Effect of Biofeedback of Pelvic Floor Muscles in Treatment of Women Stress Urinary Incontinence

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ABSTRACT

The study was designed to detect the effect of biofeedback of pelvic floor muscles in the treatment of women with mild stress urinary incontinence. Fifteen women selected randomly from outpatient clinic of gynecology at EL-Galaa Teaching Maternity Hospital, diagnosed with mild stress urinary incontinence, their age ranged from 30-40 years (34.66±3.56). They were treated with pelvic floor exercises by using the perineometer as biofeedback. Assessment of leak point pressure was done before starting the treatment, and after the end of the 36th session. The obtained results showed highly statistically significant (P<0.01) improvement in patients concerning leak point pressure at the end of the treatment programme. Accordingly, it could be concluded that the use of biofeedback of pelvic floor muscles appears to be effective in the management of mild degree of stress urinary incontinence.

Key words: Stress Urinary Incontinence- Biofeedback - Pelvic Floor Muscles Exercises.

INTRODUCTION

Stress urinary incontinence (SUI) is a common condition that affects at least 14% of women who are more than 30 years of age. SUI often has a severe negative impact on the daily lives of women, and it rarely improves spontaneously[5].

It is urodynamically proved as involuntary loss of urine via the urethra occurs following a sudden rise in the intra-abdominal pressure caused by coughing, sneezing, straining, laughing or other physical activities, when the intravesical pressure exceeds the maximum urethral pressure in the absence of detrusor contraction[15].

Stress urinary incontinence (SUI) is a medical, social and/or hygienic problem[7], It has a profound psychosocial impact not only to patients but also on their families and caregivers, resulting in loss of self stem, sexual dysfunction, withdrawal from social as well as, physical and fitness activities, which may threat women's general health, wellbeing and decrease her ability to maintain an independent life style[6].

Numerous factors are involved in the etiology of stress urinary incontinence including pregnancy, childbirth, chronic coughing from smoking or pulmonary disease, persistent urinary tract infections, obesity, and infrequent voiding. It was estimated that 78% of female urinary incontinence is related to maternity, with 64% reporting an onset during pregnancy and further 14%reporting an onset after childbirth[6].

Pelvic floor muscles may be weakened due to a variety of causes. The most common factor being vaginal delivery at childbirth. These muscles have been shown to be involved in the maintenance of continence in situations of increased intra-abdominal pressure[11].

Some studies have found an increase in the prevalence of urinary incontinence with age. It affects 50% of women over 60 years old of age. After menopause, stress incontinence is common due to decrease estrogen level which leads to atrophy of the muscles and ligaments of the pelvic floor structures because the levator ani and pelvic cellular tissue contains receptors to estrogen hormone, so when the level of estrogen hormone decreased atrophy of the muscles and ligaments occurs[12].

Certain physical therapy procedures have been shown to control or improve the problem. Pelvic floor exercises are established as first line of treatment for female stress urinary incontinence, pelvic floor exercises advocate in an attempt to strengthen weak perineal and pelvic floor muscles in patients with stress urinary incontinence and their success depend on high level of patient's motivation and compliance, with an individual exercise programmes[10].

Many studies have looked at the benefits of pelvic floor exercise in the treatment of

stress urinary incontinence. Exercise has often been combined with electrotherapy, use of vaginal weights and biofeedback[13].

Most pelvic floor muscle exercises may be accompanied by inappropriate responses such as contraction of gluteal muscles as well as, the tendency to tense abdominal muscles, which increases bladder pressure and therefore, increases the probability of incontinence. It was found that approximately 30% of the women are unable to perform an isolated pelvic floor contraction following written or verbal instruction. Once the pelvic floor muscles contraction is isolated, the patient awareness of these muscles action will be improved[2,16].

The Key factors for successful pelvic floor muscle exercises program are the ability to localize, isolate and contract the proper muscle and promote the patient motivation[3].

The purpose of the study was to determine the effectiveness of biofeedback of pelvic floor muscles in the treatment of mild stress urinary incontinence.

PATIENTS AND METHODS

This study was carried out on 15 women, selected randomly from outpatient clinic of gynecology, at EL-Galaa Teaching Maternity Hospital. Each woman in this study had signed an informed consent before starting the study and was instructed about the different evaluative and treatment procedures to gain her confidence and cooperation through the study. A detailed medical and gynecological history were taken from each patient including a characterization of the voiding patterns, stresses that evoke a loss of urine, use of medication, history of urinary tract infection and history of neurological or spinal cord disorder.

Inclusion criteria

1. Their ages ranged from 30-40 years old.
2. Their BMI not exceed 30 kg/m^2.
3. Number of parity not more than two times.
4. All women were referred from gynecologists and urologist after gynecological and urological examinations.
5. None of the women had been taken any medication or specific treatment for stress urinary incontinence during this study.

Exclusion criteria

1- Patients with urinary tract infection.
2- Unstable bladder.
3- Pregnancy.
4- Pelvic tumor.
5- Diabetes mellitus.
6- Smoking.
7- A history of neurological and respiratory disorders.
8- Low back pain.

The women performed pelvic floor exercises by using the perineometer (Peritron 9300, Cardio Design Pty Itd Australia) as biofeedback. Each woman was evaluated by leak point pressure test (Urodynamic device, Merkur 2000), which is a relatively quick as well as, valid test and easy to perform.

Treatment procedures

Before starting the treatment session women were asked to evacuate their bladders. Each women performed pelvic floor exercises, for 20 minutes, 3 sessions / week for 12 weeks (36 sessions). The treatment table was covered by a sterile sheet, then the woman was asked to lie in crock lying position with slightly abducted legs. The battery of the biofeedback was checked out. Wires of the vaginal electrode were properly connected to the main unit. Then the valva was cleaned by antiseptic solution (petadine), the vaginal electrode was covered with a condom and a layer of sterile lubricant and inserted until 1 cm of the lower margin of the pressure area of the probe remains outside (sensory feedback). Then each woman was covered by another sheet. After that each woman was asked to carry the main unit on her hand so that, allowing clear vision of the screen (visible feedback).The main unit was turned on, while at the same time the therapist turn on the stop watch. The woman was asked to contract her pelvic floor muscles strongly as she could and hold for 3, 10, 30 and 60 seconds followed by time of relaxation equal to that of contraction (9 sessions for each duration as a progression & graduation), after 10 repetitions the patient had

a rest for 1 minute for 20 minutes. Then the unit was turned off, and the vaginal electrode was removed.

Statistical Analysis

The collected data was statistically analyzed by using Wilcoxon signed-rank tests and Descriptive statistics: Mean, standard deviation and percentage for comparing before and after treatment. Statistical significance level of 0.05 was used with in this study.

RESULTS

All data had been collected and statistically analyzed and presented under the following headings;

I- Physical characteristics of the patients

The mean values of patients' age, weight, height and BMI were 34.66±3.55 yrs, 73.40 ± 4.32Kgs, 161.60 ± 4.17Cms and 28.15±1.01 Kg/m^2 respectively.

II- Leak point pressure

The mean value of leak point pressure for women before starting the study was 75.26±12.00 CmH_20 and it was increased after the end of the treatment programme to 96.66±12.46 CmH_20, with the mean difference of -21.40. This statistically differences revealed a high significant (P<0.01) increase with percentage of 28.43% improvement in the leak point pressure at the end of the treatment programme (Table 1 & Figure 1).

Table (1): Mean values of patient s leak point pressure at pre and post treatment.

	Pre-treatment	Post-treatment
X	75.26	96.66
SD	±12.00	±12.46
MD	-21.40	
% of Change	28.43%	
P-Value	0.001	
Significance	Highly Sig.	

Mean =X, Standard deviation= SD, Probability= P-Value, Mean difference = MD

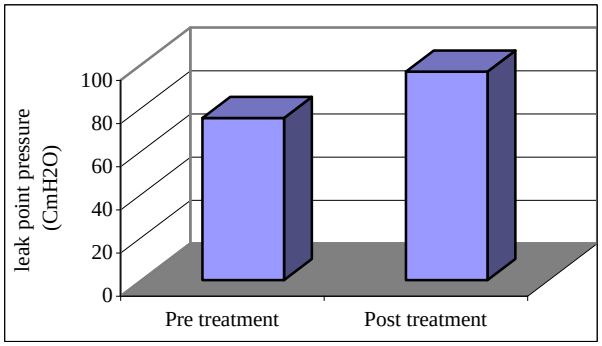

Fig. (1): Mean values of patient's leak point pressure (CmH_2O), at pre and post treatment.

DISCUSSION

This study was designed to detect the efficacy of biofeedback of pelvic floor muscles in the treatment of women stress urinary incontinence. Results of the leak point pressure in this study showed a highly statistically significant (P<0.01) improvement at the end of the treatment programme. Results of this study agreed with those reported by Kuo, (2003)[8]; who studied the videourodynamic results in stress urinary incontinence patients after pelvic floor muscle training, it was concluded that when pelvic floor contractions were performed voluntarily, the bladder neck elevation and pelvic floor contraction pressure were significantly greater after pelvic floor muscle training than at the baseline.

The results of this study were also, agreed with that of Aukee et al., (2002)[1], who studied the increase in pelvic floor muscle activity after 12 weeks training, and they concluded that pelvic floor muscle activity was increased and the amount of leaked urine was decreased after 3 months of pelvic floor muscle training.

The result of this study agreed with that of Neuwmann et al., (2006)[12]; they found consistent evidence from a number of high quality randomized controlled trials that PFMs exercises alone is an effective treatment for women with SUI with rates of cure up to 73%.

Laycock et al., (2001)[9] found that there was no difference between the usage of biofeedback and electrical stimulation in the treatment of SUI, while Smith, (1996)[14] reported that electrical stimulation was significantly better. And, B0 et al., (1999)[4] concluded that PFMs training was

significantly better than electrical stimulation to treat SUI.

Conclusion

From the statistical point of view, it can be concluded that pelvic floor exercises in the form of biofeedback for pelvic floor muscles appears to be effective in improving the pelvic floor muscles efficiency and in the management of mild grades of stress urinary incontinence. The biofeedback provides a simple, realistic, safe, inexpensive and successful alternative treatment for women seek for conservative rather than pharmacological and/or surgical treatment.

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الملخص العربي

التأثير الرجعي الحيوي لعضلات الحوض الرافعة في علاج سلس البول الإجهادي لدى السيدات

تم تصميم هذه الدراسة للكشف عن التأثير الرجعى الحيوى لتقوية عضلات الحوض الرافعة في علاج السلس البولي الإجهادى البسيط . تم اختيار 15 سيدة عشوائيا من العيادة الخارجية لأمراض النساء في مستشفى الجلاء التعليمي للولادة ، تم تشخيصهن بالسلس البولي الإجهادى البسيط ، تراوحت أعمارهن من 30-40 عاما (34.66 ± 3.56) . عولجن باستخدام مقياس العضلات العجانية لتقوية عضلات الحوض الرافعة . وقد تم تقييم ديناميكية البول قبل البدء في العلاج ، وبعد نهاية الجلسة 36 . أظهرت النتائج تحسن ذات دلالة إحصائية في نهاية برنامج العلاج . وفقا لذلك ، يمكن أن نستخلص إلى أن استخدام التأثير الرجعى الحيو ي لعضلات الحوض الرافعة يبدو أن تكون فعالة في علاج سلس البولي الإجهادى البسيط .

الكلمات الدالة : سلس البول الإجهادى - التأثير الرجعى الحيوي - تمارين عضلات الحوض الرافعة .