Pressure Ulcers in a Sample of Iraqi Patients with Spinal Cord Injury

Khudair Al-Bedri[1], Shahad Issam Ra'aof[2], Zainab A. Mahmood[3]

[1]F.I.B.M.S. Professor of Medicine, Consultant Internist and Rheumatologist, College of Medicine, University of Baghdad, Baghdad, Iraq, [2]MBChB, Diploma of Rheumatology, Baghdad Teaching Hospital, Rheumatology Unit; Baghdad, Iraq, [3]F.I.B.M.S. (Rheumatology and Rehabilitation) lecturer of Medicine, Department of Medicine, College of Medicine, University of Basra, Basra, Iraq

Abstract

Background: Pressure injury is the most common preventable secondary complication of spinal cord injury and may lead to serious.

Aims of the study: To determine the prevalence, grade, number and most common sites of pressure ulcer in people with spinal cord injury.

Patients and Method: This study carried out at Ibn Alkuff Spinal Cord Injury Rehabilitation Hospital, Baghdad, Iraq, during the period from 1st of November 2017 to the 1st of July 2018. A total sample of 100 patients was included in this descriptive cross-sectional study. Pressure ulcer was diagnosed by physical examination and graded according to the classification system for pressure ulcer by the European Pressure Ulcer Advisory Panel (EPUAP). Special scale was included in this study to assess spinal cord injury impairment (American spinal injury association scale (ASIA).

Results: Forty patients were having a pressure ulcer. This study showed these pressure ulcers more frequent in ASIA score (A) followed by (B) and (C). The results showed no statistically significant association between age, gender, duration of spinal cord injury and causes of spinal cord injury in determining the presence of pressure ulcer (p=0.089, p=0.57, p=0.214 and p=0.57 respectively).

Conclusions: Pressure ulcers are one of common secondary complication that occurs in 40% of Iraqi patients with spinal cord injury with more frequency in ASIA scale A and B spinal cord injury especially in sacral area and most of the patients presented with one ulcer only.

Keywords: *Pressure ulcer, causes of spinal cord injury,impairment after spinal cord injury, ASIA scale.*

Introduction

Spinal cord injury (SCI) is a devastating condition which occurs with an annual incidence of 12.1-57.8 cases per million, worldwide[1]. Younger males remain at greater risk.[2] The male-to-female ratio in developing countries is higher compared to developed ones.[3]

Pressure Injury: (PU) is a localized area of cellular necrosis and vascular destruction owing to prolonged exposure to pressure, shearing or friction.

There are no precise figures about the prevalence of pressure ulcers, only estimates that vary from one place to another and depending on the manner of estimation, Prevalence rates range from 4.7% to 32.1% for hospital populations, 4.4% to 33.0% for community-

Corresponding Author:
Zainab A. Mahmood
F.I.B.M.S. (Rheumatology and Rehabilitation) Lecturer of Medicine, Department of Medicine, College of Medicine, University of Basra, Basra, Iraq
Telephone: 009647801311901
e-mail: zainab_albahrani2000@yahoo.com

care populations, and 4.6% to 20.7% for nursing-home populations.[4]

A common classification system for pressure ulcers has been developed by the National Pressure Ulcer Advisory Panel (NPUAP) and European Pressure Ulcer Advisory Panel (EPUAP). They have agreed on four levels of injury which range in severity from category/ stage I (intact skin with no-blanchable erythema) to category/stage IV (full-thickness tissue loss), recognizing that the terms unclassified/unstageable and deep tissue injury are generally graded as "IV" in Europe, NPUAP has agreed to put them separately.[5]

Patients and Method

This is a cross-sectional descriptive study carried out at Ibn_Alkuff spinal cord injury Hospital (in Baghdad) during the period from 1st of November 2017 to the 1st of July 2018.

Inclusion Criteria: Patients with spinal cord injury.

Exclusion Criteria: Patients with cerebral pathology, congenital paralysis, and psychiatric issue.

Data were collected using a data collection sheet containing questionnaires for the patients.

The questionnaire includes:

1. Patients demographics; name, age, gender, body mass index (measured according to equation BMI = Weight/(Height by m^2), residence (rural, urban), job (employed, unemployed), marital status, education level (ignorance, primary school, secondary school, college, high education level), medical history (chronic illness; DM, HTN, renal, pulmonary, or cardiac disease), smoking, and alcohol intake.
2. Cause of injury (Motor vehicle collision, Violence, fall, other), site of injury, and duration by months.
3. Classification criteria for level of injury, its type, and impairment degree were assessed according to the American Spinal Injury Association impairment scale (ASIA scale).[6]Also, we have an ASIA impairment score for Functional assessment of SCI patients calculated according to a standardized formula.[7]
4. Presence of pressure ulcer was examined for all patients and their grade assessed according to the grading scale by the European Pressure Ulcer Advisory Panel (EPUAP).[5] Number and sites are recorded also.

Ethical Approval:

1. The study protocol was approved by the council of Faculty of Medicine/Baghdad University and the Department of Rheumatology.
2. Official agreements were obtained
3. Verbal patients' consents were obtained

Statistical Analysis: Data were analyzed using the statistical package for social sciences (SPSS) version 25 for windows. Descriptive statistics presented as frequencies, proportions, means, standard deviation (SD), median and interquartile ranges. Statistical tests and analysis were performed according to the type of variables, chi-square test used to assess the significance of association in cross-tabulation model, (categorical variables), Fisher's exact test was used as an alternative when Chi-square was inapplicable (more than 20% of the table cells had expected values < 5). Student's t-test (two independent groups) used to compare two means; for instance, mean BMI and mean duration of injury in patients with pressure ulcer vs. those without. Spearman's rho correlation test used to assess the correlation between pressure ulcers and other variables.

Results

A total of 100 patients were enrolled in this study with a mean age of 31.7 ± 14.6 (range: 5 – 81) years. Men were the dominant, represented (85%) of the studied group with men to women ratio of 5.7: 1.

The causes of the injury are represented in table 1:

Table 1. Distribution of cause and duration of injuries among the studied group

Variable		No.	%
Cause of Injury	Violence	48	48.0
	Fall	20	20.0
	RTA	17	17.0
	Other	15	15.0
Duration of injury (month)	Median	8	-
	IQR	4 - 24	

IQR: Interquartile range

Our results show that 72% were paraplegic, and the remaining 28% were tetraplegic.

Table 2 shows the distribution of levels of the injuries.

Table 2. Distribution of level of injury among the studied group

Level	No.	%
C2,3	2	2.0
C4,5	17	17.0
C6,7,8	9	9.0
D1, D2	8	8.0
D3, D4	11	11.0
D5, D6	6	6.0
D7, D8	8	8.0
D9, D10	13	13.0
D11, D12	5	5.0
L1, L2	9	9.0
L3, L4	12	12.0

Among the 100 patients with spinal cord injuries, unfortunately, pressure ulcers were found in 40 patients giving a prevalence rate of 40%.

Table 3 shows the total number of ulcers.

Table 3. Characteristics of the present pressure ulcers

Characteristic		No.	%
Number of Ulcers/patient	1	32	80.0
	2	6	15.0
	3, 4	2	5.0
	Total	**40**	**100.0**
Stage of Ulcer	Stage 1	8	16.3
	Stage 2	23	46.9
	Stage 3	14	28.6
	Stage 4	4	8.2
	Total	**49**	**100.0**
Site of Ulcer	Sacral	23	46.9
	Gluteal	14	28.6
	Thigh	4	8.2
	Heel	3	6.1
	Other sites	5	10.2
	Total	**49**	**100.0**

Table 4 shows pressure ulcers were relatively more frequent in women than men, and also relatively more frequent in advancing age, however, the differences were statistically insignificant.

Table 4. Cross-tabulation between pressure ulcers and each of age and gender of the patients

Variable		Pressure Ulcer		No Pressure Ulcer		P. value
		No.	%	No.	%	
Age (Year)	≤ 20	5	12.5	15	25.0	0.089
	21 - 30	18	45.0	22	36.7	
	31 - 40	5	12.5	14	23.3	
	41 - 50	6	15.0	2	3.3	
	> 50	6	15.0	7	11.7	
Gender	Man	33	82.5	52	86.7	0.57
	Woman	7	17.5	8	13.3	

Table 5 shows distribution of pressure ulcers across different ASIA.

Table 5: Stages of pressure ulcers according ASIA impairment scales

ASIA score	Pressure ulcer		No Pressure ulcer	
	No.		No.	
A	34	49.3	35	50.7
B	5	45.5	6	54.5
C	1	5.9	16	94.1
D	0	0.0	3	100.0

Table 6 shows the significance of the relationship between the presence of pressure ulcer and other variables of the studied group was assessed by conducting bivariate analysis and cross-tabulation.

Table 6: Results of correlation analysis for the relationship between presence of pressure ulcers and other variables

Variable	P. value
Job	0.17
Residence	0.74
Marital status	0.93
Education	0.34
BMI	0.56
Smoking status	0.10
Alcohol	0.08
History of chronic diseases	0.29
Cause of injury	0.57
Patient's status	0.72
Duration of injury	0.214

Discussion

Pressure ulcers were found in 40% of patients, which is higher than another study that was done in other countries like 32.3% in Pakistan [8] 17% on Dutch.[9] and 14.7% in Iran.[10] That difference may be related to the sample size, and differences in risk factors that may be attributed to the ulcer formation such as level of injury, educational level and mode of injury since most of our patients (48%) were victims of violence. Sixty-one Iraqi patients with SCI were studied in the period of 2003_2005 by Haider k. Radhee et al. They found that the major cause was RTA which represent 54.4% [11] Taghipour et al. and Fakharian et al, Otom, A. S., et al. all they found that road traffic accident was also the most common cause [12-14] . While RTA accounted for only 17% of the causes in our study. Most of the patients in this study were men 85% that support the fact explained by Dukes, Ellen M., et al. [15]. Men: women ratio was 5.33:1 which is closer to studies done in Jordan by Otom, A. S., et al.[14] Eslami et al. said that pressure ulcers were more common in women for patients aging less than 10 years while, in patients above 11 years, PU was more common in men. [16] Ning et al. did a review in Asia and they found that men were subject to a higher risk of traumatic spinal cord injury (TSCI) than women.[17]

This could be explained by the nature of the job of most of our patients as breadwinner 38%, or military 31%, that make them exposed to injurious causes. This was also noticed by Kuhn et al[18] when he concluded that the men: women ratio affected strongly by the socioeconomic and cultural status of the society. Regarding the affected age, Abdul Samad with his local study had shown the same range of age as we found [19]. Most of our patients aged 20-30, a mean age of 31.7 ± 14.6 (range: 5 – 81) years, the wide range in age may be related to special circumstances that occur in Iraq including recent war against terrorism and emigration that made all age groups be victims of violence and SCI. Asian studies reported an average age between 26.8 to 56.6 years. [17] Regarding educational levels in this study, most of our patients (45%) graduated from primary school, while 31% have graduated from secondary school. These results were compatible with those of Ali, Diaa, Ku; Lee and Mittelstaedt and LoBello et. al., in which their findings indicated that the majority of the studied subjects were secondary school graduated or less.[20-23] Comparable to another local study [19] 72% of our studied patients were paraplegic. Complete spinal cord injury A in ASIA was the most common type (69%); followed by incomplete type B (11%); C (17%) and D (3%) which is also agreed with studies of Jordan, Iran, and Pakistan. Eighty percent of patients had only one ulcer and 46% of all ulcers were stage 2. Shah, Syed Hussain; showed that only 25% of patients had stage 2 ulcer and another 25% had stage 3 ulcer[11] This reflects earlier detection of ulcer in our group sample. Patients with complete SCI lose protective pain and temperature sensation and increase the risk of developing PU as compared to other patients with incomplete. A complete injury is also associated with maceration from incontinence, which increases the risk of pressure PU. We found that the pressure ulcers in complete SCI were 49.3%, and in incomplete SCI were 19.3% which is closer to the studies carried on, Pakistanis patients by Shah, Syed Hussain[8], Nigeria by Idowu et al.[24] That means

patients with complete SCI required more attention and frequent risk assessment for PU and may require more counseling and awareness session about prevention of PU. Patients with an incomplete injury can usually be educated and motivated to use the upper limb for support in turning the body regularly. Such a maneuver has been reported to reduce the risk of pressure sores [25]. Regarding the sites of these ulcers, more frequent ulcers were found in the sacral region (46.9%), followed by (28.6%) in the gluteal region, (8.2%) in the thigh (lateral aspect), (6.1%) in the heel and (10.2%) ulcers in other sites. These findings were quite different from those on other studies. [8,26] This may be related to patient's education regarding turning from side to side and not let him on supine position for long period. There was no statistical significant association between development of PU (regarding severity or numbers) and different variants including: age, gender, residency, marital status, and education, duration of spinal cord injury, smoking, alcohol or presence of chronic illnesses. In conclusion pressure ulcers is one of common secondary complication that occurs in 40% of Iraqi patients with spinal cord injury with more frequency in ASIA scale A and B spinal cord injury especially in sacral area and most of them with one ulcer only.

Funding: This research received no grant from any funding agency in the public, commercial or not-for-profit sectors.

Disclosure: The Authors declare that there is no conflict of interest.

References

1. Rahimi-Movaghar, Vafa, et al. Epidemiology of traumatic spinal cord injury in developing countries: a systematic review. Neuroepidemiology, 2013, 41.2: 65-85.
2. Rahimi-Movaghar V, Sayyah MK, Akbari H, Khorramirouz R, Rasouli MR, Moradi-Lakeh M, Shokraneh F, Vaccaro AR. Epidemiology of traumatic spinal cord injury in developing countries: a systematic review. Neuroepidemiology. 2013;41(2):65-85.
3. Ackery A, Tator C, Krassioukov A. A global perspective on spinal cord injury epidemiology. Journal of neurotrauma. 2004 Oct 1;21(10):1355-70.
4. Correa GI, Fuentes M, Gonzalez X, Cumsille F, Pineros JL, Finkelstein J. Predictive factors for pressure ulcers in the ambulatory stage of spinal cord injury patients. Spinal cord. 2006 Dec;44(12):734.
5. Dr. Mikel Gray :NPUAP Pressure Injury Stages . http://www.npuap.org/resources/educational-and-clinical-resources/npuap-pressure-injury-stages/ Access in April 2018
6. Kirshblum SC, Burns SP, Biering-Sorensen F, Donovan W, et al. International standards for neurological classification of spinal cord injury (revised 2011). The journal of spinal cord medicine. 2011 Nov 1;34(6):535-46.
7. Maynard FM, Bracken MB, Creasey GJ, Ditunno JF, Donovan WH, Ducker TB, Garber SL, Marino RJ, Stover SL, Tator CH, Waters RL. International standards for neurological and functional classification of spinal cord injury. Spinal cord. 1997 May 1;35(5):266-74
8. Shah SH, Ahmad K, Mumtaz N. Frequency Of Pressure Ulcers In Patients With Spinal Cord Injury. Pakistan Armed Forces Medical Journal. 2017 Jun 1(3):434.
9. Van Weert K, Schouten EJ, Hofstede J, Van De Meent H, Holtslag HR, van den Berg-Emons RJ. Acute phase complications following traumatic spinal cord injury in Dutch level 1 trauma centres. Journal of rehabilitation medicine. 2014 Oct 5;46(9):882-5.
10. Javadi M, Hafezi-Nejad N, Vaccaro AR, Rahimi-Movaghar V. Medical complications and patient outcomes in Iranian veterans with spinal cord injury. Advances in clinical and experimental medicine: official organ Wroclaw Medical University. 2014;23(2):269-75.
11. Haider K. Radhee, Ayad Yousif AbdulnabI;,BasimSaed. Evaluation of Management of Closed Spinal Injury. Al-Kindy College Medical Journal, 2012, 8(2) 80-83.
12. Taghipour, M. and SherafatKazemzadeh,E.column and spinal cordinjuries in shiraz nemazi hospital, an epidemiological study. armaghandanesh, 2005. 11(4):52- 62.
13. Fakharian E, Fazel MR, Tabesh H, Navabi Z. Incidence of mild head injury, management, and expenses in Kashan, 2003-2004. Feyz. 2007;11(43):63-7.
14. Otom AS, Doughan AM, Kawar JS, Hattar EZ. Traumatic spinal cord injuries in Jordan–an epidemiological study. Spinal cord. 1997 Apr;

35(4):253.

15. Dukes, Ellen M., et al. Relationship of American Spinal Injury Association Impairment Scale Grade to Post-injury Hospitalization and Costs in Thoracic Spinal Cord Injury. Neurosurgery, 2017 Aug 9.
16. Eslami V, Saadat S, Arejan RH, Vaccaro AR, Ghodsi SM, Rahimi-Movaghar V. Factors associated with the development of pressure ulcers after spinal cord injury. Spinal Cord. 2012 Dec; 50(12):899.
17. Ning GZ, Wu Q, Li YL, Feng SQ. Epidemiology of traumatic spinal cord injury in Asia: a systematic review. The journal of spinal cord medicine. 2012 Jul 1;35(4):229-39.
18. Kuhn W, Zäch GA, Köchlin PH, Urwyler A. Comparison of spinal cord injuries in females and in males, 1979–1981 Basle. Spinal Cord. 1983 Jun;21(3):154.
19. Talal Abdul Samad, Mohammed Hadi Munshed, Ali Anees. Deep Vein Thrombosis in Iraqi Spinal Cord Injured Patients. Iraqi Academic Scientific Journal. 2009;8(1):21-6.
20. Ali DK, Tawfiq NB. Assessment of spinal cord injured persons, quality of life. kufa Journal for Nursing sciences. 2013;3(1):231-43.
21. Ku, H.J. Health Related Quality of Life in Patients with Spinal Cord Injury: Review of the Short Form 36-health Questionnaire Survey, Yonsei Medical Journal, 2007, Vol (48), No (3): 360- 70.
22. Lee Y, Mittelstaedt R. Impact of injury level and self-monitoring on free time boredom of people with spinal cord injury. Disability and rehabilitation. 2004 Oct 7;26(19):1143-9.
23. Lobello, S.; Underhil, A.; Valentine, P.; Stroud, T. Social Integration and Life and Family Satisfaction in Survivors of Injury at 5 years Post Injury, Rehabilitation Research and Development Journal, 2003, Vol (40), No (4): 73- 80.
24. Idowu OK, Yinusa W, Gbadegesin SA, Adebule GT. Risk factors for pressure ulceration in a resource constrained spinal injury service. Spinal cord. 2011 May;49(5):643.
25. Correa GI, Fuentes M, Gonzalez X, Cumsille F, Pineros JL, Finkelstein J. Predictive factors for pressure ulcers in the ambulatory stage of spinal cord injury patients. Spinal cord. 2006 Dec; 44(12):734-39.
26. Iyun AO, Malomo AO, Oluwatosin OM, Ademola SA, Shokunbi MT. Pattern of presentation of pressure ulcers in traumatic spinal cord injured patients in University College Hospital, Ibadan. International wound journal. 2012 Apr; 9(2): 206-13.