

FREQUENCY OF PRESSURE ULCERS IN PATIENTS WITH SPINAL CORD INJURY

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ABSTRACT

Objectives: To determine the frequency of pressure ulcers in patients with spinal cord injury. To compare frequency of pressure ulcers in complete and incomplete spinal cord injury using ASIA impairment scale.

Study Design: Cross sectional study.

Place and Duration of Study: Departments of Armed Forces Institute of Rehabilitation Medicine Rawalpindi, from Jun 2013 to Jan 2014.

Material and Methods: After permission from the hospital ethical committee and informed consent, spinal cord injury (SCI) patients were included from the outdoor and the indoor departments of Armed Forces Institute of Rehabilitation Medicine Rawalpindi from June 2013 to January 2014. Patients were divided in two groups of complete SCI and incomplete SCI on the basis of American Spinal Injury Association (ASIA) impairment scale. SPSS version 17 was used for data analysis.

Results: Total 62 SCI patients were included. Mean age of patients was 36 ± 0.93 SD. Males were more in number 79% (49). On ASIA scoring 51.6% (32) were in ASIA 'A' followed by 19.4% (12), 17.7% (11) and 11.3% (7) patients in ASIA 'B', 'C' and 'D' respectively. SCI was complete in 51.6% (32) and incomplete in 48.4% (30). PU were present in 32.3% (20) patients. PU were in stage 4 in 30% (6) patients. PU were more frequent in ASIA 'A' injuries followed by "B", "C" and "D" involving 43.8%, 25%, 18.2% and 14.3% of patients respectively. Pressure ulcers (PU) were common in complete injuries involving 43.8% (14) than in incomplete injuries 20% (6) ($p=0.041$).

Conclusions: Pressure ulcers were more common complication detected after spinal cord injury with more frequency in complete spinal cord injury.

Keywords: ASIA impairment scale, Complete SCI, Pressure ulcers, Spinal cord injury.

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INTRODUCTION

Spinal cord injury (SCI) is a devastating and lifelong condition. Its victims are at increased risk of developing many complications. Pressure ulcers (PU) are one of the common and serious complications after SCI and they are associated with long term mortality. More than 20% patients with spinal cord injuries develop PU¹. Pressure ulcers cause prolong hospital stay and they are the leading cause of re-hospitalization among SCI patients². This makes PU a huge financial burden on SCI patients. Prevention is best management for PU³.

There are many risk factors for developing

PU after SCI e.g. pressure, shear, duration of injury, age, smoking, urinary incontinence, race, education and the nutritional status of patient⁴. One of the important risk factor is severity of SCI. Currently there is no local data available regarding frequency of pressure ulcer based on American Spinal Injury Association (ASIA) impairment scale among patients with SCI.

In 1982, the American Spinal Injury Association (ASIA) first published standards for neurological classification of SCI, adopting the Frankel Scale. ASIA impairment scale is considered essential when classifying persons with SCI as to their neurological status. This is an internationally recognized standard which is widely used for research and clinical purposes. Its development and continued evolution are well grounded in expert clinical consensus thereby ensuring high content validity⁵.

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Received: 06 Jun 2016; revised received: 24 Jun 2016; accepted: 09 Aug 2016

Purpose of this study was to determine the frequency of PU in patients with spinal cord injuries based on ASIA impairment scale and to compare frequency of PU in complete and incomplete SCI patients using ASIA impairment scale. This study may help clinicians to manage patients with SCI based on increased risk of PU in different categories according to ASIA impairment scale. Knowing frequency of pressure ulcer will also help authorities to allocate resources for different categories of patients with SCI.

PATIENTS AND METHODS

It was a cross sectional study conducted at Armed Forces Institute of Rehabilitation Medicine (AFIRM) Rawalpindi Pakistan from June 2013 to January 2014. Using WHO sample size calculator with level of significance 5%,

data were collected on a structured proforma. Well understood informed consent was obtained from all patients. All patients with SCI fulfilling inclusion criteria were included in the study from the indoor and the outpatient department of AFRIM. Information regarding, age, gender, severity of injury, site and stage of PU were documented. Observational bias was reduced by using ASIA impairment scale for severity of injury and national pressure ulcer advisory panel (NPUAP) stages of PU were used to stage PU. Patients were divided into two groups. Group "A" consisted of patients with complete SCI and group "B" comprised patients with incomplete SCI. Information was documented in proforma immediately after examining the patient by the trainee researcher to reduce recall bias.

Data were analyzed by using SPSS version 17 computer program. Descriptive statistics

Table: Stages of pressure ulcers (PU) in different ASIA impairment scales.

Stage of PU	ASIA Impairment Scale							
	A		B		C		D	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
no PU	18	56.3	9	75.0	9	81.8	6	85.7
Stage 1	3	9.4	1	8.3	0	0	0	0
Stage 2	4	12.5	0	0	1	9.1	0	0
Stage 3	3	9.4	1	8.3	0	0	1	14.3
Stage 4	4	12.5	1	8.3	1	9.1	0	0
Total	32	100.0	12	100.0	11	100.0	7	100.0

confidence level 95% population proportion 20% and with absolute precision 10%, sample size of 62 patients was taken. Non probability consecutive sampling technique was used. All cases of traumatic SCI of both genders from 16 to 54 years of age were included. Patients with co-existing traumatic brain injury, co-morbid medical conditions like cardiovascular accidents, diabetes mellitus and rheumatoid arthritis, tumors, metastatic disorders and caries spine were excluded.

Permission was taken from the hospital ethical committee before start of study. Patients were selected from AFIRM through non probability consecutive sampling. The relevant

(mean and SD) were calculated for continuous (quantitative variables) including age and frequencies in form of percentages were calculated for categorical (qualitative) variables like gender, PU, site and stage of PU, and groups based on severity of injury in both groups were calculated. Chi square test was applied at 5% level of significance to compare frequency of PU in complete versus incomplete SCI patients. A *p*-value <0.05 was considered significant.

RESULTS

A total 62 patients of SCI were included. The mean age of presentation was 36 years with SD of ± 0.93 . Most common age group was between 26 to 35 years including 40.3% (25) patients. Males in

our study were 79% (49) and females were 21% (13). On ASIA scoring 51.6% (32) patients were in ASIA 'A', 19.4% (12) had ASIA 'B', 17.7% (11) had ASIA 'C' and 11.3% (7) patients had ASIA 'D' type of SCI. According to ASIA scoring 51.6% (32) had complete SCI and 48.4% (30) patients had incomplete SCI. PU were found in 32.3% (20) patients. In 20 patients with PU; stage 1 PU were found in 20% (4) patients, stage 2 in 25% (5), stage 3 in 25% (5) and stage 4 PU were found in 30% (6) patients. Site and location of PU were; sacrum (30%, 6), ischium (15%, 3), trochanter (10%, 2), ankle (10%, 2), heel (15%, 3), knee (5.5%, 1), scapula (5%, 1) and on other places in (10%, 2) patients. Frequency and stages of PU in different ASIA score SCI are given in table.

In males, the frequency of PU was 34.7% (17)

temperature sensations and they are at increased risk of developing PU as compared to persons with incomplete spinal cord injuries. In a group of patients with complete spinal cord injuries 36% developed PU while only 19% patients with incomplete spinal cord injuries develop PU in a study by Verschueren and colleagues⁶. It implies that patients with complete spinal cord injuries will require more frequent risk assessments for PU and may require more counseling and awareness sessions about prevention of PU. If they develop, they may interfere with the initial rehabilitation and reintegration into the community, as well as are a source of morbidity and mortality⁷.

In USA, average age at the time of SCI has increased from 28.7 years to 41 years since 2005⁸.

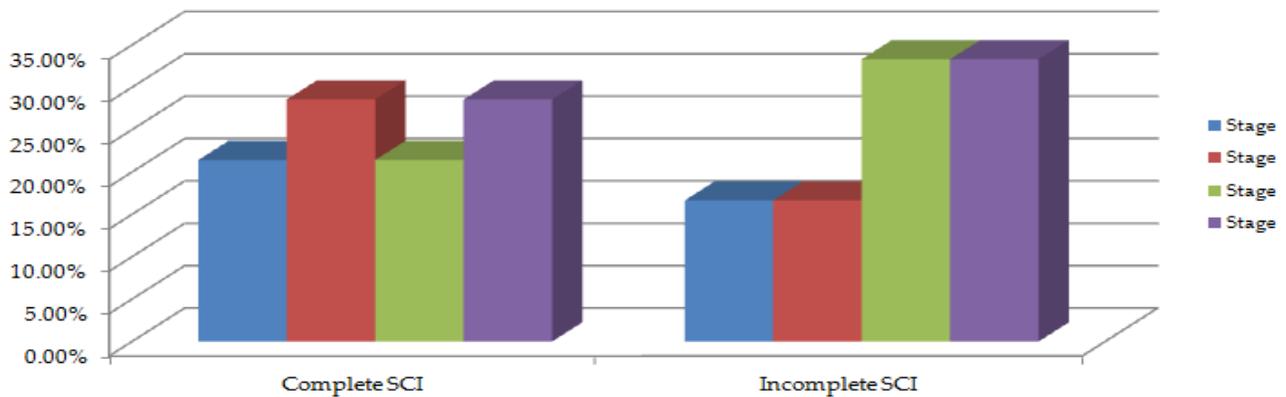


Figure: Stages of pressure ulcers (PU) in complete and incomplete spinal cord injury (SCI) patients.

and in females the frequency was 23.1% (3). PU were more frequent in ASIA 'A' injuries involving 43.8% cases followed by ASIA 'B' in 25% cases, 18.2% in ASIA 'C' and 14.3% in ASIA 'D'. Frequency of different stages of PU in complete and incomplete injuries is shown in figure. PU was significantly more frequent in complete injuries involving 43.8% (14) patients than in incomplete injuries affecting 20% (6) with *p*-value of 0.041.

DISCUSSION

PU are one of the most common and potentially serious complications of SCI. Patients with complete SCI lose protective pain and

Mean age in our study was 37 years which was higher than the published data of 2005 earthquake in northern areas of Pakistan (mean age of 28.3 years)⁹. In our study, PU were more frequent in males than females. Eslami et al. found that PU were more common in females for patients less than 10 years of age. In patients above 11 years, PU was more prevalent in males¹⁰.

In one of the local studies, 46% had ASIA A injuries; 4% had ASIA B, 11% had ASIA C and 9% had ASIA D, which is comparable to our results¹¹. In international studies, at the time of discharge from in-patient rehabilitation, 48.6% of persons

had ASIA A, followed by incomplete injuries of ASIA D, C, B, and E¹².

PU frequency is higher in this study as compared to the local studies where PU occurred 20 to 30% of SCI patients^{13,14}. One possible reason for low frequency in these studies may be that they were conducted shortly after 2005 earthquake and time after injury for developing of PU was short. In international studies, frequency of PU ranges from 20% to 65% during lifetime of SCI patient^{15,16}.

We found in this study that PU is more frequent in complete injuries as compared to incomplete injuries. Literature shows that the risk for complete SCI to have PU is 4.3 times greater than other types of SCI. Complete SCI also has first PU earlier than patients with other types of SCI¹⁷. Idowu et al. found in their study that there was no significant difference in the development of PU in paraplegia vs tetraplegia and complete vs incomplete SCI¹⁸. Age did not demonstrate a relationship with number and seriousness of PU¹⁸. Similarly in incomplete injuries frequency of PU increases with severity of injury measured by ASIA scoring. With increasing severity there is increasing loss of protective sensations and decrease mobility. Both of which increases risk of PU development¹⁹.

PU were distributed as follows; 69% in the sacral region, 18% trochanteric, 5% scalp, 1.5% ankle, 1.5% ischial tuberosity and the remaining 5% in other sites²⁰.

The relative frequencies of pressure ulcer stages vary across different studies. Salzberg et al. found that most patients had stage 3 or 4 ulcers, but this was a population of chronic SCI patients living in the community²¹.

In SCI population, it is cheaper and technically easier to prevent PU than to treat them. PU once occurred results in an increase in hospital stay, requires frequent doctor visits, needs expert staff and results in secondary complications²².

CONCLUSION

Pressure ulcers were more common complication detected after spinal cord injury with more frequency in complete spinal cord injury.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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