

Comparison of oxybutynin, electrostimulation of the posterior tibial nerve and perineal exercises in the treatment of overactive bladder syndrome

Comparação entre oxibutinina, eletroestimulação do nervo tibial posterior e exercícios perineais no tratamento da síndrome da bexiga hiperativa

Comparación entre oxibutinina, electroestimulación del nervio tibial posterior y ejercicios perineales en el tratamiento del síndrome de la vejiga hiperactiva

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ABSTRACT | The objective of this study was to evaluate the efficacy of perineal exercises, transcutaneous electrostimulation of the posterior tibial nerve (TPTNS) and oxybutynin in women with overactive bladder syndrome, which is the second most common cause of urinary incontinence, with extremely uncomfortable urinary symptoms which impair their quality of life. A total of 65 women were randomized, of whom 57 completed treatment. Three groups were formed: the perineal exercises group, the TPTNS group and the control group, which used oxybutynin. The exercises were performed in groups, in the standing, supine and sitting positions, twice a week in 30-minute sessions, totaling 12 sessions. In the TPTNS group, carried out with 10Hz frequency and 200 microsecond pulse width, a transcutaneous electrode was positioned on the patients' medial malleolus, and another was positioned 10cm above it. The patients of the control group received 10 mg/day doses of immediate release oxybutynin, divided into two 5mg/day doses for 12 consecutive weeks. Before and after the treatments, the patients' voiding diary was analyzed, their pelvic floor was functionally evaluated

and they were asked to fill in an OAB-V8 quality of life questionnaire. Urge incontinence was reduced by 50%, 70.5% and 41% in the exercises, TPTNS and oxybutynin groups, respectively, and statistical significance was detected for stimulation only. The three treatment modalities were effective for improving quality of life in the short-term therapy, and were statistically similar to each other.

Keywords | Overactive Bladder Syndrome; Physiotherapy Modalities; Transcutaneous Electrical Stimulation.

RESUMO | Objetivou-se avaliar a eficácia dos exercícios perineais, da eletroestimulação transcutânea do nervo tibial posterior (ETNTP) e da oxibutinina em mulheres com síndrome da bexiga hiperativa, que é a segunda causa mais comum de incontinência urinária, com sintomas urinários extremamente incômodos que prejudicam a qualidade de vida. Foram randomizadas 65 mulheres, das quais 57 completaram o tratamento. Formaram-se três grupos: o de exercícios perineais, ETNTP e o grupo controle, que utilizou oxibutinina. Os exercícios foram realizados em grupo, nas posições em pé, supino e

Study carried out in the urogynecology and vaginal surgery sector of the General Gynecology discipline of Unifesp's Gynecology Department.

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sentado, duas vezes por semana, com duração de 30 minutos cada sessão, totalizando 12 sessões. Na ETNTP utilizou-se eletrodo transcutâneo posicionado em maléolo medial e outro 10cm acima, com frequência de 10Hz e largura de pulso de 200 microssegundos, por 30 minutos, duas vezes por semana, totalizando 12 sessões. Na medicação as pacientes receberam oxibutinina de 10mg/dia de liberação imediata divididos em duas doses de 5mg/dia, durante 12 semanas consecutivas. Antes e depois dos tratamentos, as pacientes passaram por uma avaliação composta pela análise do diário miccional, avaliação funcional do assoalho pélvico e aplicação de questionário de qualidade de vida OAB-V8. Houve redução da incontinência de urgência em 50%, 70,5% e 41% nos grupos de exercício, ETNTP e oxibutinina, respectivamente, com significância estatística somente da eletroestimulação. As três modalidades de tratamento foram eficazes na melhora da qualidade de vida para a terapêutica em curto prazo, estatisticamente semelhantes entre si.

Descritores | Síndrome da Bexiga Hiperativa; Modalidades de Fisioterapia; Estimulação Elétrica Transcutânea.

RESUMEN | Se evaluó la eficacia de los ejercicios perineales, de la electroestimulación transcutánea del nervio tibial posterior (ETNTP) y de la oxibutinina en mujeres con síndrome de la vejiga hiperactiva, la segunda causa más común de incontinencia

urinaria, con síntomas muy incómodos, que perjudican la calidad de vida. Sesenta y cinco mujeres, de las cuales 57 completaron el tratamiento, formaron tres grupos: el de ejercicios perineales, ETNTP y el grupo de control, que utilizó oxibutinina. Los ejercicios se realizaron en grupo, en las posiciones en pie, supino y sentado, dos veces por semana, con duración de 30 minutos cada sesión, totalizando 12 sesiones. En la ETNTP se utilizó electrodo transcutáneo posicionado en el maléolo medial y otro 10 cm arriba, con frecuencia de 10Hz y ancho de pulso de 200 microssegundos, por 30 minutos, dos veces por semana, totalizando 12 sesiones. En la medicación las pacientes recibieron oxibutinina de 10 mg/día de liberación inmediata, divididos en dos dosis de 5mg/día, durante 12 semanas consecutivas. Antes y después de los tratamientos, las pacientes pasaron por una evaluación compuesta por el análisis del diario miccional, la evaluación funcional del piso pélvico y la aplicación del cuestionario de calidad de vida OAB-V8. Se observó una reducción de la incontinencia de urgencia en un 50%, 70,5% y 41% en los grupos de ejercicio, ETNTP y oxibutinina, respectivamente, con significancia estadística solamente de la electroestimulación. Las tres modalidades de tratamiento fueron eficaces en la mejora de la calidad de vida para la terapéutica a corto plazo y estadísticamente similares.

Palabras clave | Síndrome de la Vejiga Hiperactiva; Modalidades de Fisioterapia; Estimulación Eléctrica Transcutánea.

INTRODUCTION

Overactive bladder syndrome (OAB) is described as a set of symptoms that characterize urinary urgency, usually accompanied by high urination frequency and nocturia, with or without urge incontinence, in the absence of urinary infection or other conditions that justify these symptoms¹⁻⁴.

Urgency is understood as the sudden, overbearing urge to urinate, being difficult to control; increase in daytime urinary frequency is the complaint that urination occurs more frequently during waking hours than before, i.e, then the normal frequency considered by the woman³; and nocturia is the interruption of sleep one or more times because of the urge to urinate, impairing the quality of rest^{5,6}. However, the most limiting symptom of OAB patients is urge incontinence⁷.

Complaints of functional lower urinary tract dysfunctions, such as OAB, are very common, and the prevalence found in a Brazilian study was 18.9%⁸. It

negatively affects quality of life, and its prevalence in epidemiological studies tends to increase with age⁹⁻¹¹. Responsible for 40-70% of incontinence cases¹², it is as a public health problem that can be found in any period of life, generating physical, economic, psychological, emotional and social consequences for the affected women¹³.

OAB is idiopathic when not associated with another pathology. In contrast, when it has neurogenic origins, it is caused by neurological changes related to the micturition mechanism¹³.

There are several treatment options, such as oral antimuscarinic drugs, like oxybutynin, used to reduce symptoms, but which are not directly related to adverse effects. Despite this, they are often used to inhibit the binding of acetylcholine to muscarinic receptors, allowing the detrusor muscle's tonus to be reduced and increasing the bladder's storage capacity¹⁴.

Perineal exercises emerge as a treatment in the field of physical therapy, which aims to strengthen the pelvic-floor muscle (PFM) via voluntary and repetitive

contraction and relaxation¹⁵. This contraction can be used to occlude the urethra and prevent urinary loss during the detrusor muscle's activity¹⁶, but may reflexively inhibit it, as well as decrease the urge to urinate, by activating the peripheral urinary control mechanism, where there is recruitment of motor neurons inhibiting the parasympathetic system in the sacral medulla, suppressing vesical activity¹⁷.

Another resource is the transcutaneous electrostimulation of the posterior tibial nerve (TPTNS), a non-invasive peripheral technique which uses a low-frequency electric current, where the posterior tibial nerve (branch of the sciatic nerve) would lead the electric stimulus back to the hypogastric plexus¹⁸. Thus, the stimuli reaching the bladder would be modulated in the same medullary region where bladder projections are found, promoting the inhibition of parasympathetic motor neurons and reducing the detrusor muscle's contractions^{18,19}. Studies have shown positive results of this method in the treatment of urinary symptoms, quality of life and urodynamic findings²⁰⁻²³.

Given the great number of treatment modalities in clinical practice, the aim of this study was to evaluate the efficacy of perineal exercises, TPTNS and oxybutynin in women with OAB.

METHODOLOGY

This was a prospective and randomized study carried out in the urogynecology sector of Unifesp's Gynecology Department, which was approved by the Research Ethics Committee (CEP 0367/07).

Virgins, pregnant women, patients under hormone therapy, with neurological diseases, decompensated diabetes, lower urinary tract infection, contraindications to the use of oxybutynin, impossibilities to fill in the voiding diary (VD), urethral sphincter defect, genital dystopia exceeding the vaginal introitus, and muscle strength classified as zero (absence of perineal function) and/or 1 (absence of visible perineal function and its recognition via intravaginal palpation only) on the Ortiz scale in the evaluation of the pelvic-floor muscle (PFM) were not included²⁴.

All patients were part of the same physical therapy evaluation protocol, which included an evaluation form composed of the anamnesis with clear and simple language, analysis of the complementary exams, PFM, explanation and distribution of the VD and application

of a quality of life (QOL) questionnaire and of the Overactive Bladder Questionnaire (OABq). All steps occurred prior to the initiation of the protocol and one week after its completion.

The physical examination consisted in PFM, which is based on the visualization and measurement of these muscles' contraction. Thus, with the naked patient lying down in the supine position, with hip flexed and slightly abducted, knees flexed and feet on the stretcher, the examiner initiates the evaluation, where the perineal contraction's visualization corresponds to the objective perineal function, which is measured by observing the distance between the anus and vaginal introitus. The measurement of contraction can be done via bidirectional intravaginal palpation, which corresponds to the subjective perineal function, with high sensitivity and specificity. In this step, the examiner, with a pronated wrist, inserts the index and middle fingers into the vaginal canal, requests a perineal contraction, and separates the fingers to impose an opposing resistance to the contraction.

Ortiz's classification²⁴ considers the absence of objective and subjective perineal function as grade zero; in grade 1, objective perineal function is absent, but recognized via intravaginal palpation; in grade 2, objective perineal function is weak and recognized via palpation; in grade 3, objective perineal function is present without the maintenance of contraction under opposing resistance in the palpation; and in grade 4, objective perineal function is present and the contraction is maintained for more than five seconds under opposing resistance.

The VD is a record of voiding behavior filled in by the patient that is used for the initial diagnosis from the analysis of the urinary symptoms, and that is frequently used as a tool to evaluate the treatment's results²⁵. In this study, a simplified VD was applied for five consecutive days. The patients were instructed to record their diurnal urinary frequency, episodes of nocturia and urge incontinence (urgency incontinence). After they returned the diary, the mean, standard deviation, maximum and minimum value of the symptoms' episodes were estimated.

The OABq is an instrument that has been validated and translated to Brazilian Portuguese, consisted of a scale of symptoms with eight or 25 items related to quality of life. The eight-item symptom scale is called OAB-V8, which aims to assess the degree of discomfort associated with OAB symptoms. Each question is

scored on a six-point scale ranging from zero to five, and total score results greater than or equal to eight indicate likely OAB²⁶.

After signing the informed consent form, the patients were randomized into three treatment groups. A total of 65 women were evaluated, of which 57 concluded the protocol, and only after its end it was questioned whether the patient was satisfied or not with the treatment, and if there was still presence of urinary urgency.

The drug treatment group (control group) consisted of 13 women who received 10 mg/day doses of immediate release oxybutynin, divided into two 5mg/day doses for 12 consecutive weeks.

The electrostimulation group consisted of 22 patients treated with the TPTNS technique, using a Quark Dualpex 961 neuromuscular electrostimulation device. A transcutaneous (self-adhesive) electrode was placed between the medial malleolus and the Achilles tendon on the left side, and another was placed ten centimeters above it. The frequency used was 10Hz, the pulse width was 200 microseconds and the intensity was adjusted according to each patient's threshold, below the motor threshold (having ranged between 10 and 25mA). Therapy consisted of two weekly 30-minute sessions, totaling 12 sessions.

In the exercise group, also composed of 22 patients, the training program consisted of two PFM contractions, for which contraction/relaxation time (in seconds) was respectively 2:2; 5: 5 in a series of ten contractions; and 10:10 in a series of five perineal contractions, followed by three perineal contractions associated with

cough in the sitting and orthostatic positions. In the supine position, the program was the same, except for the contractions associated with cough, which were replaced by three PFM contractions associated with the bridge movement (feet supported on the ground and elevation of the hip). The treatment with perineal exercises was performed in groups (maximum of four patients), supervised by a physical therapist, twice a week with an average duration of 30 minutes per session, totaling 12 sessions.

Pearson's chi-square test was used to analyze the homogeneity between the groups in relation to the categorical variables. For the quantitative variables, the Kruskal-Wallis test was used. In the abnormal distribution samples, the Kruskal-Wallis and Wilcoxon tests were used, and, in the normal samples and for comparison of the pre and post-treatment data, paired t-test was applied. Tests with descriptive level <5% ($p < 0.05$) were considered statistically significant.

RESULTS

Table 1 shows the distribution of the data according to clinical characteristics, and homogeneity was observed between the groups. In the VD's evaluation, there was significant reduction in voiding frequency in the TPTNS and oxybutynin groups, significant reduction in nocturia in the exercise and TPTNS groups, and significant reduction in urge incontinence in the TPTNS group only (Table 2).

Table 1. Distribution of data according to clinical characteristics

	Total	Treatment groups			p-value
		Exercise (n=22)	TPTNS (n=22)	Oxybutynin (n=13)	
Age* (years)					0.277*
Mean±SD	61.2±10.9	60±12.2	60±11	65.8±8.2	
Post-menopause**					0.167**
No	10 (17.5%)	5 (23%)	5 (23%)	0	
Yes	47 (82.5%)	17 (77%)	17 (77%)	13 (100%)	
Parity**					0.202**
No	4 (7%)	0	2 (9%)	2 (15%)	
Yes	53 (93%)	22 (100%)	20 (91%)	11 (85%)	
BMI (kg/m²)*					0.851*
Mean±SD	29±5.3	29.3±5.7	28.8±5.3	28.8±5	

n: number of patients in each treatment group; *p-value obtained by the Kruskal-Wallis test; **p-value obtained by Pearson's chi-square test.

Table 2. Distribution of symptoms by study group, according to the five-day voiding diary, before and after the treatments

Pre and Post-Treatment			
Symptoms	Mean±SD	Mean±SD	p-value
Urinary frequency			
Exercises (n=22)	6.9±1.9	6.2±1.8	0.150
TPTNS (n=22)	7.8±2.7	7.1±2.0	0.015^a
Oxybutynin (n=13)	7.4±2.4	5.6±2.2	0.014^a
Nocturia			
Exercises (n=22)	1.7±1.3	1.1±1.1	0.005^a
TPTNS (n=22)	2.5±1.7	1.8±1.5	0.012^a
Oxybutynin (n=13)	3.3±1.8	3.0±2.1	0.646
Urge incontinence			
Exercises (n=22)	0.8±1.7	0.4±0.7	0.130
TPTNS (n=22)	1.7±2.1	0.5±0.9	0.015^a
Oxybutynin (n=13)	1.7±2.1	1±1.3	0.262

^ap-value obtained by the Wilcoxon test, statistically significant differences being those for which p<0.05.

As for PFM before and after treatment, it was observed that the TPTNS and oxybutynin groups were similar; in

the perineal exercise group, on the other hand, there was significant increase in muscle strength after 12 sessions (Table 3). Regarding the values related to the OAB-V8 questionnaire, there was reduction in the significant score in all post-treatment groups, but when analyzing the data pertaining to the period after treatment, it was noted that the treatments were similar (p=0.754) (Table 4).

Table 3. Distribution of the sample according to the functional evaluation of the pelvic-floor muscle (PFM) before and after treatment

	PFM – Pre-Treatment		PFM – Post-Treatment		p-value
	Mean±SD	Median	Mean±SD	Median	
Exercise (n=22)	3.4±0.6	3	3.8±0.4	4	0.003^a
TPTNS (n=22)	3.0±0.8	3	3.0±0.8	3	0.317
Oxybutynin (n=13)	2.4±0.8	2	2.4±0.8	2	1.000

^ap-value obtained by the Wilcoxon test, statistically significant differences being those for which p<0.05.

Table 4. Score in the OAB-V8 questionnaire before and after treatment for each group, and comparison between groups

Category	Exercises (n=22)	TPTNS (n=22)	Oxybutynin (n=13)	p-value ^a
	Mean±SD	Mean±SD	Mean±SD	
	p-value ^b	p-value ^b	p-value ^b	
Pre	22.68±8.51	23.55±7.13	23.92±8.84	0.754 ^a
Post	10.27±6.2	13.18±9.85	12.77±11.35	
p-value	0.000^b	0.035^b	0.000^b	

^ap-value obtained by the Kruskal-Wallis test, statistically significant differences being those for which p<0.05; ^bp-value obtained by the paired t-test, statistically significant differences being those for which p<0.05.

In the subjective evaluation, seven patients (32%) of the exercise group, seven patients (32%) of the TPTNS group and three patients (23%) of the oxybutynin group reported disappearance of urinary urgency after treatment, having not statistically differed from each other. Twenty

patients (91%) of the exercise group, 17 patients (77%) of the TPTNS group and eight patients (61.5%) of the oxybutynin group were satisfied with the results and did not wish for another type of treatment, the difference between the groups having been statistically significant (Table 5).

Table 5. Distribution of the sample according to the presence of urinary urgency and degree of satisfaction after treatment

Variable	Category	Exercise n=22 (%)	TPTNS n=22 (%)	Medication n=13 (%)	p-value
Urgency	Yes	15 (68%)	15 (68%)	10 (77%)	0.538
	No	7 (32%)	7 (32%)	3 (23%)	
Satisfaction	Satisfaction	20 (91%)	17 (77%)	8 (61.5%)	0.041^a
	Dissatisfaction	2 (9%)	5 (23%)	5 (38.5%)	

^ap-value obtained by Pearson's chi-squared test, statistically significant differences being those for which p<0.05.

DISCUSSION

Conservative treatments are the main approaches to OAB, and include anticholinergic medications and behavioral therapy programs with interventions to ameliorate symptoms by educating patients about healthy urination habits, lifestyle changes (such as changes in diet,

bladder training, and strategies for suppressing urgency and strengthening the pelvic-floor muscle (PFM)⁴.

In our study, the control group was treated with oxybutynin, which has anticholinergic and spasmolytic properties. Immediate-release oxybutynin has demonstrated greater efficacy than the placebo, with success rates ranging from 61% to 86%²⁷. Antimuscarinic

drugs have been the mainstay of OAB therapy for several decades, and still hold this position due to their proven efficacy^{28,29}.

However, given the low selectivity of specific muscarinic receptors of the urinary function, these drugs can affect other systems, contributing to significant side effects, such as dry mouth, headache, constipation and blurred vision. Therefore, adherence to this therapy is, at best, average³⁰. For this reason, physiotherapeutic treatment has been standing out in recent years.

It is known that the voiding diary (VD) is extremely valuable to quantify urinary symptoms and evaluate the response to treatments, but it has as disadvantage the total dependence on the information provided by the patient. It also allows the initiation of the patients' re-education, with changes to their perception of life habits³¹.

As the clinical manifestations of OAB may appear in different ways, several instruments have been developed to measure its symptoms and level of discomfort. The OAB-V8 questionnaire²⁶ is a psychometrically robust instrument with eight questions that may be easily understood by both patient and evaluator. With regard to OAB-V8, in this study, it was possible to observe a significant decrease in the questionnaire's score, indicating the symptoms' improvement. When comparing the post-treatment scores of the three groups, it was noted that they remained similar to each other, showing that they are all viable therapeutics. In addition, it is important to evaluate the therapeutic results from the perspective of the patient, about their condition or symptom.

The goal of any treatment is to offer benefits that go beyond the cure or improvement of symptoms, i.e., that improve the patient's quality of life (QoL). This can be achieved not only by curing the disease, but by preserving and promoting physical and mental well-being, which means that, in this respect, the patient is considered the best person to judge his or her own state of health, and also inform if the treatment's objectives were achieved. QOL questionnaires are valuable instruments for this purpose³².

Even with the improvement of symptoms, which presupposes satisfaction with the treatment, for Gormley et al.⁴, it is unlikely that all symptoms are eliminated, because OAB is a variable and chronic condition which requires the use of multiple strategies.

Regarding urinary frequency, this study corroborates some studies that have demonstrated that the transcutaneous electrostimulation of the posterior tibial nerve (TPTNS) and oxybutynin improve this

symptom³³⁻³⁵. However, the best post-treatment results measured by the VD appeared in the group that used oxybutynin, which experienced a 24% reduction. Arruda et al.³⁶ observed a 17% improvement in voiding frequency in the treatment with oxybutynin (5mg, twice a day), and found that the perineal exercises did not improve this symptom.

Karademir et al.³⁷ subjected one group to percutaneous electrostimulation (needle) of the posterior tibial nerve only, and the other group, to the association between electrostimulation and oxybutynin (5mg), having observed significant reductions in urinary frequency, of 36.7% and 44.2%, respectively, in the groups. In relation to the percutaneous technique, other studies have been successful, with significant reduction in symptoms and improvement in the quality of life (QoL) of patients who did not respond well to drug treatment³⁸⁻⁴⁰.

With a comprehensive rehabilitation protocol (ten sessions consisting of PFM exercise, biofeedback, TPTNS and bladder training,) Tapia et al.⁴¹ found a significant improvement in voiding frequency, nocturia, perineal strength and QoL. It should be noted that the combination of treatments makes it difficult to measure their effectiveness in isolation. In our study, the patients did not receive behavioral guidance, but the VD was used to measure the urinary symptoms, and the VD is an instrument that favors behavioral reeducation from the perception of one's own life habits³¹.

The symptoms evaluated in the VD were diurnal urinary frequency, episodes of nocturia and urgency urinary incontinence (urge incontinence). It was not possible to collect urinary urgency episodes due to the patients' difficulty of understanding and filling in the diary in relation to this symptom. We believe that this situation may have occurred because, though its definition has been standardized, the term is often confused with the strong desire to urinate⁴². It seems like the objective symptoms (voiding frequency, nocturia, urge incontinence) were better understood by the patients and, therefore, recorded in the VD. The presence or absence of urinary urgency was questioned by the examiner after the end of treatment as an item of the anamnesis, and this symptom was still present in all three treatment groups.

In the study by Wang et al.⁴³, oxybutynin was used in 2.5 mg/day doses, three times a day for 12 weeks, and the urgency symptom was resolved in 8.7% of cases, improved in 30.4% of them and did not change in 61%. In another study⁴⁴ aimed at the comparison between oxybutynin and TPTNS, the patients were randomized

into three groups, one with oxybutynin in 10 mg/day doses, another with 30 minutes of TPTNS, and finally a group with the combination of the two modalities (multimodal treatment), for 12 weeks. It was possible to observe the improvement of symptoms and QoL in the three groups, but only in the TPTNS and multimodal groups the QoL score remained the same 12 weeks after the end of the protocol.

Arruda et al.⁶ were able to cure the urgency symptom of 63.6% of the patients in the oxybutynin group. Our results (23% reported no urgency after the drug treatment) may have differed from theirs due to the fact that 77% of the patients who used the medication in our study were older adults, a population for whom its effects may be more modest^{45,46}.

As for the measurement of nocturia based on the VD, there was a 35% improvement in the perineal exercise group and a 28% improvement in the TPTNS group after the treatments (statistically significant reductions). Corroborating our results, Fitz et al.⁴⁷ also observed reduction in nocturia after the PFM training protocol. Differing from our findings, Arruda et al.³⁶ noted a significant reduction in nocturia in the group treated with oxybutynin, and the symptom did not change in patients who were treated with perineal exercises. According to Fonseca et al.¹⁰, nocturia significantly compromises sleep quality and, therefore, affects the energy and emotion of women with involuntary loss of urine.

Similarly to our findings, Marques⁴⁸ found a 38% relief of this symptom in the sample subjected to TPTNS. In the study by Peters et al.⁴⁹, statistically significant improvements were observed in the evaluation of patients with overactive bladder symptoms, proving that TPTNS may be considered an effective alternative therapy. Ammi et al.⁵⁰ emphasize that this technique is well tolerated by patients who did not respond to the anticholinergic. Other studies²⁰⁻²³ have shown positive results in the treatment of urinary symptoms, QoL and urodynamic findings.

Regarding urge incontinence, the best results evaluated by the VD were associated with TPTNS, as there was a 70.5% reduction in the TPTNS group, a 50% reduction in the exercise group, and a 41% reduction in the oxybutynin group, with statistical significance for electrostimulation only. It is believed that this technique modulates the stimuli that reach the bladder, reducing the detrusor muscle's involuntary contraction, and has as main advantages its low cost and the absence of adverse reactions⁵¹.

Using TPTNS, Marques⁴⁸ found a 20% reduction in urge incontinence. Vandoninck et al.⁵² found that 68.5% of the patients showed a reduction of 50% or more in their incontinence episodes, of which 46% considered themselves to be cured (without episodes of urinary loss due to urgency). Varying results appear in other studies using percutaneous electrostimulation (needle), but with reduction in urge incontinence as well as other symptoms related to OAB⁵³⁻⁵⁶.

According to Goode et al.⁵⁷, the clinical improvement of patients who underwent perineal training was not due to the increase in their maximal cystometric capacity, but to the women's ability of adequately administering their limited bladder capacity with the PFM's contraction to repress urgency⁵⁸ and get to the restroom in time. Therefore, pelvic floor muscle therapy significantly reduced the symptoms and complaints of overactive bladder^{59,60}.

In addition to the benefit achieved with the technique, helping the patient reach the restroom without urinary loss, the perineal exercise was the only modality of treatment performed in groups, promoting not only the improvement of the PFM function, but also socialization, mutual support, motivation and intensive instructions provided by the physical therapist, contributing to the patients' high percentage of satisfaction (91%) with the exercises^{47,61-64}.

For Azuri et al.⁶⁵, perineal exercises and behavioral therapy are attractive options, since they do not offer risks or have side effects, and their efficacy is similar to that of drug therapy in relation to OAB symptoms and QoL score in the long term.

An important limitation of this work was the lack of follow-up beyond the immediate post-treatment period. Further studies with more subjects, homogeneous clinical symptoms and longer follow-up period are required to determine the effect of different treatments in terms of urgency and urge incontinence, and other outcome measures.

CONCLUSION

Because OAB is a functional disorder of the lower urinary tract, described as a set of symptoms, we observed different results when analyzing each symptom individually. Based on the analysis of the VD, urge incontinence was reduced by 50%, 70.5% and 41% in the exercises, TPTNS and oxybutynin groups, respectively, and statistical significance was detected for stimulation only.

Regarding the decrease in diurnal urinary frequency, the best response, which corresponded to a 24% reduction, appeared in the group treated with oxybutynin, and this symptom did not change in the group treated with perineal exercises. As for the nocturia symptom, significant reduction occurred in 35% and 28% of the women treated with perineal exercises and TPTNS, respectively. There were improvements in the urinary symptoms and in quality of life, with all three treatments being statistically similar, demonstrating that they are viable and effective therapeutics for the care of women with overactive bladder symptoms in the short term.

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