

DOI: 10.15225/PNN.2016.5.2.3

The Functioning of Patients with the Spinal Cord Stimulator

Funkcjonowanie pacjentów z zaimplantowanym neurostymulatorem rdzeniowym

Małgorzata Kołpa, Agnieszka Jankowicz-Szymańska, Beata Jurkiewicz

Institute of Health Sciences, State Higher Vocational School in Tarnów, Poland

Abstract

Introduction. Despite recent advancement in medical science, the effectiveness of therapies preventing or curing neuropathic pain is still not satisfactory enough.

Aim. To assess the functional state of persons with the Spinal Cord Stimulator and their beliefs about pain management.

Material and Methods. A total of 44 respondents with the Spinal Cord Stimulation (SCS) due to pain complaints in the lumbosacral region of the spine participated in the survey, in which the Roland–Morris Disability Questionnaire (RMDQ) and the Beliefs about Pain Control Questionnaire (BPCQ) were applied.

Results. Physicians scored 18 points (i.e.: 75.0% of the maximum score) in the RMDQ in their attempts to reduce the experience of pain and the respondents' degree of disability was assessed as 15.8 (± 3.2 pts).

Conclusions. Pain complaints significantly decreased the quality of life in patients with the neurostimulator. The greatest influence on pain control was ascribed by respondents to physicians' attempts. (JNNN 2016;5(2):53–57)

Key Words: spinal cord stimulation, spinal cord stimulator, functional state, pain control

Streszczenie

Wstęp. Mimo postępu medycyny, skuteczność terapii bólu neuropatycznego nadal nie jest satysfakcjonująca.

Cel. Celem pracy była ocena stanu funkcjonalnego oraz przekonań na temat kontroli bólu wśród pacjentów z zaimplantowanym rdzeniowym neurostymulatorem bólu.

Material i metody. Badaniem objęto 44 pacjentów poddanych stymulacji rdzenia kręgowego (ang. Spinal Cord Stimulation, SCS) z powodu dolegliwości bólowych odcinka lędźwiowo-krzyżowego kręgosłupa. Posłużono się Kwestionariuszem Bólu Krzyża Rolanda i Morrisa (ang. The Roland–Morris Disability Questionnaire, RMDQ) oraz Kwestionariuszem Przekonań o Kontroli Bólu (The Beliefs about Pain Control Questionnaire, BPCQ).

Wyniki. Wskaźnik wpływu lekarzy i opieki medycznej na kontrolę bólu wyniósł śr. 18,0 pkt (75,0% wartości maksymalnej). Respondenci uzyskiwali śr. 15,8 ($\pm 3,2$ pkt) w skali RMDQ.

Wnioski. Największe znaczenie chorzy przypisywali wpływowi lekarzy na kontrolę bólu. Dolegliwości bólowe u pacjentów z zaimplantowanym rdzeniowym neurostymulatorem bólu powodowały znaczny ubytek jakości życia. (PNN 2016;5(2):53–57)

Słowa kluczowe: stymulacja rdzenia kręgowego, neurostymulator rdzeniowy, stan funkcjonalny, kontrola bólu

Introduction

The International Association for the Study of Pain (IASP) defined pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” [1].

Chronic pain is recognized when it becomes persistent or recurring, lasts more than 3–6 months and requires

regular analgesic therapy [2]. This type of pain is responsible for a number of adverse changes in physical activity and psychosocial development of man, such as addiction to substances and medications, isolation from the environment, dejection, or anxiety and depression [3]. The World Health Organization (WHO) recommends that chronic pain, as any other disease, should be treated as quickly as possible [4].

According to the IASP, neuropathic pain results from damage to or dysfunction of the central or peripheral nervous system [1]; it has exceptional typical clinical image, responds differently than other pains to pharmacotherapy and is rather resistant to analgesics [5].

Despite recent advances in medical science, numerous research projects conducted in many research centers worldwide and systematic introduction of new medicines, treatment of neuropathic pain still does not bring satisfactory effects [6]. Contemporary medicine has at its disposal many ablation and neuromodulation procedures for treating neuropathic pain which cannot be relieved by non-invasive treatment. The Spinal Cord Stimulation, which is approximately 57–90% [7] effective depending on the cause of pain, belongs to one of the aforementioned methods [8]. Annually, more than 14.000 spinal cord stimulators are implanted worldwide [9]. The SCS, as a method of treating chronic pain, brings pain relief in many patients and in some cases it enables them to return to work [10].

The purpose of the survey was to assess the functional state of persons with Spinal Cord Stimulator and find out about their beliefs about pain control.

Material and Methods

Sample and Setting

The survey was conducted from March to April 2015 in patients of the Neurosurgery Department in one of the Malopolska Region hospitals (Poland), who between 2013 and 2014 had spinal cord stimulators implanted in the lumbosacral region of the spine. Fifty questionnaires were sent by post and forty-four respondents (20 females — 45.5%, and 24 males — 54.5%) aged 26 to 78 years (average age 55.68 ± 13.7 years) returned their replies. They constituted the research group.

Measures

The Roland–Morris Disability Questionnaire (RMDQ) was used to assess respondents' functional state. It consisted of 24 statements referring to the activities of daily living (ADLs) whose performance could be affected by pain in the lower region of the spine. The RMDQ distinguished four varying degrees of disability resulting in the loss of quality of life, i.e.: no/mild (0–3 pts), moderate (4–10 pts), severe (11–17 pts) and profound disability (18–24 pts) [11]. The Beliefs about Pain Control Questionnaire in its Polish version adapted by Juczyński was also used. It contained 13 statements referring to patients' perceived personal pain control, ex-

ternal pain management (physicians' attempts to control pain) and other accidental sources of pain relief [12].

Data analysis

The analysis of the results was conducted using basic descriptive statistics: the mean, median, minimum and maximum value and standard deviation. Comparison of mean values of the quantitative variables between the groups was performed using the independent t-Student test and analysis of variance (ANOVA). The normality of distribution was assessed by means of the Shapiro–Wilk test and the significance of intergroup differences by means of the U Mann–Whitney test (for two groups) or by the Kruskal–Wallis. Statistical analysis was conducted by means of Statistica v. 9.0 software and statistical significance of the results was accepted at ≤ 0.05 .

Results

The analysis revealed a considerable influence of physicians' attempts at pain management (18.0 pts, i.e.: 75.0% of the maximum score). Respondents ascribed smaller significance to their perceived self-control of pain (15.5 pts on average, i.e.: 64.6% of the maximum score) and to accidental sources of pain relief (19.0 pts on average, i.e.: 59.4% of the maximum score) (Table). Based on the replies to the BPCQ, they were qualified to given types of patients due to their source of pain control. Six respondents (14%) represented a strong type of perceived self-control of pain and the same number represented strong external pain control. The remaining respondents belonged to undiversified weak type ($n=5$; 11.1%), undiversified strong type ($n=4$; 8.9%), the type which depreciated accidental sources of pain control ($n=4$; 8.9%) and the type which depreciated physicians' attempts at pain management ($n=3$; 6.7%). The smallest number of respondents belonged to the type which appreciated physicians' attempts to control pain ($n=2$; 4.4%) and the type which appreciated the significance of accidental sources of pain relief ($n=2$; 4.4%). The remaining twelve respondents (26.7%) were not qualified to any of the eight types proposed by the authors of the BPCQ.

Respondents scored 15.8 pts (± 3.2 pts) in the RMDQ which implied a considerable loss in the quality of their lives caused by pain complaints. As many as 24 respondents (53.3%) had high level of disability. A small decrease in the quality of life due to pain was mentioned by three respondents (6.7%) (Figure). Neither external pain management ($p=0.81$), patients' perceived self-control of pain ($p=0.44$) nor accidental sources of pain relief ($p=0.46$) were determined by respondents' gender.

Table. Assessment of patients' perceived personal control of pain, physicians' attempts to control pain and accidental sources of pain relief

Variables	Gender		Age		Total (N=44)
	Females (N=20)	Males (N=24)	<60 years (N=25)	≥60 years (N=19)	
	Type of pain control [mean]				
Patients' perceived personal control of pain (max. 30 pts)	16.0	15.0	16.0	13.0	15.5
Physicians' attempts to control pain (max. 24 pts)	17.5	18.5	15.9	18.6	18.0
Accidental sources of pain relief (max. 24 pts)	19.0	18.5	17.0	19.0	19.0

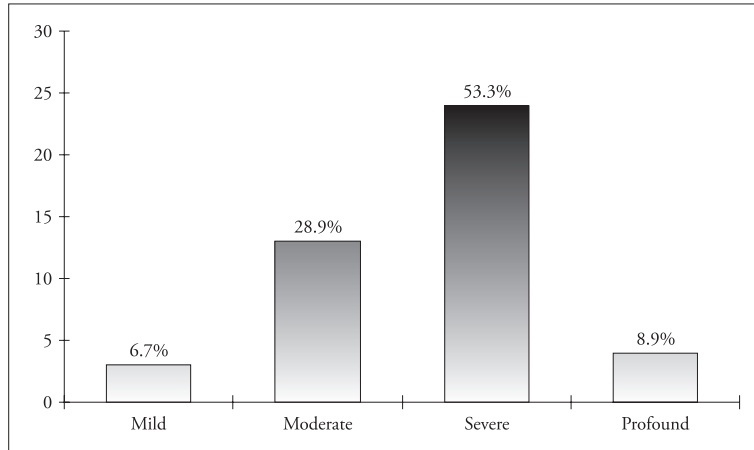


Figure. Respondents' degree of disability according to the Roland-Morris Questionnaire

Moreover, females and males did not differ as far as their source of pain control ($p=0.68$), functional state ($p=0.38$) or degree of disability ($p=0.77$).

No statistically significant relation between patients' perceived pain control and their age ($p=0.33$) was discovered. Age did not differentiate the source of pain control ($p=0.22$) either. Respondents ≥ 60 years ascribed greater significance to physicians' attempts to control pain ($p=0.04$) and accidental sources of pain relief than the remaining respondents ($p=0.03$).

The age of respondents did not affect their functional state ($p=0.18$), degree of disability ($p=0.22$) or the source of pain control ($p=0.37$). The functional state of respondents did not bear any relation to the source of pain control ($p=0.21$). The level of disability did not differentiate either the effect of perceived self-control of pain ($p=0.57$), physicians' attempts at pain management ($p=0.19$) or pain relief caused by accidental sources ($p=0.43$).

Discussion

The survey conducted by Kocot-Kępska et al. revealed that not each patient with a severe chronic pain received proper analgesic treatment [13]. Woźniak et al. found out that stimulation of the spinal cord decreased neu-

ropathic pain in 70.0% of their respondents [14].

Our survey disclosed enormous influence of physicians' attempts at pain control in the group of respondents. They ascribed considerably smaller significance to their perceived self-control of pain and sources of accidental pain control. Also Zielazny et al., who surveyed pain control in patients qualified for surgical procedures because of degenerative spinal problems, disclosed that the greatest significance was ascribed by them to physicians' attempts at pain control [15]. Similar results were achieved by Misterska et al. who conducted surveys in patients after surgical treatments of discopathy and spondylosis [16]. Bargiel-Matusiewicz and Krzyszkowska — who conducted surveys in patients suffering from rheumatoid arthritis, spinal pain and neuropathy — found out that a higher level of optimism to a greater extent affected perception of personal control of pain [17].

A detailed analysis of sources of pain control revealed their great diversity. A total of 23.0% of respondents disclosed desirable types of pain control (strong self-control of pain and strong undiversified pain control) while 7.0% revealed the type which decreased the effect of physicians attempts, and 14.0% of respondents represented the so called weak undiversified type which implied a poor assessment of each source of pain control. The results achieved were similar to Cabak's et al. findings who investigated pain control in persons with chronic spinal pain syndrome [18].

On average, our respondents scored 15.8 pts (± 3.2 pts) in the RMDQ, which was interpreted as a considerable decrease in the quality of life caused by pain complaints. However, they scored better than respondents in the survey conducted by Brazilian researchers who discovered that chronic back pain caused depression and substantial disability (19.9 pts average RMDQ score) [19]. Results similar to the ones achieved in our group of respondents were obtained in the United States in patients with chronic spinal pain who contacted their general practitioners (14.5 pts average RMDQ score)

[20]. Turkish pregnant women who were succumbed to the Transcutaneous Electrical Nerve Stimulation (TENS) achieved similar results (14.0 pts on average in the RMDQ) [21]. A slightly lower ratio of disability was discovered by Misterska et al. in patients with spinal pain who underwent operative treatments (12.70 pts on average) [16] and by Kapussamy et al. in patients who performed exercises following the McKenzie method (11.67 pts on average) and Pilates exercises (12.07 pts on average) [22]. Good effects in treating chronic back pain were achieved by Licciardone et al. by means of using the Osteopathic Manual Treatment (OMT), while the Ultrasound Therapy (UST) turned out to be ineffective [23].

In our survey, the age of respondents did not affect the level of disability. On the other hand, Topolska et al., while analyzing disability in females with chronic spinal pain, discovered that it increased with age [24].

Conclusions

1. Pain complaints in patients with the Spinal Cord Stimulator considerably decreased the quality of their lives.
2. The greatest significance in pain control was ascribed by respondents to the physician's attempts to control pain.
3. Respondents most frequently presented a strong type of self-control of pain and a type of strong external pain control relating to physicians' attempts to manage it.

Implications for Nursing Practice

Traditional assessment of effective therapy is usually based on objective indications, but from the patient's point of view those effects are not always traceable. For the patients, their subjective experiences concerning their state of health are important, e.g.: relief in pain or a weaker feeling of expulsion from the society due to their health problems and that is why, while assessing therapeutic effects in everyday practice, it is also worth taking into account patient's views and not only objective clinical parameters.

References

- [1] Merskey H., Lindblom U., Mumford J.M. et al. Part III: Pain Terms, A Current List with Definitions and Notes on Usage. In: Merskey H., Bogduk N. (Eds.), *Classification of Chronic Pain*, Second Edition. IASP Press, Seattle 1994;209–214.
- [2] Turk D.C., Okifuji A. Pain Terms and Taxonomies of Pain. In: Loeser J.D. (Ed.), *Bonica's Management of Pain*. 3rd ed. Lippincott Williams & Wilkins, Philadelphia 2001; 18–25.
- [3] Harvard Mental Health Letter 2004. *Depression and Pain*. Retrieved July 02, 2015, from http://www.health.harvard.edu/mind-and-mood/depression_and_pain/article/.
- [4] Kumar N. WHO normative guidelines on pain management. Report of a Delphi Study to determine the need for guidelines and to identify the number and topics of guidelines that should be developed by WHO, Geneva 2007.
- [5] Butera J.A. Miniperspectives: recent approaches in the treatment of neuropathic pain. *J Med Chem* 2007;11: 2543–2546.
- [6] Szczudlik A., Dobrogowski J., Wordliczek J. et al. Diagnosis and management of neuropathic pain: review of literature and recommendations of the Polish Association for the study of pain and the Polish Neurological Society — part one. *Neurol Neurochir Pol.* 2014;48:262–71.
- [7] Cameron T. Safety and Efficacy of Spinal Cord Stimulation for the Treatment of Chronic Pain: a 20-year Literature Review. *J Neurosurg Spine.* 2004;100:254–267.
- [8] Oakley J.C. Spinal cord stimulation for the treatment of chronic pain. In: Follet K.A. (Ed.), *Neurosurgical pain management*. Saunders, Philadelphia 2004;131–144.
- [9] Meyerson B.A., Linderoth B. Mode of action of spinal cord stimulation in neuropathic pain. *J Pain Symptom Manage.* 2006;31:S6–12.
- [10] Frey M.E., Manchikanti L., Benyamin R.M. et al. Spinal cord stimulation for patients with failed back surgery syndrome: a systematic review. *Pain Physician.* 2009; 12:379–397.
- [11] Opara J., Szary S., Kucharz E. Polish cultural adaptation of the Roland–Morris Questionnaire for evaluation of quality of life in patients with low back pain. *Spine.* 2006; 31:2744–2746.
- [12] Juczyński Z. *Narzędzia pomiaru w promocji i psychologii zdrowia*. Pracownia Testów Psychologicznych, Warszawa 2009.
- [13] Kocot-Kępska M., Dobrogowski J., Zdziechowska K. et al. Evaluation of the results of a survey conducted among persons suffering from chronic pain. *Ból.* 2015; 16:9–19.
- [14] Woźniak K., Śniegocki M., Siedlecki Z. et al. Spinal cord stimulation as one of the modern treatment methods of neuropathic pain. *Journal of Health Sciences.* 2014;4:73–84.
- [15] Zielazny P., Biedrowski P., Lezner M. et al. Acceptance of illness, beliefs about pain control and coping strategies among patients scheduled for surgery for osteoarthritis of the spine. *Post Psychiatr Neurol.* 2013;22:251–258.
- [16] Misterska E., Jankowski R., Głowacki M. Chronic pain coping styles in patients with herniated lumbar discs and coexisting spondylotic changes treated surgically: Considering clinical pain characteristics, degenerative changes, disability, mood disturbances, and beliefs about pain control. *Med Sci Monit.* 2013;19:1211–1220.

- [17] Bargiel-Matusiewicz K., Krzyszkowska A. Dispositional Optimism and Coping with Pain. *Eur J Med Res.* 2009; 14:271–274.
- [18] Cabak A., Wasilewski L., Zdrodowska A. et al. Pain Control in Patients with Chronic Back Pain Syndrome. *Ortop Traumatol Rehabil.* 2011;4:361–368.
- [19] Garbi M.O.S.S., Hortense P., Gomez R.R.F. Pain intensity, disability and depression in individuals with chronic back pain. *Rev Latinoam Enferm.* 2014;22:575.
- [20] Dobscha S.K., Corson K., Perrin N. et al. Collaborative Care for Chronic Pain in Primary Care. A Cluster Randomized Trial. *JAMA.* 2009;301:1242–1252.
- [21] Keskin E.A., Onur O., Keskin H.L. et al. Transcutaneous Electrical Nerve Stimulation Improves Low Back Pain during Pregnancy. *Gynecol Obstet Invest.* 2012;74:76–83.
- [22] Kappusamy S., Narayanasamy R., Christopher J.D. Effectiveness of McKenzie Exercises and Mat Based Pilates Exercises in Subjects with Chronic Non-Specific Low Back Pain: A Comparative Study. *International Journal of Prevention and Treatment.* 2013;2:47–54.
- [23] Licciardone J.C., Minotti D.E., Gatchel R.J. et al. Osteopathic manual treatment and ultrasound therapy for chronic low back pain: a randomized controlled trial. *Ann Fam Med.* 2013;11:122–129.
- [24] Topolska M., Sapuła R., Topolski A. et al. Analysis of disability among women with chronic low back pain. *Fizjoter Pol.* 2011;4:357–366.

Corresponding Author:

Małgorzata Kołpa
 Institute of Health Sciences,
 State Higher Vocational School in Tarnów,
 ul. Mickiewicza 8, 33-100 Tarnów, Poland
 e-mail: malgorzatakolpa@interia.pl

Conflict of Interest: None

Funding: None

Author Contributions: Małgorzata Kołpa^{A, B, C, G, H}, Agnieszka Jankowicz-Szymańska^{B, C, D, G}, Beata Jurkiewicz^{C, D, E, F}
 (A — Concept and design of research, B — Collection and/or compilation of data, C — Analysis and interpretation of data, D — Statistical analysis, E — Writing an article, F — Search of the literature, G — Critical article analysis, H — Approval of the final version of the article)

Received: 12.01.2016

Accepted: 26.01.2016