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Original Article

Influence of Pain on Depression and Quality of Life in Patients with Spinal Cord Injury

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Objective: To assess pain prevalence in a spinal cord injury (SCI) population and the influence of pain on depression and quality of life in patients with SCI.

Methods: Two hundred twenty six SCI patients were asked to participate in this study after completing a questionnaire. The questionnaire included demographic data, clinical characteristics of SCI, performance of daily activities and pain intensity on a Numerical Rating Scale (NRS). The Chinese version of Identification (ID) of pain questionnaire was used to detect the neuropathic form of pain. The Taiwanese Depression Questionnaire (TDQ) was used for screening of depression and the Taiwan version of the 36-Item Medical Outcomes Short-Form Health (SF-36) for quality of life. Patients' attitude to the effect of pain medications was also asked. Patients were divided into those having mild pain, those having moderate pain and those having severe pain. These three groups of patients were compared according to clinical variables,depression scale and quality of life.

Results: The response rate was 59.2%. The prevalence of pain after SCI was 85.0%. Of them, 41.2% reported severe pain. Patients with neuropathic pain had higher scores of pain (NRS, 6.86±2.21). Age, sex, marriage, employment status, education, and duration/level of injury did not influence pain intensity. Pain intensity was significantly associated with TDQ score. All scores of subgroups of SF-36 in the SCI population were lower than the general population. Only scores of bodily pain and social functioning domains of SF-36 were significantly influenced by pain intensity. Most of the patients (86.2%) with pain felt little or no effect of pain medications.

Conclusion: Prevalence of pain after SCI is high. Intensity of pain is significantly correlated with depression. Patients with neuropathic pain had higher intensity of pain than patients with non-neuropathic pain. SCI patients had decreased scores in all domains of SF-36 but intensity of pain had a significant influence on domains of bodily pain and social functioning only. However depression had a significant influence on all domains of SF-36. In SCI patients with pain, most of them felt little or no relief from pain medications and most of them disliked taking pain medications. There is need for further study for an effective strategy for pain after SCI. (Tw J Phys Med Rehabil 2014; 42(2): 81 - 87)

Key Words: spinal cord injury, pain, depression, quality of life

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INTRODUCTION

Pain is a frequent complication of spinal cord injury (SCI). According to the previous studies, about two-thirds to three-quarters of SCI patients have pain, with about one-third reporting their pain as severe.[1] Pain had unfavorable effects on psychosocial function, occupational activities and basic needs, such as sleep. These resulted in a lower level of quality of life. Although there have been significant gains in limiting bladder, skin, cardiovascular and respiratory complications after SCI , chronic pain after SCI has proven to be largely refractory to medical management.[2] There is need for more thorough study of management of pain after SCI. Pain is associated with bio-psychosocial factors such as race or culture. Currently, there are only limited data about SCI pain in Taiwan. The present study was designed to assess the pain prevalence in a SCI population and the influence of pain on depression and quality of life in patients with SCI in Taiwan.

METHODS

The members of the Taichung SCI organization and SCI potential development center during May, 2013 to September, 2013 were invited to participate in the study. They were approached by a postal survey and were asked to complete the included questionnaire.

A questionnaire gathered information on age, sex, level of education, cause of SCI, level of injury, duration since injury, severity of injury, employment status, status of activity of daily living and ambulation capacity. Severity of injury was based on motor completeness or incompleteness. Level of injury was classified as cervical, thoracic and lumbar level or below. Status of activities of daily living was classified as independent, partially dependent and totally dependent. Ambulation capacity was classified as independent ambulation with or without a device and wheel chair ambulation. Pain or not was asked and its severity was graded by a Numerical Rating Scale (NRS), with 0 =' no pain' and 10 =' pain as bad as pain could be'. NRS has been shown to have good test-retest reliability and adequate validity.[3] The Chinese version of the Identification (ID) pain questionnaire was used to discriminate between neuropathic pain and non-neuropathic pain. Scores of 3 or higher (out of a total of 5) were considered neuropathic pain. One study showed that the ID pain questionnaire is a valuable tool for discriminating neuropathic pain.[4] In patients with pain, their frequency of use of pain medications and attitude to the effect of pain medications were also asked.

The Taiwan version of the 36-Item Medical Outcomes Short-Form Health (SF-36) was used to assess the quality of life. One study showed that the Taiwan version of SF-36 is a valuable tool for evaluation of the quality of life in Taiwan.[5]This study also revealed scores of SF-36 of general population in Taiwan. The score of a SCI population was compared to the general population. The Taiwanese Depression Questionnaire (TDQ) was used for screening of depression. Scores of 19 or higher (out of a total of 57) were considered as a possible diagnosis of depression and scores of 28 or higher as probable diagnosis of depression. There is one study that suggested that the TDQ is superior to the Beck Depression Inventory (BDI) in detecting depression in patients with chronic pain in Taiwan.[6] Patients were divided into three groups, as those having no pain or mild pain (NRS=0-3), those having moderate pain (NRS=4-6) and those having severe pain (NRS= 7-10). A study has suggested that the best set of pain severity cutoff points is 1 to 3, 4 to 6 and 7 to 10 in SCI population.[7] These three groups of patients were compared according to clinical variables, depression scale and quality of life. In patients with pain, the frequency of use of pain medications was classified as used every day, used when needed, used a little, or never used pain medications. The effect of pain medications was classified as very effective, moderately effective, a little effective and not effective at all.

SPSS (Statistical Package for social science) version 21 was used for statistical analysis. Comparisons between the groups were performed with Mann-Whitney *U*-test, Krustal-Wallis test for non-normal distributed variables and student's *t*-test for normal distributed variables. Spearman's rank coefficients and Pearson correlation coefficients were used for correlation analysis. A p value of less than 0.05 was considered to be significant.

RESULTS

A total of 226 questionnaires were sent and the numbers of completed and returned questionnaires were 134 (59.2%). Table 1 shows the demographic and SCI characteristic of the 134 respondents. Ages ranged from 16 to 73 years(average 44±12.6), and time post injury from 6 months to 39 years(average 13±10).

Table 1 Demographic data and characteristics of SCI (Total number=134)

Variables	N	%
Sex		
Male	87	64.9
Female	47	35.1
Education		
Primary education	36	26.8
High school degree	64	47.8
College graduate or higher	34	25.4
Marriage		
Married	51	38.1
Single	83	61.9
Employment status		
Unemployed	83	61.9
Employed	51	38.1
Level of injury		
Cervical	48	35.8
Thoracic	65	48.5
Lumbar and below	21	15.7
Completeness of injury		
Motor complete	81	60.4
Motor incomplete	53	39.6
Cause of SCI		
Traumatic	108	80.6
Non-traumatic	26	19.4
Years since injury		
<1 year	11	8.2
1–5 years	31	23.1
6–10 years	22	16.4
10–20 years	39	29.1
> 20 years	31	23.1
Ambulation		
Independent ambulation	27	20.1
Ambulation with wheel chair	107	79.9
Activities of daily living		
Independent	74	55.2
Partial dependent	44	32.8
Total dependent	16	12

The prevalence of pain in SCI is high, with 85.1% of SCI patients reporting pain. Table 2 shows pain intensity and characteristics in SCI. In patients with pain, 41.2% reported their pain was severe. There were no significant relationships between pain intensity and age, sex, marriage, employment status, education, and duration/level of injury. According to the ID pain questionnaire, neuropathic pain was present in 38.8% of SCI patients. SCI with neuropathic pain had higher scores (6.86&5.07) than the non-neuropathic pain group (p<0.001). There were 31 patients (23.1%) having a TDQ score higher than 28, which means probable diagnosis of depression. The TDQ score was positively correlated with the NRS score (r=0.254, p<0.004). SCI patients with severe pain had a higher TDQ score than mild or moderate pain groups (p<0.022) (Figure 1).

Table 3 compares the scores of all SF-36 domains in SCI patients with the general population. The poorest SF-36 subscale scores were in physical functioning, role-physical and role-emotional. Pain intensity had a significant influence on the score of bodily pain (r=-0.629, p<0.001) , social functioning (r= -0.213, p<0.014) only. There was no significant influence of pain intensity on other domains of SF-36. However, TDQ scores correlated significantly with all domains of SF-36. Table 4 showed the data of correlations between TDQ scores and scores of domains of SF-36, with the highest correlation with social functioning (r= -o.609, p=0.000) and least correlation with physical functioning (r= -0.205, p=0.022). In patients with pain, most (86.2%) felt little or no relief from pain medications and most (64.6%) used only a little or never used pain medications.

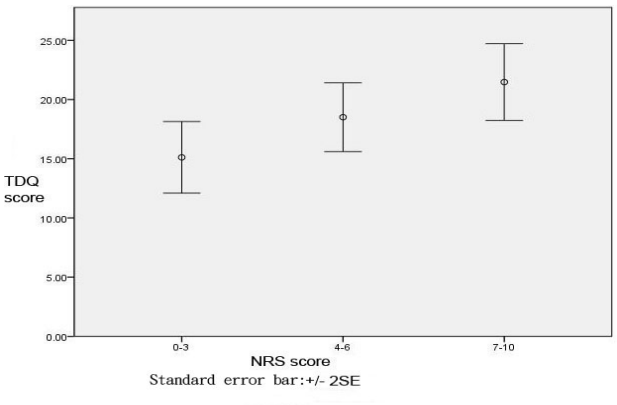

Figure 1. The comparison of TDQ score and NRS score between the groups according to pain intensity.

Table 2 Characteristics , pain intensity and depression score of SCI(N=134)

Pain type	N	%	Mean of NRS score	Mean of TDQ score
Without pain	20	14.9		
Neuropathic pain	52	38.8	6.86±2.21	18.94±10.65
Non-neuropathic pain	62	46.3	5.07±2.21	19.31±10.09
Pain intensity			5.8	
No pain or mild pain	38	28.3%	1.21±1.20	15.11±8.68
Moderate pain	49	36.5%	5.08±0.75	18.51±9.85
Severe pain	47	35.1%	8.23±1.24	21.47±10.86

Table 3 Mean scores of the SF-36 domains

SF-36	SCI patients	General population
Physical functioning	19.3	92.24
Role-physical	22.01	83.65
Bodily pain	51	84.84
General health	45.2	69.29
Vitality	49.4	68.27
Social functioning	67.42	86.81
Role-emotional	38.9	79.4
Mental health	57.2	73.01

Table 4 Correlation between TDQ scores and scores of domains of SF-36

Domains of SF-36	Pearson correlation coefficients	*P* value
Physical functioning	-0.205	0.022
Role-physical	-0.299	0.000
Bodily pain	-0.436	0.000
General health	-0.440	0.000
Vitality	-0.606	0.000
Social functioning	-0.609	0.000
Role-emotional	-0.524	0.000
Mental health	-0.591	0.000

DISCUSSION

Our study showed that chronic pain after SCI is very common, with a prevalence of 85%. It had been estimated that overall prevalence of pain after SCI ranged from 25 to 96%, whereas for severe pain, the prevalence ranged from 30 to 51%.[8] Differences are due to different study designs and lack of consistent definitions of SCI pain categories. The prevalence of neuropathic pain in our study is 38.8% and the estimates of prevalence of neuropathic pain in the literature are from 14 to 40%. [9-11] The patients with neuropathic pain had higher intensity of pain than non-neuropathic pain in the present study. According to previous studies, demographic variables and SCI characteristics such as duration after SCI and completeness of SCI were not associated with pain ratings.[12] Our study also showed similar results.

There is evidence that a higher portion of SCI patients have more depressed moods than healthy mem-

bers of the population.[13] One study showed that the prevalence of depression after SCI was about 22%.[14] and 23.1% of our SCI patients had a TDQ score higher than 28, a score consistent with a probable diagnosis of depression. Chronic pain is closely related to depression and SCI patients with chronic pain had higher ratings of depression than patients without pain.[15]Our study showed that a higher NRS score was positively correlated with a higher score of TDQ (r=0.254, p<0.004). Patients with severe pain had a higher percentage of depression.

Certain studies have shown that a SCI had a negative impact on scores of SF-36[16 17] and one study showed that a higher pain intensity had a significant negative impact on all the domains of SF-36, except for physical functioning.[18] However, the present study showed that a higher intensity of pain had a negative impact only on bodily pain and social functioning. There was no significant influence of pain intensity on other domains of SF-36. One other study supported the finding of the present study.[15] Decreased quality of life after SCI was due to multiple factors, such as injury severity, age or depression. Our study showed that a higher TDQ score had a significant negative impact on all domains of SF-36.

Current treatment recommendations for pain after a SCI focus on pharmacological strategies involving anticonvulsants, antidepressants, analgesics, cannabinoids and anti-spasticity medications.[2] But effective treatment of pain following SCI is notoriously difficult.[19 20] Our study also revealed that most patients with pain feel little or no effect of drugs on pain reduction. Studies of non-pharmacological treatments have increased during the past few years. Some showed better effect of non-pharmacological treatments than pharmacological treatments.[21] There is need for further study for an effective strategy for pain after a SCI.

CONCLUSION

Pain after SCI is very common with about 41% reporting severe pain.SCI patients with severe pain had more probable diagnosis of depression. Patients with neuropathic pain had a higher intensity of pain than patients with non-neuropathic pain. Pain intensity had a significant influence on domains of bodily pain and social functioning. Depression had a significant influence on all domains of SF-36. In SCI patients with pain, most of them felt little relief from pain medications and most of them disliked taking pain medications. There is need for further study for an effective strategy other than pharmacological treatments for pain after a SCI.

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脊髓損傷患者疼痛對憂鬱及生活品質之影響

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目的：調查脊髓損傷患者出現疼痛之盛行率，以及疼痛對脊髓損傷患者之憂鬱及生活品質之影響。

方法：研究以問卷方式，請 226 位脊髓損傷患者完成問卷調查，問卷內容包含人口統計相關資料、脊髓損傷患者之臨床特徵、疼痛嚴重度、以中文版 ID 疼痛問卷評估有無神經性疼痛、以台灣人憂鬱問卷(TDQ)評估憂鬱狀況及以台灣版 SF-36 評估脊髓損傷患者之生活品質，並詢問患者使用藥物減低疼痛之頻率及其效果。患者以疼痛嚴重度分成無痛或輕微疼痛、中等程度疼痛及嚴重疼痛三組，並依據患者之臨床變項、憂鬱狀況及生活品質，比較三組間之不同。

結果：完成完整問卷之比率為 59.2%。脊髓損傷患者疼痛盛行率為 85.0%，其中 41.2%為嚴重疼痛。具有神經性疼痛性質之患者，有較高之疼痛度。年齡、性別、婚姻狀態、就業有無、教育程度、發病多久及脊椎受傷位置，不會影響疼痛嚴重度。疼痛嚴重度與台灣人憂鬱問卷分數，具有正向統計相關性。疼痛嚴重度只影響 SF-36 中的身體疼痛及社會功能兩項。TDQ 之憂鬱分數，則影響 SF-36 所有分項之分數。大部分患者(86.2%)，認為以藥物減輕疼痛只有些許效果或完全無效。

結論：脊髓損傷患者疼痛盛行率很高。疼痛嚴重度與憂鬱狀態，具有正向統計相關性。疼痛嚴重度只影響 SF-36 中的身體疼痛及社會功能兩分項。憂鬱則影響 SF-36 所有分項之生活品質分數。大部分患者認為以藥物減輕疼痛，只有些許效果或完全無效，未來必須對脊髓損傷患者疼痛 ，做深入之研究以獲得有效之治療。（台灣復健醫誌 2014；42(2)：81 - 87）

關鍵詞：脊髓損傷（spinal cord injury)，疼痛（pain)，憂鬱（depression），生活品質（quality of life）

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