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Pain, Anxiety and Depression in Spinal Cord Injured Patients

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Abstract

Objective: To assess the prevalence of pain, anxiety and depression in a sample of chronic SCI patients in Northern Sweden.

Design: Descriptive, cross-sectional study.

Setting: Specialist Clinic at a University Hospital.

Participants: 78 patients with chronic spinal cord injury, at different injury and functional level.

Outcome measures: Patients registered presented pain above, at or below injury level on a Visual Analogue Scale (VAS). Patients currently on pain medication were also registered as having pain. Depression and anxiety were assessed by the Hospital Anxiety and Depression Rating Scale (HADS).

Results: Out of 78 patients, 58 (74%) indicated current presence of pain or were on continuous pain medication. Pain above injury level was present in 32% of the patients, with a mean VAS of 15.9±20.1, range 0-60mm. Pain at injury level were present in 24% of the patients, mean VAS 11.0±17.0, range 0-50mm and 58% had pain below injury level with a mean VAS 31.4±22.3, range 0-80mm.

Clinically significant psychological disorders were reported in 4 patients (5%) for both anxiety and depression.

Conclusions: Pain is very common in persons with chronic SCI, but, at least in a drug-treated population, the pain is at a mild or moderate level. Anxiety and depression were found much less common than reported in other studies. Medication effects have been considered. Even in a presumably well-medicated and well-rehabilitated population, there is still a need for further optimization of pain management, including both pharmacological and non-pharmacological methods.

Keywords: Tetraplegia; Paraplegia; Psychological Disorders; Visual Analogue Scale; Hospital Anxiety and Depression Scale

Introduction

Persons with spinal cord injury (SCI) now live longer than ever before, due to significantly improved acute care, primary comprehensive rehabilitation, as well as life-long structured check-up [1,2]. Secondary complications remain a clinical challenge, and in some respect even an increasing challenge. In addition to classic SCI complications, such as urinary tract infections and pressure ulcers, concern is directed towards cardiovascular risk and also towards "invisible" problems such as depression, anxiety and pain [3-5].

Pain, in particular, is a very common problem in the SCI patient group. In some studies, neuropathic and musculoskeletal pain are the most commonly reported secondary health problems [6]. Within the group of SCI patients with pain, psychological issues like depression and anxiety are also common. Pain, depression and anxiety are secondary complications that substantially affect the SCI person's quality of life (QOL), activities of daily living (ADL) and working ability [7-9].

Nociceptive pain, where musculoskeletal pain probably is the most common type of pain after a SCI [10], often affects shoulders and wrists due to overuse of the upper extremities, muscle weakness, poor seated posture etc.[11].

Neuropathic pain after SCI has been suggested to be classified by its location, i.e. above-, at-, and below-level of neurological lesion [12], and about 40-50% of SCI patients are affected by neuropathic pain.

Psychological problems are also prevalent after SCI, where 20-43% of SCI patients develop a depressive disorder during post-acute rehabilitation. Furthermore, 11-60% of the patients have been found to suffer depressive disorders post discharge and prevalence of anxiety disorders in this patient group have been reported to range between 13 and 44%.

Depression should be considered a significant threat to life expectancy [13], and also seems to be an independent risk factor for pain and CVD in individuals with SCI [14, 15].

In the northern region of Sweden, containing large rural areas, there are about 120 patients of all ages with chronic SCI, that attend regular medical contacts, with 1-5 year intervals, at the specialist clinic in the region. As SCI affects functions in all organ systems, and as it leads to a life-long vulnerability for complications, there is international consensus in support of regular medical check-ups for this group of patients. In light of the increased longevity, more focus should be put on long-term complications such as pain and psychological distress.

Aim

The aim of this study was to assess the prevalence of pain, anxiety and depression in a population of chronic SCI patients in Northern Sweden.

Material and Methods

Data were collected between August 2012 and December 2014 during regular clinical check-ups at the Neurorehabilitation Outpatient Clinic, a specialist clinic for SCI patients at the University Hospital of Umeå, Sweden.

Data pertaining to injury duration (i.e. elapsed time since injury), age, smoking habits and current medication were retrieved from the patient files.

Patients were classified according to ISNCSC [16], Iincluding the ASIA Impairment scale and the neurological level of lesion (NLL). In AIS, AIS-A indicates no preserved motor or sensory function in the sacral segments, thus a complete injury [17], AIS-B denotes an incomplete injury in which sensory, but not motor, function is at least partially preserved

Below the neurological level, including the sacral segments. AIS-C denotes partially preserved motor function in which more than half of key muscles below the neurological level have a muscle grade below 3. AIS-D indicates partially preserved motor function in which at least half of key muscles below the neurological level have a muscle grade of 3 or more.

Patients were asked to answer the question if they experienced any existing pain at the time of the examination with the answer yes or no, and if they were on any prescribed pain medication. If the answer was yes on one of the questions, they were asked to register the pain intensity above, at or below injury level on a Visual Analogue Scale (VAS) [18]. The scale ranges from 0-100, where 0 is no pain and 100 is worst possible pain. The pain intensity level was scored by measurement in millimeters of the distance from the no pain end of the line. Additionally, patients currently on daily pain medication (i.e. any prescribed for analgesic purposes) were registered as having current pain problem, regardless of their VAS values.

Depression and anxiety were assessed by the Hospital Anxiety and Depression Rating Scale (HADS), in which the patients were asked to rate their feelings during the last week. The instrument comprises 14 items and two subscales with 7 items each to screen for both anxiety and depression. The answers were given on a 0-3 scale where higher scores indicate more distress. Each subscale ranges from 0-21, where clinically relevant evaluation cut-offs for both anxiety (HADS-A) and depression (HADS-D) are suggested. A score ≥11 is considered a clinically significant disorder, whereas a score between 0 and 7 are considered as normal. A score from 8 to 10 suggests a mild disorder [19-21]. The results were dichotomized in normal vs mild/clinically significant disorder when comparing subgroups in the study.

Self-reported physical activity was registered using a questionnaire including frequency, type(s) of physical activity, duration and intensity of activity. Our cut-off comprised a level of physical activity corresponding to a minimum of 30 min at least 5 days per week. Based on their self-report, the patients were dichotomized into two groups, either performing physical activity on a moderate or vigorous level ≥30 min per day at least five days per week, or not[22,23].

All data were collected by the author PF. Data were analyzed by using IBM SPSS Statistics 22. Values are described as mean ± standard deviation (SD), median and range. Differences between groups in numerical values were calculated using Mann-Whitney U-test, categorical differences were calculated using Chi-square test. Correlations were calculated using Pearson Correlation test. Group comparisons were made between men-women, tetraplegia-paraplegia, complete-incomplete, wheelchair dependent (WD)-non wheelchair dependent (NWD). A p-value ≤ 0.05 was considered significant.

The study was approved by the Central Ethical Review Board in Umeå, Sweden, No 2012-252-31M.

Results

All of the 81 consecutively assessed SCI patients during the time period were invited to participate in the study, of which 78 (96%) accepted, gave their informed and written consent, and were included in the study. The estimated total regional SCI population at the time of the study was around 120 persons, thus making the study sample comprise about two thirds of this population. Further patient descriptors are presented in Table 1.

NLL ranged from C4 to L3, of which 39 patients had a cervical injury level (tetraplegia) and 39 patients had a thoracic or lumbar injury level (paraplegia). Age ranged from 22 to 75 years, mean 50.2 years. Time since injury was 1-53 years, mean 14.5 years. Patients with complete injuries were significantly younger than patients with incomplete injuries (47.8 vs 54.1 years, p=0.050), and had a longer time since injury, (17.6 vs 9.5 years, p=0.005). Wheelchair dependent (WD) patients were significantly younger, (48.0 vs 55.1 years, p=0.033) and had a longer time since injury, (17.0 vs 8.5, p=0.004), than not wheelchair dependent (NWD).

Out of 78 patients, 58 (74%) indicated current presence of pain or were on continuous pain medication. Pain above injury level was present in 32% of the patients, with a mean VAS of 15.9±20.1 (median 0, range 0-60mm). Pain at injury level was present in 24% of the patients, mean VAS 11.0±17.0 (median 0, range 0-50mm) and 58% of the patients had pain below injury level with a mean VAS 31.4±22.3 (median 30, range 0-80mm).

Twenty-nine patients (37%) were prescribed continuous medication due to neuropathic pain. Patients with pain below injury level that had continuous neuropathic pain medication registered significantly higher pain on VAS than patients without medication, mean 35.9±24.3 (median 40, range 0-80) vs mean 15.9±20.0 (median 0, range 0-60), p<0.001. Gabapentin and pregabalin were the most common pain medications. No patient used opioids.

Variable	Whole group (n=78)	Men (n=61)	Women (n=17)	p-value
Age (years), mean (SD), median, range	50.2 (14.4) 50.5, 22-75	50.9 (14.6) 48.0, 22-75	47.6 (13.6) 52.0, 25-68	0.380
Injury duration, years, mean (SD), median, range	14.5 (12.5) 14.0, 1-53	13.1 (12.1) 9.0, 1-49	19.4 (13.0) 17.0, 2-53	0.045
Tetraplegia/paraplegia (%)	50/50	54/46	35/65	0.170
Wheelchair dependence (%)	71	71	71	0.994
AIS score (%)				0.578
A (complete)	64	66	59	
B	3	2	6	
C	3	2	6	
D	31	31	29	
Physical activity ≥30 min/day ≥5 days/week (%)	32	31	35	0.748
Smokers	1	0	1	

SD: standard deviation

Table 1. Patient descriptors for 78 patients with SCI, ASIA impairment scale grade A-D for at least one year.

No difference was found between pain registered with VAS above, at or below injury level and the patients' age or time since injury. Also, no difference was found regarding presence of pain between men and women, (77.0% vs 88.2%, p=0.312) or pain intensity. However, women had a significantly more severe pain at injury level than men, mean VAS 15.9±20.7 (median 0, range 0-50) vs mean 6.1±13.1 (median 0, range 0-50), p=0.037. There was no difference between men and women concerning use of pain medication.

There was no difference in overall prevalence of pain between tetraplegics and paraplegics (74.4 vs 84.6%, p=0.262), however, paraplegics had significantly more severe pain above injury level than tetraplegics, mean VAS 17.2 (median 0, range 0-60) vs 6.4 (median 0, range 0-50), p=0.018. No difference in use of pain medication, age or time since injury were seen between tetraplegics and paraplegics.

There was no difference in presence of pain between patients with complete and incomplete SCI (79.2 vs 80.0%, p=0.929). However, patients with an incomplete injury registered significantly more pain below injury than patients with complete injury, mean VAS 31.0±26.0 (median 10, range 0-60) vs 18.5±20.8 (median 30, range 0-80), p=0.037.

There was no difference in prevalence of pain between WD and NWD patients (80.0 vs 78.3%, p=0.862). WD patients had significantly more severe pain above injury level than NWD patients, mean VAS 14.5±18.2 (median 0, range 0-60) vs 5.2±17.3 (median 0, range 0-60), p=0.012. No significant difference was found in pain medication between WD and NWD.

There was no difference in presence of pain, pain registered with VAS between physically active and not physically active patients.

The self-estimated scores on psychological disorder, HADS-A and HADS-D, are divided into HADS subscales and presented in Table 2. Two patients registered clinically significant disorder for both HADS-A and HADS-D.

HADS subscales	HADS-A, n (%)	HADS-D, n (%)
Normal (0-7)	67 (86)	70 (90)
Mild disorder (8-10)	7 (9)	4 (5)
Clinically significant disorder (11-21)	4 (5)	4 (5)

Table 2. Registered anxiety and depression divided into HADS subscales in 78 SCI patients.

HADS-A was significantly correlated to age (r=-0.351, p=0.002), where younger patients had a higher HADS-A score. Mean age was also significantly lower (39.1±15.7 vs 52.0±13.4, p=0.005) in patients with mild or moderate to severe disorder than in patients with no disorder. There was no correlation with time since injury.

Seventeen patients had medication with anti-anxiety effect (22%). Two of these patients had a HADS-A ≥8. Nine patients with HADS-A ≥8 had no anti-anxiety medication.

Five patients had medication with anti-depressive effect (6%), but none of the eight patients with HADS-D ≥8 were on anti-depressive medication.

No other differences were seen when comparing HADS-A and HADS-D between men/women, tetraplegia/paraplegia, WD/NWD, complete/incomplete and physically active/not physically active.

HADS-A was positively correlated with VAS pain at injury level (r=0.279, p=0.013), but not with VAS pain above or below injury level.

Patients with anxiety disorder had significantly higher VAS pain at injury level than patients with no anxiety disorder, mean VAS 18.2±6.7 (median 0, range 0-50) vs 6.6±16.5 (median 0, range 0-50), p=0.041, but no significant difference was found above or below injury level.

There was no difference in prevalence of pain between patients with and without anxiety disorder (90.9 vs 77.6%, p=0.311).

Patients with depression disorder hade significantly higher pain registered with VAS at injury level than patients with no depression disorder, mean VAS 26.2±8.2 (median 0, range 0-60) vs 6.1±15.5 (median 0, range 0-60), p=0.003), but no difference was found above or below injury level. There was no difference in prevalence of pain between patients with and without depression disorder (88 vs 79%, p=0.554).

Discussion

Pain was common in this studied patient group, however, the mean VAS pain scores above, at and below injury level in this group of patients were low, compared with studies from other countries. According to Jensen et al, VAS rating of 0-4mm are considered as no pain, 5-44mm as mild pain, 45-74mm as moderate pain and 75-100mm as severe pain [18]. The average pain score in this study is characterized as mild and is a much lower mean pain score than reported by Mahnig et al.[7] (8.2 on a 0 to 10 numeric scale) and Sidall et al., where 58% reported the pain as severe or excruciating[10].

A systematic review of SCI patients, by van Gorp et al. [24] (2015), showed that the overall pain prevalence is 61±20%, with large prevalence differences when divided into the subgroups mild (67±19%), moderate (59±18%) and high (44±14%) level of pain.

When assessing pain severity, it has to be remembered that a substantial minority of patients were on analgesic medication at the time of study. Although we included these patients (regardless of presence of current pain or not) for the prevalence assessment, there is no way of knowing how pain severity would have been reported if these patients didn´t receive analgesic treatment. Thus, our results reflect pain severity despite treatment, rather than pain severity in drug-naïve state.

Mahnig et al. [7] also found a significantly higher prevalence of pain at and below injury level in patients with complete injuries than incomplete injuries, while in our study, we found no difference in pain prevalence or pain distribution between complete or incomplete injuries except pain below injury, which was significantly higher among patients with incomplete injuries, as also found by Sidall et al. [10].

This study showed an overall presence of pain in 74% in this group of SCI patients, which is a high frequency of pain, but in parity with some other studies. However, there is a large variation reported. The pain frequency below injury level (78%) in this group was higher than previously reported in other studies Sidall (34%), Mahnig (42%) [7,10]. Prevalence of chronic pain in primary care patients in Sweden is 40-65% and stands for around 30% of all treatments in general practice [25, 26].

In our study group, we found no difference in pain prevalence or pain level between men and women, a difference found in the general population [25]. However, women in our study had a higher registered pain at injury level than men. Other reports show that there are no difference in pain prevalence or pain severity between men and women [27], while other studies have found that women with SCI have a higher prevalence of nociceptive pain and a greater use of opioids and NSAID drugs [28].

The pain frequency in this group of SCI patients highlights the need for adequate treatment and attention. According to other studies, pain management is an important part of treating SCI patients, as it is difficult to treat and demands special attention with inter-disciplinary and multi-modal rehabilitation [6, 29]. In addition, presence of neuropathic pain may be significantly associated with CVD in individuals with SCI [14]. Patients with SCI have an increased risk for CVD, showing the importance of adequate treatment of existing pain [23, 30]. Thus, as persons with SCI constitute a high-risk group for development of CVD, and as presence of neuropathic pain, which is common among persons with SCI, may be an independent CVD risk factor, there seems to be good reasons for adding optimal pain management to the overall CVD-prevention strategy for this patient group.

One limitation in this study is the lack of data pertaining to the impact of the studied problems on activities, participation and quality of life, since we have only used VAS and HADS for the registration of pain and mood disturbances. There are more comprehensive instruments available for assessing such consequences, e.g. International Spinal Cord Injury Pain (ISCIP) classification, that might be a future valuable instrument for assessing pain[7,31].

None of the patients in our study were using opioids at the time of the examination. An important notion, as there in the SCI population is a higher prevalence of drug abuse, almost twice as common as in the normal population [32, 33]. Also Krause et al. [34] showed that pain medication misuse is prevalent in 25% of the SCI population and should therefore be of concern.

Depression prevalence among the general population varies between 3-17% with the most common range being between 8-12% globally. Anxiety affects around 18% of the Americans and 14% of the Europeans [35, 36]. The point prevalence in Sweden is 5-8% [37, 38].

Mahnig et al. [7] reported presence of mild to severe anxiety and depression in 56% and 53% respectively in the SCI group. In our study, only 5% had a HADS-A score indicating mild or clinically significant disorder, where younger patients seemed to have more anxiety, which should call for special attention in the clinic. Again, however, these figures reflect the situation in a group where several persons were under current treatment, which could affect the HADS-A scores. Thus, as is the case with pain, the true prevalence and severity of such problems might likely be higher in a drug-naïve population.

A longitudinal study by Saunders et al. [5], showed that around 20% of the SCI patients probably had a major depression. In our study, only 9% had a HADS-D score that indicated mild depression and 5% had a HADS-D score equivalent to clinically significant disorder.

It is important to screen for psychological distress in SCI rehabilitation and at regular follow-up where HADS is confirmed as a valid instrument to measure anxiety and depression in people with SCI [21].

Anxiety and depression is more frequent in women than men in the general population [39, 40]. However, in our study we found no differences between men and women concerning anxiety and depression. This might be explained by the fact that there were few women in the study.

Studies on the general population have shown a connection between pain and anxiety/depression, suggesting routine evaluation for depression in patients seeking consultation for chronic pain. Also, it has been suggested that diagnosis and treatment of depression should include both emotional and physical symptoms [41, 42]. In a study by Mahnig et al. [7] a correlation was found between pain and depression in SCI patients, but in our study, no correlations were seen between pain and anxiety/depression disorder, except for pain at injury

level. As there also exists other associations, like between depression and the risk for CVD [15], it indicates the need for consultation from specialized teams working with pain, anxiety and depression problems within this patient group.

Conclusion

Pain is very common in persons with chronic SCI, but, at least in this drug-treated population, the pain is at a mild or moderate level. Anxiety and depression was found much less common than reported in other studies. Again, medication effects have been considered. Even in a presumably well-medicated and well-rehabilitated population, there is still a need for further optimization of pain management, including both pharmacological and non-pharmacological methods.

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