for TSI patients was 78% with no significant difference between the surgical rates of complete, incomplete, and non-SCI patients. Traumatic spine injuries can be isolated spine injuries or with other associated injuries Spine injuries can be vertebral column fractures and with or without involvement of spinal cord. Pattern of vertebral fractures can be of Compression type, Burst type, Flexion type, Extension type, Distraction type and dislocation type. The most common causes of cervical spine injuries are motor vehicle accidents(41%), falls(27%), violence (15%), sports related injuries (8%), and fall of heavy object on head.[12] The overall mortality rate from cervical spine injuries is 6%.[13] Treatment of a fracture begins with pain management and stabilization to prevent further injury. Other body injuries (e.g., to the chest) may be present and need treatment as well. Depending on the type of fracture and its stability, bracing and/or surgery may be necessary.

CONCLUSION

In present study, majority of spine fractures occurred at cervical (41.84%) followed by Lumbar (27.30%) followed by thoracic (19.50%) vertebral level. Out of 282 patients, 50.71% patients had no neurodeficit and 49.29% patients had neurodeficit. Overall 30 patients died. 19 patients died who at injury at cervical level, 6 patients had injury at thoracic level and 5 patients had injury at lumbar level, the leading causes in deaths at cervical level were due to respiratory failure and leading causes of deaths in thoracic and lumbar vertebral level were due to secondary complications of long standing bed sores.

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