

Evaluation of Different Types of Pain in Patients with Spinal Cord Injury

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Abstract

Background: Pain is an unpleasant sensory experience associated with actual or potential tissue damage. In patients with spinal cord injury (SCI), pain may occur as a result of damage to the spinal cord, or it may occur due to damage to other areas of the body at the time of injury. It is also common for many individuals with SCI to experience different types of chronic pain. Sometimes the pain is very severe and may have a great impact on daily living. This study evaluates the prevalence and different types of pain in Iranian SCI patients.

Methods: Eighty four SCI patients were included in the present study based on an inclusion criteria. An expert physiatrist evaluated the patients and filled demographic questionnaires. After, the patients filled the short-form McGill pain questionnaire (SF-MPQ-2).

Results: The mean age of patients was 34.9 (SD: 10.9) years and the mean duration of spinal cord injury as well as duration of having pain were 2.57 (SD: 2.32) and 1.81 (SD: 1.96) years, respectively. The most prevalent type of pain was tingling (84.5%), hot-burning and shooting pain (65.7%), as well as cramping pain (63.1%). The mean of pain in the visual analogue scale (VAS) is 5.69 (SD: 2.21).

Conclusions: Pain is one of the most debilitating complications among SCI patients. Heeding to the patients' pain, it's appropriate and precise diagnosis, and timely treatment can improve the quality of life as well as their more efficient return to social activities among these patients.

Keywords: Spinal Cord Injury, Pain, Neuropathic Pain

1. Background

Spinal cord injury (SCI) is a debilitating damage, which affects various sensory-motor systems and leads to limb paralysis (1). This condition leads to lifelong loss of function, autonomic disturbances and reduced quality of life, as well as increased morbidity and mortality. Patients with SCI suffer a number of complications. One of the most prevalent of these complications is pain. Pain is an unpleasant feeling when it turns chronic; it can have debilitating effects on different aspects of the patients' life including their independence, mental health, and ability to return to work or normal life (1-4). Pain in these patients commonly starts within the first 6 months of their life. Further, this moves toward turning into a chronic pain in many of these patients.

The prevalence of pain in these patients has been estimated between 39% to 90% (5). This wide range of pain has probably been due to various criterias considered for the patients' pain in different studies.

Different types of pain have been observed in these patients. The pain might be caused due to injury to the spinal cord or other parts.

The pain in these patients is usually categorized into 2 groups, neuropathic (arising from nervous system structures such as spine and brain) and nociceptive (arising from somatic and organs structures).

Neuropathic pain was classified at level and below level in these patients. At-level SCI (neuropathic) pain refers to neuropathic pain perceived in a segmental pattern anywhere within the dermatome representing the NLI and/or within the 3 dermatomes below this level and not in any lower dermatomes (6). A necessary condition for classifying a pain as at-level SCI pain is that a lesion or disease must affect the spinal cord or nerve roots, and the pain is believed to arise as a result of this damage. As previously mentioned pain may occur at areas with normal, reduced, or numb sensation. Below-level SCI (neuropathic) pain or below-level spinal cord pain refers to neuropathic pain that is perceived more than 3 dermatomes below the dermatome representing the NLI. It might or might not be perceived within the dermatome representing the NLI and the 3 dermatomes below the NLI (6). A necessary condition for classifying a pain as below-level SCI pain is that a lesion or disease must affect the spinal cord and that the pain is thought to arise as a result of this damage. In some cases,

the pain is extremely disturbing leading to disorders and disruptions in patients' lives and reducing their quality of life. The present study was planned to investigate different types of neuropathic pain in SCI patients. Whereas numerous studies have been carried out in other countries, there is a lack of information in this area in Iran. To decrease this lack, we designed this study for evaluation of the neuropathic pain and its types among our SCI patients.

2. Methods

142 patients with SCI were referred to the physical medicine and rehabilitation clinic of SCI research center in a 1-year period starting from September 23, 2013 to September 23, 2014. Among these, 89 patients who met the inclusion criteria were included in the study. The inclusion criteria included the ages of 18 - 75, pain duration (more than a month), no other systemic diseases such as diabetes, cardiovascular diseases, and malignancies, as well as receiving no invasive treatment for their pain. The patients were then closely examined by an experienced specialist in the SCI field. Furthermore, the demographic information questionnaire and short form McGill pain questionnaire 2 (SF-MPQ-2) was filled out for these patients.

The SF-MPQ-2 is used to measure the severity of different types of pain. This questionnaire is not necessarily and merely used to measure neuropathic types of pain, and is usually employed to measure and assess non-neuropathic pain as well. The SF-MPQ-2 comprises 22 items on various types of pain, which is scored based on a Likert Scale from 0 to 10. Zero indicates lack of pain and 10 represents extreme level of pain in the week before filling the questionnaire. The questionnaire investigates pain within 4 domains including continuous pain (items 1, 5, 6, 8, 9, 10), intermittent pain (2, 3, 4, 11, 16, 18), neuropathic pain (7, 17, 19, 20, 21, 22), and affective pain (12, 13, 14, 15).

3. Results

89 patients, including 71 men and 18 women, were investigated. The demographic information is displayed in [Table 1](#).

As displayed in [Table 1](#), 71 patients were paraplegic and 18 patients were quadriplegic. The most common injury occurred at the level of thoracic (68.1%) (mostly in T12 level) and cervical (20%). On the other hand, the lowest level of damage was observed at the level of lumbosacral (18.8%).

The most common cause of SCI, in our study, was vehicle collisions (65.2%) ([Table 2](#)).

The distribution of pain, considering the level of the injury, is presented in [Table 3](#).

Table 1. Demographic Information of the Patients Participating in the Study

Variable	Value
Gender (%)	
Men	(71) 79.9
Women	(18) 20.1
Mean age (\pm SD) range (year) range: 18 - 73	
Men	34.35 (\pm 10.83)
Women	37.44 (\pm 11.31)
Mean years since SCI \pm SD	
6 months - 21 years	2.72 \pm 2.13
Marital status (%)	
Married	69.6
Divorced	28.1
Never married	2.2
Education (%)	
Low grade	70.8
High grade	15.7
Never go to school	12.4
Employment (%)	
Employed	19
Unemployed	81

Table 2. The Cause of SCI in the Patients of the Study

	Frequency	Percent (%)
Accident	58	65.2
Falling	19	21.3
Heavy object falling on the patient	6	6.7
Violence	4	4.5
Diving	2	2.2
Total	89	100.0

Pain duration in patients was 1.83 years (SD: \pm 1.41). In addition, VAS mean of the patients was 5.62 (SD: 2.24).

The VAS mean has been presented based on gender, employment, spasticity or no spasticity, injury level (paraplegic, and quadriplegic), and education level in [Table 4](#).

[Table 5](#) presents different types of pain based on the SF-MPQ-2 developed by McGill.

[Table 6](#) displays the mean of pain severity based on the domains in the McGill's SF-MPQ-2.

Table 3. Distribution of Patients' Pain Based on the Injury Level

	Frequency	Percent (%)
Below level	58	65.2
At and below level	12	13.5
Above level	6	6.7
At level	6	6.7
Above and below level	3	3.4
Above and at	3	3.4
Above, at and below	1	1.1

Table 4. VAS Mean Based on Various Factors

	VAS (mean \pm SD)	P Value
Male	5.45 (\pm 2.34)	0.2
Female	6.22 (\pm 2.04)	
Employed	5.41 (\pm 2.03)	0.69
Unemployed	5.65 (\pm 2.36)	
Spasticity	5.41 (\pm 2.07)	0.28
No spasticity	5.96 (\pm 2.65)	
Paraplegic	5.54 (\pm 2.30)	0.64
Quadriplegic	5.83 (\pm 2.30)	
High education	4.78	0.107
Low education	5.86	

4. Discussion

Spinal cord injury is a disaster in everyone's life and its complications can interfere with the patients and their family's quality of life. One of the debilitating complication is pain, and in specific, a neuropathic one. In our study, 62% of the SCI patients referring to the physical medicine and rehabilitation clinic suffered from pain for more than a month. The prevalence of pain in SCI patients has a wide range between 26% and 77% in various investigations, which can be due to the discrepancies in classifications and considered criteria (7, 8). With regards to investigating the relationships between pain severity and age increase, there was no statistically significant relationship found in our study, whereas some studies report the significant relationship between age and increase in pain severity (9-11).

In the Ulrich study, it was shown that the prevalence of pain was not related to the demographic features, while the severity of pain was higher in tetraplegic patients than paraplegic ones (12).

However, a study carried out in Turkey showed the higher prevalence of pain among paraplegic patients com-

pared with quadriplegic, as well as in patients with complete than incomplete injury. Ravenscroft found out that patients with complete injury suffer a more severe pain compared with ones with incomplete injury (3). This, however, was in contrast with Vall's study in which patients with incomplete injury had a more severe pain (1). In our study, the severity of pain is higher in paraplegic than quadriplegic patients; however, it doesn't have statistical means.

In general, the SCI tends to occur in men more than women. In most of the studies, the pain has existed among men, however, in our study, the severity of pain among women tended to be higher than the value among men. Though, this difference was not statistically significant.

In our study, the severity of pain in people with lower education tended to be higher than that among patients with a higher education. In addition, unemployed patients experienced a higher severity of pain in comparison with employed ones.

Furthermore, the results of our study indicated that the severity of pain among patients with spasticity was higher than patients with no spasticity. Though, this difference was not statistically significant.

Additionally, the prevalence of pain below the level of injury was more than other areas. In Valls's study, the prevalence of neuropathic pain at level of injury was 13% while this was 27% below the level of injury.

In a study done by Azma et al., conducted on Bam's earthquake stricken SCI patients, the prevalence of pain and its influence were studied 4 years after the Bam earthquake. 82.5% of the patients complained about their pain. This value was 77.8% among men and 86.4% among women. Furthermore, the pain was more severe among patients with a higher education and lower employment levels. The most commonplace area of pain was thoracic level and was more prevalent in the case of patients with incomplete injuries (13).

Shojaei et al.'s study, in 2005, done on 270 SCI patients, investigated the prevalence of phantom pain in these patients. The pain existed in 33% of the patients. There was a significant relationship between age, marital status, and the duration of time after the injury (P value $<$ 0.05) (14).

In our survey regarding the questionnaire, the most common types of pain (tingling & hot burning) are located in the neuropathic group and the 3rd type was shooting pain that is represent of intermittent sensory pain. Cramping pain shows a continuous type of pain, in which our patient mentioned it in the 4th rank.

4.1. Conclusion

Pain is to be a significant problem in people with spinal cord injuries. In our study most SCI patients suffer from

Table 5. Pain Mean Based on McGill's SF-MPQ-2

		Yes	No	Mean
1	Throbbing pain	39.3	60.7	4.88 (SD: 2.52)
2	Shooting pain	65.2	34.8	5.41 (SD: 2.68)
3	Stabbing pain	27	73	4.75 (SD: 2.96)
4	Sharp pain	41.6	58.4	4.86 (SD: 3.01)
5	Cramping pain	64	36	5.73 (SD: 2.66)
6	Gnawing pain	48.3	51.7	5.72 (SD: 2.86)
7	Hot burning	66.3	33.7	6.42 (2.94)
8	Aching pain	38.2	61.8	6 (SD: 2.93)
9	Heavy pain	44.9	55.1	6.67 (SD: 2.86)
10	Tender	22.6	67.4	5.68 (SD: 2.73)
11	Splitting pain	15.7	84.3	5.14 (SD: 2.68)
12	Tiring-exhausting	37.1	62.9	5.63 (SD: 2.80)
13	Sickening	21.3	78.7	3.42 (SD: 2.52)
14	Fearful	15.7	84.3	4.92 (SD: 2.52)
15	Punishing-cruel	13.5	86.5	0.59 (SD: 1.84)
16	Electrical shock pain	50.6	49.4	5.66 (SD: 2.73)
17	Cold freezing pain	56.2	43.8	5.78 (SD: 2.97)
18	Piercing	23.7	66.3	1.73 (SD: 2.98)
19	Pain caused by light touch	44.3	55.7	4.76 (SD: 2.72)
20	Itching	37.1	62.9	4.18 (SD: 2.75)
21	Tingling or pins and needles	83.1	16.9	6.83 (SD: 2.61)
22	Numbness	53.9	46.1	6.02 (SD: 3.04)

Table 6. Mean Pain Severity Based on McGill's SF-MPQ-2

	Mean	Std. Deviation
Continuous	15.50	14.52
Intermittent	12.23	11.03
Affective	4.19	6.21
Neuropathic	20.14	12.21

Table 7. Investigating Correlations Between Age and VAS Severity

	Mean	Std. Deviation	N	P Value
Age	34.97	10.94	89	0.21
VAS	5.60	2.29	89	

pain. SCI-related professionals should be aware of the importance of pain in these patients. Timely pain management in these patients can improve quality of life and de-

crease their complication.

Footnotes

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