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An assessment of the effect of sex and age on complaints of patients with carpal tunnel syndrome

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ABSTRACT

Introduction: Carpal tunnel syndrome (CTS) is the most common compressive neuropathy in the upper limb. Morbidity is approx. 4 times higher in women than in men. Clinical observations suggest that the course of the disease, including the severity of symptoms, varies depending on the sex and age of the patients. The objective of the study was to investigate this issue.

Materials and methods: The study group consisted of 1,117 patients, 909 women (81%) and 208 men (19%) with a mean age of 59 years. Each patient declared their subjective perception of pain intensity using the Numeric Rank Scale (NRS) and completed the Levine questionnaire which evaluates the severity of symptoms caused by the disease.

Results: A mean pain intensity in the NRS (6.3 vs. 5.4) and in the symptoms judged by the Levine questionnaire (3.1 vs. 2.9) were statistically significantly higher in women than in men, although these differences were borderline regarding clinical significance. A comparison of variables in the age groups (from <40 to >80 years) showed no statistically or clinically significant differences: for NRS 5.8–6.5 and for the Levine symptom score 3.0–3.2.

Conclusion: Women suffering from CTS experience slightly more intensive pain than men, but this has no clinical significance. The age of the patients has no impact on experience of complaints caused by the syndrome.

Keywords: carpal tunnel syndrome; clinical assessment; pain scales.

INTRODUCTION

Carpal tunnel syndrome (CTS) is the most common compressive neuropathy of the upper limb, affecting approx. 6% of women over 40 years [1, 2, 3]. Symptoms and signs of CTS:

— paresthesiae (numbness, tingling, "pins and needles" phenomenon) experienced in digits I–IV and part of the palm; pain in the hand, sometimes radiating to the forearm,

— these symptoms (paresthesiae and pain) occur mostly in the night and wake the patient; shaking the hand or placing it in a stream of warm water alleviates the symptoms; typically, these disappear spontaneously within 20–30 min, but they may recur the same night,

— numbness in the fingers occurring in the morning, after a night's rest, and cesing following exercise and morning homework,

— pain and numbness in the fingers throughout the day after maintaining the wrist in extreme flexionor extension for long periods of time,

— weaker grip strength and dexterity of the hand.

Apart from complaints, a proportion of patients also experience impaired function of the hand in terms of a weaker and unsafe grip, faster hand fatigue and problems with the performance of some daily living tasks, including buttoning, sewing or taking out coins from a purse. In longer lasting courses of the disease, an atrophy of the thenar muscles and a reduction of sensation in the fingertips develops.

Observations from the authors' institution show that women suffer from greater pain than men and older patients have weaker sensations, grip strength and overall hand function in the affected hand than younger patients. The literature provides sufficient information concerning the effect of these factors on the treatment outcomes of CTS, but much less about the influence of its clinical presentation [1, 2, 4]. We hypothesize that several distinct factors are predictive of the clinical presentation of CTS, including sex and age.

The objective of the study was to investigate the effect of sex and age on the complaints of patients suffering from CTS.

MATERIALS AND METHODS

The study was conducted in the Department of General and Hand Surgery, Pomeranian Medical University in Szczecin. Records were analysed from the institutional CTS Register, including patients with CTS who were operated on at the authors institution over a period of 4 years (2014–2017). The approval of the Bioethical Council of the local Medical University was obtained for the funding of the CTS Register and for performance of further analyses. The records of 1,117 patients were analysed. The group comprised 909 women (81%) and 208 men (19%) with a mean age of 63 (range 20–91) years. The study group was divided into 2 subgroups with regard to sex and 4 subgroups regarding age (Tab. 1).

TABLE 1. Age groups within the study

Age (years)	Number	Percent
<40	89	8
40–60	603	54
61–80	394	35
>80	31	3
Total	1117	100

The diagnosis of CTS was made on the basis of clinical findings including the typical signs and symptoms listed. Results of electrodiagnostic tests were not required. At admission, each patient declared their subjective perception of pain intensity using the numeric rank scale (NRS) and completed the Levine questionnaire which evaluates the severity of symptoms caused by the disease.

The questionnaire was filled by the patients themselves with the assistance of the person conducting the examination who helped them in cases where items were misunderstood.

The Levine questionnaire (also named the Carpal Tunnel Questionnaire or Boston Questionnaire) is a standardized instrument used to assess the clinical severity of CTS [5]. It consists of 2 parts: a symptom severity section for the assessment of the subjective perception of pain and pain-related phenomena, and a function severity section which evaluates the function of the hand in the performance of daily living tasks. The answers on each item are scored 1–5, where a score of 1 means that the patient has no complaints and a score of 5 means the severest of complaints. Lower scores indicate milder forms of the disease, whereas higher scores indicate a more severe form.

Minimal important (meaningful) difference (MID) and describe the smallest changes and differences between individuals that are relevant to them. This is the smallest change in an outcome measure that is clinically meaningful, and not simply statistically significant. Based on a systematic review study, the following values were considered MID: 1.0 for pain in NRS and 0.7 for the Levine symptom severity score [6].

Statistical analysis

For a comparison of the variables between sex subgroups, the Student t-test was used based on the assumption that the distribution of the means taken from a sufficiently numerous group (>100 subjects) simulates a normal distribution. For a comparison of variables between age groups having non-normal distribution (the Shapiro–Wilk test), Kruskal–Wallis ANOVA was used, and in a *post-hoc* analysis, the Mann–Whitney U test with Bonferroni correction was used. A confidence level of 0.05 was assumed as indicating statistical significance.

RESULTS

Sex-related differences in pain perception

Women with CTS experienced statistically significant greater pain than men (NRS 6.3 vs. 5.4; Tab. 2), but the difference of 0.9 points on the NRS was borderline regarding the minimal clinically important difference, which is rated at 1.0. Likewise, the intensity of complaints expressed in the Levine symptom severity score was statistically significantly higher in women than in men (3.1 vs. 2.9; Tab. 3), but the difference of 0.2 points was clinically not meaningful (MID for the Levine symptom score is rated at 0.7). The results of both measures show that women with CTS experience slightly greater pain than men, but this difference is clinically non-important.

TABLE 2. A comparison of pain intensity between women and men

	Pain intensity in numeric rank scale		
	women	men	p
Number of patients	909	208	
Mean	6.3	5.4	<0.001
SD	3.1	3.3	

SD – standard deviation

TABLE 3. A comparison of the Levine symptom severity scores between women and men

	The Levine symptom severity score		
	women	men	p
Number of patients	909	208	
Mean	3.1	2.9	<0.001
SD	0.7	0.7	

SD – standard deviation

Age-related differences in pain perception

A comparison of the pain intensity on the NRS between patients in different age ranges showed no statistically significant differences (p = 0.08; Tab. 4). The differences were also not clinically meaningful (a maximum difference on NRS of 0.7 points). A comparison of the intensity of complaints expressed in the Levine symptom severity score only showed statistically significant differences (p = 0.006) between groups aged 41–60 years and 61–80 years (Tab. 4), but the difference of 0.1 points was not meaningful. Results of both measures show that age has no effect on the perception of pain in CTS patients.

TABLE 4. A comparison of pain intensity and the Levine symptom severity scores in various age groups

	Pain intensity in numeric rank scale		The Levine symptom severity score	
Age (years)	mean	SD	mean	SD
<40	6.5	3.3	3.0	0.7
40–60	6.4	3.0	3.1	0.7
61–80	5.8	3.3	3.0	0.7
>80	6.2	3.1	3.2	0.6

SD – standard deviation

DISCUSSION

Medical practitioners treating CTS patients have been faced with some variability in symptoms due to certain factors such as sex, age or duration of symptoms. Determining the relationship between these factors and the clinical profile of the disease is not only useful as an anecdotal/academic issue but may also translate into clinical practice. The results of this study show that women with CTS experience slightly greater pain than men. This difference was borderline regarding the minimal clinical importance of the NRS, and not meaningful in terms of the Levine symptom severity score. One should remember that the Levine questionnaire is more complex and evaluates a greater spectrum of pain phenomena than the NRS. Another finding from this study is that the age of CTS patients has no impact on the perception of pain.

Little information is available in the literature on the possible impact of sex and age on the clinical profile of CTS. Hobby et al. evaluated the intensity of complaints and the level of dysfunction in 97 CTS patients. They found that women had significantly greater complaints than men (the Levine symptom severity score 3.1 vs. 2.6) and worse hand function (the Levine function severity score 2.7 vs. 2.0). These differences were statistically significant, but their clinical importance was borderline (with a difference of 0.7). They had no effect on the outcomes of surgery which were satisfactory in both sexes [7]. Ibrahim et al. evaluated the same variables in 479 CTS patients. They found that women had slightly greater complaints than men (the Levine symptom severity score 3.4 vs. 3.2) and slightly worse hand function (the Levine function severity score 3.0 vs. 2.8). These differences were statistically and clinically insignificant [8]. Similar findings were reported in 3 other studies [9, 10, 11]. Overall, the results of the present study are consistent with those reported in the literature. By contrast, another study showed women suffering from CTS reported less intense pain and were more often affected bilaterally, while men reported fewer nightly episodes of pain [12].

With regard to the relationship between the age of CTS patients and the perception of pain, the authors only found a single report in the literature. Hobby et al. showed that patients in various age ranges (from 30 to over 80 years) reported similar experiences of pain (Levine symptom severity score 2.7–3.0; differences statistically and clinically insignificant) [7].

Ibrahim et al. reported that CTS patients grouped in the same age ranges as in the present study experienced similar complaints (a Levine symptom severity score 3.3–3.4; differences statistically and clinically insignificant) [8]. In an earlier study from the authors institution, the results of surgery for CTS in 386 patients – 322 women (83%) and 64 men (17%) – with a mean age of 57 years were reviewed. The group was divided into 3 age subgroups: <40 years (n = 28), 41–65 years (n = 248) and >65 years (n = 73). At the preoperative examination, no statistically significant differences were found in the intensity of complaints (the Levine symptom severity score from 3.3 vs. 3.2 vs. 3.2, respectively; p = 0.51) [13].

In conclusion we can state that women suffering from CTS experience slightly more intensive pain than men, but this has no clinical significance and does not translate to any changes in behaviour, i.e. an earlier referral to surgery. Likewise, patients at various age experience similar disease-related pain.

REFERENCES

1. Ceruso M, Angeloni R, Lauri G, Checcucci G. Clinical diagnosis of the carpal tunnel syndrome. In: Luchetti R, Amadio P, editors. Carpal tunnel syndrome. Berlin: Springer-Verlag; 2007. p. 63-8.
2. Żyluk-Gadowska P, Żyluk A. Factors affecting outcomes of carpal tunnel surgery: a review. Handchir Mikrochir Plast Chir 2016;48(5):260-5.
3. Żyluk A, Żyluk-Gadowska P, Kołodziej Ł, Szlosser Z. An analysis of patient's and disease related factors predictive of the outcomes of surgery for carpal tunnel syndrome. Handchir Mikrochir Plast Chir 2020;52(1):11-7.
4. Ortiz-Corredor F, Enríquez F, Díaz-Ruíz J, Calambas N. Natural evolution of carpal tunnel syndrome in untreated patients. Clin Neurophysiol 2008;119(6):1373-8.
5. Levine DW, Simmons BP, Koris MJ, Daltroy LH, Hohl GG, Fossel AH, et al. A self-administered questionnaire for the assessment of severity of symptoms and functional status in carpal tunnel syndrome. J Bone Joint Surg Am 1993;75(11):1585-92.
6. Rodrigues JN, Mabvuure NT, Nikkhah D, Shariff Z, Davis TR. Minimal important changes and differences in elective hand surgery. J Hand Surg Eur 2015;40(9):900-12.
7. Hobby JL, Venkatesh R, Motukr P. The effect of age and gender upon symptoms and surgical outcomes in carpal tunnel syndrome. J Hand Surg Br 2005;30(6):599-604.
8. Ibrahim T, Majid I, Clarke M, Kershaw CJ. Outcome of carpal tunnel decompression: the influence of age, gender, and occupation. Int Orthop 2009;33(5):1305-9.
9. Edgell SE, McCabe SJ, Breidenbach WC, LaJoie AS, Abell TD. Predicting the outcome of carpal tunnel release. J Hand Surg Am 2003;28(2):255-61.
10. Nawrot P, Nowakowski A, Bartochowski Ł, Jaroszewski J. Wpływ wieku chorego i czasu trwania neuropatii na wyniki leczenia operacyjnego neuropatii uciskowych kończyny górnej. Chir Narz Ruchu Otrop Pol 2008;73:116-28.
11. Porter P, Venkateswaran B, Stephenson H, Wray CC. The influence of age on outcome after operation for carpal tunnel syndrome. A prospective study. J Bone Joint Surg Br 2002;84(5):688-91.
12. Gruber L, Gruber H, Djurdjevic T, Schullian P, Loizides A. Gender influence on clinical presentation and high-resolution ultrasound findings in primary carpal tunnel syndrome: do women only differ in incidence? J Med Ultrason 2016;43(3):413-20.
13. Żyluk A, Puchalski P. A comparison of the results of carpal tunnel release in patients in different age groups. Neurol Neurochir Pol 2013;47(3):241-6.