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Elektrostymulacja w leczeniu zachowawczym wysiłkowego nietrzymania moczu u kobiet

Electrostimulation as a conservative treatment for urinary incontinence in women

Streszczenie

Wprowadzenie. Ze względu na rosnącą w społeczeństwie populację kobiet w senium, nietrzymanie moczu (NTM) stanowi coraz bardziej znaczący problem. NTM nie jest schorzeniem, ale objawem, który występuje w zespołach klinicznych o różnej etiologii, dlatego też wymaga zróżnicowanego postępowania diagnostyczno-terapeutycznego.

Cel pracy. Celem pracy była ocena skuteczności 6-tygodniowej zachowawczej terapii wysiłkowego nietrzymania moczu (WNTM) metodą elektrostymulacji TVES (transvaginal electrical stimulation).

Materiał i metoda. Do grupy terapeutycznej włączono pacjentki, które przeszły kompleksowe badanie uroginekologiczne. Celem badania była obiektywna ocena nasilenia i rodzaju NTM. Wszystkie pacjentki przed rozpoczęciem terapii i po jej zakończeniu wypełniały kwestionariusz Gaudenza oraz polską wersję ankiety I-QoL. Terapię prowadzono ambulatoryjnie przy pomocy urządzenia NeuroTrac™ firmy Verity Medical Ltd. (UK). Po aplikacji elektrody dopochwowej, zgodnie z wytycznymi producenta ustalano natężenie stymulacji, które powodowało wyraźny skurcz i było akceptowane przez pacjentkę. Parametry stymulacji mięśni były dobierane indywidualnie: częstotliwość w zakresie od 10 do 40 Hz, szerokość impulsu od 200 do 250 μs, czas praca/rozkurcz w układzie 15 s/30 s, przez 20 min. Pacjentki ćwiczyły przez 6 tygodni. Zabiegi prowadzono średnio 2 razy w tygodniu.

Wnioski. TVES wpływa w znaczący sposób na spadek częstotliwości oddawania moczu, nocturii, dziennych niekontrolowanych wycieków moczu oraz zmniejszenie zużycia środków higieny. TVES poprawia jakości życia pacjentek z WNTM w zakresie ograniczania i unikania zachowań, oddziaływania psychosocjologicznego i zawstydzenia towarzyskiego.

Słowa kluczowe: elektrostymulacja, nietrzymanie moczu, kobieta.

Summary

Introduction. Due to the increasing population of women in senium, urinary incontinence (UI) has become a more and more significant problem. UI is not a chronic illness but a symptom that occurs in the clinical syndrome of various aetiology. Therefore, it requires a diverse diagnostic and therapeutic management.

Aim of the study. The aim of the current study was to evaluate the effectiveness of a six-week conservative treatment of urinary stress incontinence (USI) using the transvaginal electrical stimulation (TVES) method.

Material and methods. The therapeutic group consisted of women who underwent the urogynecological examination. The aim of this examination was an objective evaluation of the severity and type of UI. All the patients completed the Gaudenz questionnaire and the Polish version of I-QoL survey before and after the therapy. Treatment took place on an outpatient basis, with the use of a NeuroTrac™ device produced by Verity Medical Ltd. (UK). A vaginal electrode was applied according to the producer's instructions and then the intensity of stimulation that caused an evident spasm and was accepted by the patient was determined. The parameters of muscle stimulation were selected individually: the frequency range from 10 to 40 Hz, impulse width from 200 to 250 μs, run time/decontraction in configuration of 15 s/30s, for 20 minutes. The treatment lasted for 6 weeks, twice a week on average.

Conclusions. TVES contributes significantly to the decrease in voiding frequency, nocturia, daily uncontrolled urine leak and leads to a reduced use of sanitary protection. TVES improves life quality in USI patients, has a psycho–sociological effect and reduces social embarrassment.

Key words: electrostimulation, urinary incontinence, women.

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INTRODUCTION

Urinary incontinence (UI) affects 10-30% of the population of women aged 15-64 years. Idiopathic urinary stress incontinence (USI) is the most common type of UI manifested by uncontrolled loss of urine due to physical exertion. The predisposing risk factors include attenuation of connective tissue elasticity, natural labours, obesity, hard physical work and elderly age [1].

Various surgical methods are used to treat UI, with the efficacy ranging from 23% to 96% [2, 3]. Despite promising reports on successful outcome of surgery as the primary therapy, long-term observations seem to indicate that the actual percentage of the successful procedures is considerably lower and poor evidence for its efficiency. The arising doubts have contributed to a considerable interest in conservative treatment of USI, with the major role of pelvic floor exercises combined with such accessory techniques as vaginal cones, biofeedback and electrostimulation [4-8]. Until now, there have been no uniform standards with regard to the duration and frequency of the exercises; however, electrostimulation-based biofeedback appears to be the method which can have a causative effect in USI [9].

STUDY OBJECTIVE

The aim of the current study was to evaluate the results of conservative treatment of urinary stress incontinence (USI) using electrostimulation system with biofeedback.

MATERIAL AND METHODS

The study was conducted in a group of 32 women aged 38-64 years with the diagnosis of USI. The therapy employed electrostimulation with biofeedback, performed in outpatient conditions using a NeuroTrac ETS device, Verity Medical Ltd (UK).

A vaginal electrode VeriProbe was applied according to the producer's instructions and then stimulation parameters and sensitivity threshold acceptable by the patient were determined. The parameters of muscle stimulation were selected individually: the frequency range from 10 to 40 Hz, impulse width from 200 to 250 μs, run time/decontraction in configuration of 15s/30s, for 20 minutes. Electrostimulation with biofeedback lasted for 6 weeks and was performed twice a week.

All of the patients completed the Gaudenz questionnaire and the Polish version of I-QoL (Incontinence Quality of Life) survey before and after the therapy. The Gaudenz questionnaire as a specific research tool was designed to assess the effect of lower urinary tract dysfunction on the quality of patients' life. The IQoL questionnaire exposes the problem of emotional adaptation to urinary incontinence. In the year 1997, the "Consensus Statement from the First International Conference for the Prevention of Incontinence" approved I-QoL as an acknowledged and valuable method for the evaluation of life quality in women, which makes undertake the preventive and therapeutic actions on UI possible. The results were subjected to statistical analysis using the t-Student test, with $p<0.05$ considered to be the level of statistical significance.

RESULTS

The study group consisted of 32 women aged 38-64 years, most of them coming from town (68%). Twelve of these patients had menstrual cycles (37%), 20 were in the postmenopausal period (63%). Multipara women (after two labours) constituted the most numerous subgroup (54%). Eighteen women were professionally active (56%), 11 were physical workers (61%). The others were retired or pensioners (39%). Obese and overweight patients were predominant. The mean body mass index in the group was 27.88 (kg/m^2) (Table 1).

TABLE 1. Characteristics of the study group of female patients.

Chosen features	Mean value	Minimum value	Maximum value
Age (years)	54.23	38	64
Body mass index (BMI) (kg/m^2)	29.38	19.46	41.26
Number of labours	1.73	1	4
Duration of complaints (years)	12.23	4	23

The major complaints lasting for 5-15 years were associated with urinary incontinence, including: frequent urination, lack of bladder control with even slight exertion or coughing, lack of bladder control with marked exertion, and urine leak at rest.

The results of the Gaudenz questionnaire have been presented graphically in Figs. 1-6. The I-QoL questionnaire was used to assess: limitation and avoiding of behaviours, psycho-sociological effects and social embarrassment. The investigation was performed twice – before and after the therapy (Table 2).

TABLE 2. Assessment of the quality of life of female patients before and after therapy.

Quality of life	Before therapy			After therapy		
	Max.	Min.	Mean	Max.	Min.	Mean
Limiting and avoiding behaviours (0-40 points)	32	13	19.7	38	22	26.4
Psycho-sociological impact (0-45 points)	40	23	26.3	45	26	31.6
Social embarrassment (0-25 points)	21	11	13.4	25	17	20.8
Total (0-110 points)	102	49	59.4*	107	65	78.8*

* $p < 0.05$

DISCUSSION

Urinary incontinence is an uncomfortable ailment which when untreated or treated improperly causes a number of secondary complications, both the somatic and psychological ones [3]. With time, UI may become a growing social problem. In Poland, urinary incontinence in women is considered to be a social disease as it affects over 5% of the population.

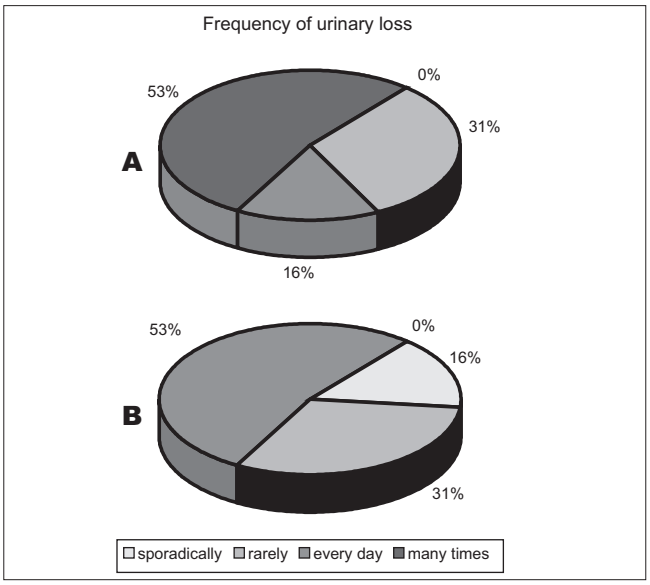

FIGURE 1. Frequency of urinary loss before (A) and after (B) therapy.

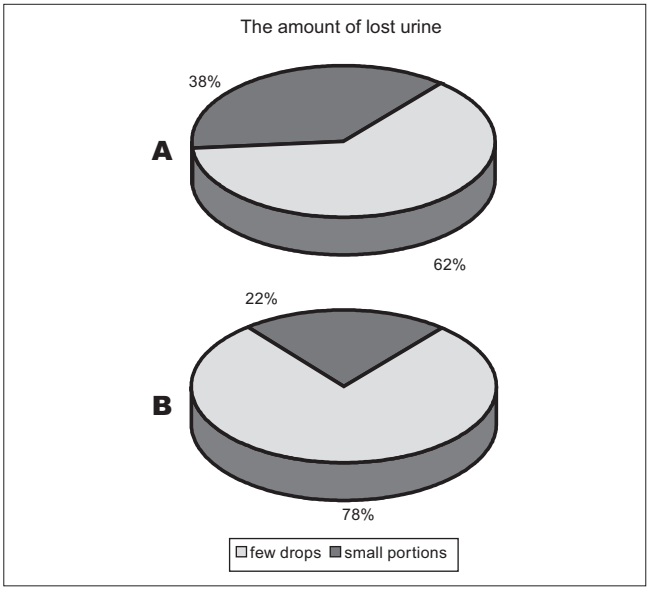

FIGURE 2. The amount of lost urine before (A) and after (B) therapy.

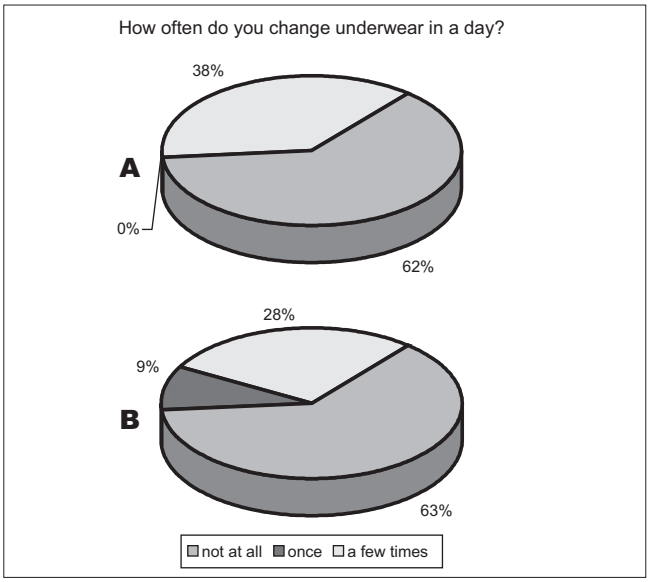

FIGURE 3. The frequency of changing underwear before (A) and after (B) therapy.

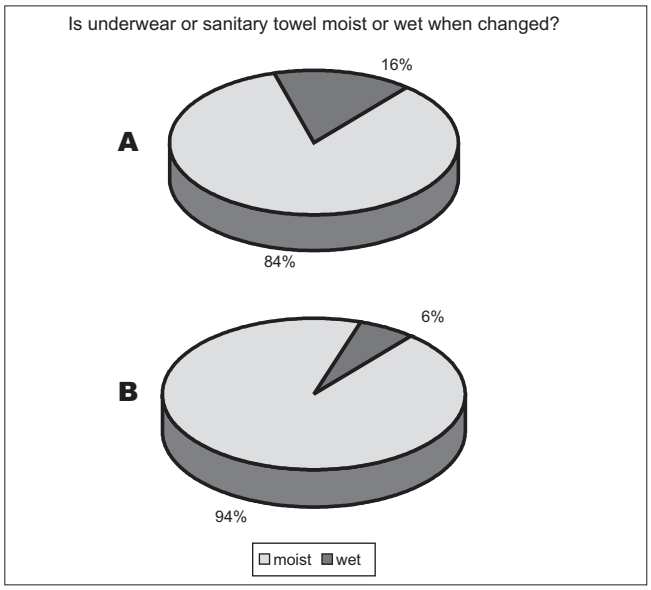

FIGURE 4. The effect of urinary incontinence on underwear or sanitary towel before (A) and after (B) therapy.

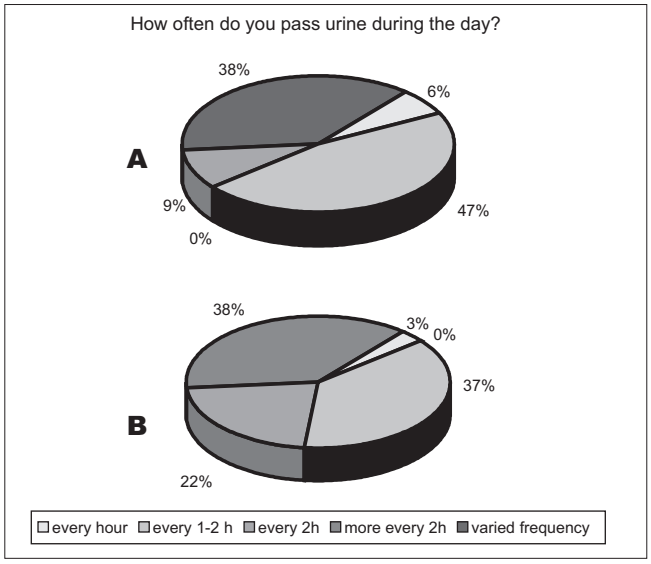

FIGURE 5. Frequency of urination during the day before (A) and after (B) therapy.

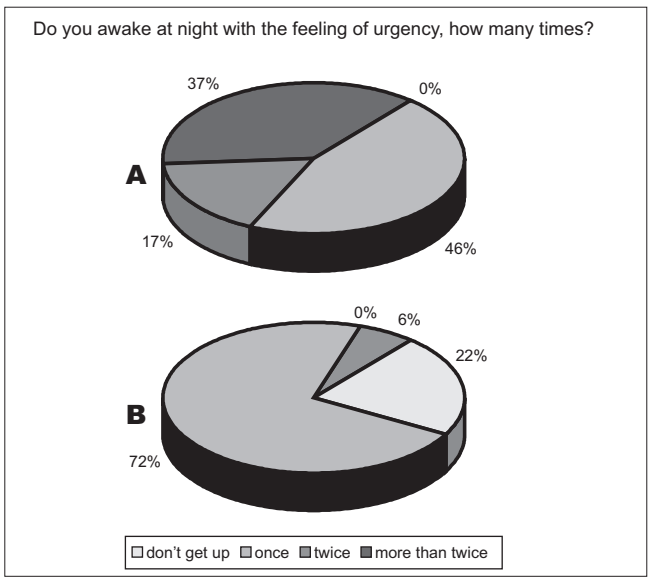

FIGURE 6. Frequency of nocturnal urgency episodes before (A) and after (B) therapy.

In the current study, the method of electrostimulation with biofeedback was applied in the therapeutic cycle. The method helps localize the muscles which have to be voluntarily contracted, thus contributing to the increase in their mass and what is most important, to the reduction in nocturnal and diurnal pollakiuria. It is also assumed that it can affect the conversion of quickly contracting fibres into the slowly contracting ones. Electrostimulation causes an increase in muscle strength and in contraction effectiveness due to involvement of a higher number of motor units. The ultimate effect is a rise in urethral closure pressure [10, 11].

In order to objectively assess the therapeutic effects in women with USI, voiding frequency, nocturia, diurnal uncontrolled urine leak and the number of sanitary towels used daily were evaluated before and after the therapy. The I-QoL questionnaire was used to broaden the aspects of the evaluation. The quality of life in the study group before the therapy showed an average score of 59.4, which increased after the exercises to 78.8. A similar tendency was observed by Ayse et al. [12], who obtained the score of 61 before and 88 after the therapy. The score obtained based on the analysis of the completed I-QoL questionnaire forms demonstrates a statistically significant improvement of life quality. Our own findings and literature survey seem to confirm that electrostimulation with biofeedback can be a safe and effective therapy for USI.

High cure rates in the treatment of USI using electrostimulation were also reported by Eriksen and Eik-Nes [13], who applied the procedure for 5 months with the success rate of 68%. Benet et al. [10] performed electrostimulation twice daily for 6 weeks and reported the treatment success rate of 71%. Wall and Davidson [14] combined electrostimulation with muscle exercises for the period of 2-8 weeks. Two months after the therapy termination its efficacy was found to be 91%. Major factors that determine this high success rate of electrostimulation therapy with biofeedback include proper selection of female patients and their personal motivation.

Our own findings entitle us to a statement that despite lack of method standardization and the resulting difficulties in the comparison of results obtained in different centres, the method of electrostimulation with biofeedback can be recommended for the treatment of USI. It requires time, great engagement of both the therapist and the patient as well as individual approach to the therapeutic process, but at the same time appears effective in the therapy of USI, which has been confirmed by numerous publications [6-8, 15].

CONCLUSIONS

1. Electrostimulation with biofeedback contributes significantly to the decrease in voiding frequency, nocturia, daily uncontrolled urine leak and leads to a reduced use of sanitary protection.
2. The therapy improves life quality in USI patients in the aspect of limiting and avoiding certain behaviours, has a psycho–sociological effect and reduces social embarrassment.

REFERENCES

1. McLennan MT, Leong FC, Steele AC. Evaluation of urinary incontinence and voiding dysfunction in women. Mo Med. 2007;104(1): 77-81.
2. Dmochowski RR. Urinary incontinence: proper assessment and available treatment options. J Womens Health. 2005;14(10):906-16.
3. Rechberger T, Jakowicki JA. Nietrzymanie moczu u kobiet – patologia, diagnostyka, leczenie. Lublin: BiFolium; 2005.
4. Bø K, Kvarstein B, Nygaard I. Lower urinary tract symptoms and pelvic floor muscle exercise adherence after 15 years. Obstet Gynecol. 2005; 105(5 Pt 1):999-1005.
5. Hay-Smith EJ, Bø K, Berghmans LC, Hendriks HJ, de Bie RA, van Waalwijk van Doorn ES. WITHDRAWN: Pelvic floor muscle training for urinary incontinence in women. Cochrane Database Syst Rev. 2007;18(1):CD001407.
6. Hay-Smith EJ, Dumoulin C. Pelvic floor muscle training versus no treatment, or inactive control treatments, for urinary incontinence in women. Cochrane Database Syst Rev. 2006;25(1):CD005654.
7. Konstantinidou E, Apostolidis A, Kondelidis N, Tsimtsiou Z, Hatzichristou D, Ioannides E. Short-term efficacy of group pelvic floor training under intensive supervision versus unsupervised home training for female stress urinary incontinence: a randomized pilot study. Neurourol Urodyn. 2007;26(4):486-91.
8. Parkkinen A, Karjalainen E, Vartiainen M, Penttinen J. Physiotherapy for female stress urinary incontinence: individual therapy at the outpatient clinic versus home-based pelvic floor training: a 5-year follow-up study. Neurourol Urodyn. 2004;23(7):643-8.
9. Dannecker C, Wolf V, Raab R, Hepp H, Anthuber C. EMG-biofeedback assisted pelvic floor muscle training is an effective therapy of stress urinary or mixed incontinence: a 7-year experience with 390 patients. Arch Gynecol Obstet. 2005;273(2):93-7.
10. Bent AF, Sand PK, Ostergard DR, Brubaker L. Transvaginal electrical stimulation in the treatment of genius stress incontinence and detrusor instability. Int Urogynecol J Pelvic Floor Dysfunction. 1993;4:9-13.
11. Eriksen BC, Eik-Nes SH. Long-term electrostimulation of the pelvic floor: primary therapy in female stress incontinence? Urol Int. 1989; 44(2):90-5.
12. Ayse D, Turhanoglu A, Akay F, Bayhan G, Karabulut Z, Sahin H, Erddogan F, Bircan KJ. Transvaginal electrical stimulation in female genuine stress incontinence. Phys Ther Sci. 2000;12:75-9.
13. Eriksen BC, Eik-Nes SH. Long-term electrostimulation of the pelvic floor: primary therapy in female stress incontinence? Urol Int. 1989; 44(2):90-5.
14. Wall LL, Davidson TG. The role of muscular reeducation by physical therapy in the treatment of genuine stress urinary incontinence. Obstet Gynecol Surv. 1992;47(5):322-31.
15. Neumann PB, Grimmer KA, Deenadayalan Y. Pelvic floor muscle training and adjunctive therapies for the treatment of stress urinary incontinence in women: a systematic review. BMC Women's Health. 2006;6:11.

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