TREATMENT OF UNCONTROLLED URINE LEAKAGE PROBLEMS

Tadeja Štrumbelj[1], MD; Polona Podnar[2], MD; Zdravka Koman Mežek[3], MD and Barbara Zorec[4]

[1]Private health center ZZZ-Štrumblej, Ljubljana, Slovenia
[2]Medical center Podnar, Šenčur, Slovenia
[3]Private health institution for gynecology and obstetrics Zdravka Koman Mežek, Bled, Slovenia
[4]Faculty of Electrical Engineering, University of Ljubljana, Slovenia

1. Introduction

Undesired, uncontrolled leakage of urine, referred to as urinary incontinence, occurs when the sphincter muscles, the muscles of the pelvic floor and bladder muscles do not work properly and consistently [1]. It is a common and embarrassing problem affecting males and females of all ages. Urinary incontinence is more common with women, of which according to the expert estimations 40% are suffering from it. 33% of them are under the age of 40 and 50% are over the age of 60 [2]. During pregnancy, 60% of women have problems with uncontrolled urine leakage; after childbirth 52% of them remain incontinent [3]. 76% of people consider urinary incontinence a normal disorder related to aging. However, people with urine leakage problems often feel ashamed and begin to avoid social life, retreating to solitude. A particular problem is also urine leakage during the sexual relation, which can lead to rejection of the partner and gradual alienation. These people rarely talk about their urine leakage problems, hide it from their close ones and often also from their doctors. This is why only a few people seek professional help on time [4].

However, a timely initiation of treatment before mild and moderate incontinence progresses to severe problem is extremely important. The success of the timely treatment with non-invasive methods is more efficient and sustainable [5]. With non-invasive methods it is possible to treat stress, urge and mixed urinary incontinence. The goal of the treatment is to strengthen the pelvic floor muscles and decrease the detrusor activity, what contribute to urine control. Consequently, the surgical treatment can be avoided or at least postponed for several years.

Stress urinary incontinence occurs during periods of increased intra-abdominal pressure, when the intravesical pressure rises higher than the pressure that the urethral closure mechanism can withstand, and urine loss results. Urine most often leaks during coughing, sneezing, lifting loads, jogging, skipping and other activities. The main causes are weakened pelvic floor muscles and connective tissues, which impede the bladder neck urine control function. Stress urinary incontinence is most common form of urinary incontinence.

Major risk factors for the weakness of the pelvic floor muscles in women are pregnancy and childbirth. Urine leakage can also appear after gynecological and urological operations (after a prostatectomy in men), due to neurological disorders or aging. Tissue and muscular structures of the pelvic floor muscles can be damaged with hard physical

work or chronic cough, chronic closure and excessive straining, which cause excessive pressure in the lower urinary tract and pelvic floor. If these adverse effects are pronounced and prolonged, the position of the bladder can change, causing urinary incontinence, and involuntary passage of feces and winds can occur as well.

Urge urinary incontinence is a consequence of an overactive bladder. The urine leaks after previous urgent need to urinate. The patient must go to the bathroom more than eight times a day and because of the need to urinate they also get up several times per night. Problems often occur on the way to the bathroom, listening to running water or during work with cold water. It is the most common form of urine incontinence in older women.

A large number of women, especially older patients, are faced with a combination of stress and urge incontinence, the so-called mixed urinary incontinence.

Strong pelvic floor muscles can withstand the increased pressure in the abdominal cavity and effectively participate in the retention of urine and feces. They also contribute to the stability of the spine and pelvic girdle. Last but not least they are important for the sexual experience. Pelvic floor muscles can be strengthened with intensive exercises for the pelvic floor muscles (Kegel exercises). With these exercises the urinary incontinence can be treated and even prevented. It is important that the exercises are performed continuously over lifetime (three sessions per day, 15-20 times per session) and correctly, i.e., the right muscles are strained in the right way. Although nearly all gynecologists are familiar with these exercises, they rarely are thought and used properly. Therefore, exercises based on this approach are not only disappointing in their results, but can also train women to become dysfunctional voiders.

There exists a possibility for a faster regeneration of muscles and other tissues of the pelvic floor with functional magnetic stimulation (Functional Magnetic Therapy). This therapy can replace and upgrade electro-stimulation used so far. With the use of magnetic stimulation stronger pelvic floor muscles can be achieved in three to four weeks. The therapy is carried out two or three times per week for twenty to thirty minutes. Because people differ from each other, it is important that the treatment is individualized. For the optimum performance throughout the treatment, the therapy program is adapted according to incontinency improvement reported by the patient. During the therapy patients are dressed and sitting in a comfortable chair. Because there is no direct contact with the skin or unpleasant electrode insertion, the treatment is painless, comfortable and has no known side effects. An advantage of functional magnetic stimulation is also that the patients can learn the proper implementation of Kegel exercises through the therapy. The patients may then continue to carry out these exercises at home.

Magnetic therapy has proven to be an effective treatment for all types of urinary incontinence. In June 1998, the U.S. FDA recognized functional magnetic stimulation as a conservative method for treatment of urinary incontinence.

Treatment of the stress urinary incontinence can be upgraded with laser, which strengthens the tissue binding structures. The binding structure strength can be improved with local application of estrogen. A surgical therapy is also possible. Additional treatments of urge and mixed urinary incontinence include a healthy lifestyle, regular pelvic floor muscles exercise, bladder training, adjusting diet regime, drinking a lot of water, and relaxation techniques (autogenic training and medical hypnosis). With that in mind we can do a lot to maintain the health of our bladder.

2. Materials and methods

In total 78 females with urge, stress and mixed urinary incontinence were included in a study of the effects of electromagnetic chair device (Magneto STYM®, Iskra Medical d.o.o., Slovenia). Patients with a history of epilepsy, severe cardiac arytmias, a pacemaker or metal implants, as well as concurrent pregnancy, malignancy or physiotherapy during the study, were excluded. From 78 women included in the study, 11 suffered from urge urinary incontinence (UUI), 30 from stress urinary incontinence (SUI), 23 from mixed urinary incontinence (MUI), and 14 from incontinence after childbirth. They were treated in three different medical centers in Slovenia: Private health center ZZZ-Štrumbelj, Medical center Podnar and Private health institution for gynecology and obstetrics Zdravka Koman -Mežek.

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During magnetic therapy, a focused, time-varying magnetic field penetrates into the perineum and activates the motor neurons of the pelvic floor muscles. The pelvic muscles contract and relax with each magnetic pulse, thereby strengthening the muscles. The goal of the therapy is the rehabilitation of the pelvic floor musculature to reduce urinary incontinence [11], [12]. During the treatment, patients are seated on the electromagnetic chair. Magnetic stimulation of the muscles is conducted by an electromagnetic coil built into the seat and controlled by an external unit. The coil can produce magnetic fields with strength up to 2 Tesla with frequencies between 1 and 80 Hz. Magnetic coil offers the greatest magnetic field at the center of the coil, so the perineum must be in the middle of the seat, right above the center of the coil.

All patients were treated twice a week for 8 weeks (16 therapies in total). 30 Women suffering for stress urinary incontinence were treated with two different frequencies. The treatment protocol used for the first treatment session consisted of two episodes of 10 min, one at 10 Hz and another at 23 Hz, with 2 min pause in between. For the second treatment session the 23 Hz was changed for 35 Hz frequency, while other parameters stayed the same. 11 women having urge urinary incontinence were treated with three different frequencies, 2, 10 and 15 Hz. Each of those lasted for 9 minutes, with 1 minute of pause in between. The protocol for treatment of the 23 women suffering from mixed urinary incontinence was combined of two different sessions with 3 different frequencies. First session includes therapy of 9 minutes at 2 Hz, 9 minutes at 10 Hz and another 9 minutes at 23 Hz (after each 9 min there was a minute of pause). In the second session frequency of 23 Hz was replaced with 35 Hz. Activation time was the same for all protocols at all frequencies (5 seconds of activation and 5 second pause). The stimulus intensity was gradually increased up to the limit of tolerability as indicated by the patient. Results were obtained using patients' self-evaluation questioner. Results were collected after the last therapy.

The study was conducted in accordance with the Helsinki Declaration. Informed consent was obtained from all patients before the first treatment.

3. Results

7 out of the 11 female patients suffering from urge incontinence were completely dry after the therapy (64,0%), 3 out of 11 patients showed significant improved (27,0%) and 1 out of 11 did not show any improvement after the treatment (9,0%).
23 out of 30 patients suffering from stress incontinence were completely dry after the therapy (76,7%), two patients showed significant improvement (6,7%) and 5 out of 30 did not show any improvement (16,6%).
13 out of 23 patients suffering from mixed urinary incontinence were cured (56,5 %), 9 patients showed significant improvement (39,0%) and 1 out of 23 women did not show any improvement (4,5%).
The best results are representing patients with urine incontinence after the childbirth. All 14 women were completely dry after even less than 16 therapies (100%).

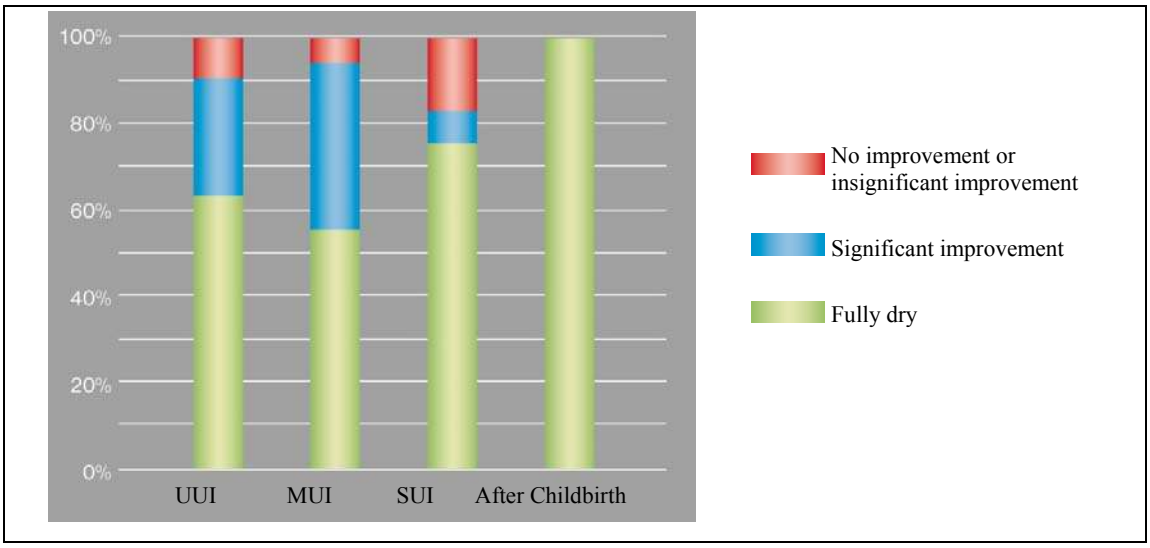

Figure 1: Multi-center results in treating urge urinary incontinence (UUI - 11 women), mixed urinary incontinence (MUI - 23 women), stress urinary incontinence (SUI - 30 women) and incontinence after childbirth (14 women). acquired at Private health center ZZZ-Štrumbelj (Tadeja Štrumbelj, MD), Medical center Podnar (Polona Podnar, MD) and Private health institution for gynecology and obstetrics Zdravka Koman -Mežek (Zdravka Koman Mežek, MD).

4. Discussion

The so far options for conservative treatment of the urinary incontinence were Kegel exercises conducted by the patients themselves or induced with the electrical stimulation. The electrical stimulation treatment was reported to be effective for stress incontinence

and urge incontinence, where 60–90% and 50–80% of patients became completely dry or showed significant improvement [4], [6]. After the magnetic stimulation treatment 84% of women with SUI became completely dry or showed significant improvement, whereas 91% of women suffering from UUI showed the same progress. The best success rate was achieved with MUI, where 95% of patients became completely dry or showed significant improvement. Overall, the success rate of magnetic stimulation therapy is higher compared to the electric stimulation therapy used so far.

For the Kegele exercise conducted by the patients themselves, it was established by researches summarized in Novak's Gynecology, that 32% of patients with SUI became completely dry and other 68% showed observable improvement. However, the Kegel exercises in these cases were conducted under complete supervision and lasted 3 months. Since Novak's also reported shortcomings in learning of Kegel exercises and lack of patients will do conduct them on a regular basis, such results could be considered too optimistic. The magnetic stimulation treatment induces the same muscle contraction as Kegel exercises, but does not require any interaction of the patient. The improvement rate of both treatments is comparable.

Besides the objective improvement of urine retention, one of the aspects of treatment is also patient comfort during treatment. However, the insertion and use of probe during the electrical stimulation therapy can cause discomfort or irritation with some patients [7]. On the other hand, the Kegel exercises are often conducted too seldom, the wrong way and consequently do not produce optimal results. The magnetic stimulation therapy combines the advantages of electric stimulation, where the muscle activity is induced by the probe, and the comfort of Kegel exercises, because the muscle activity is induced by the coil built into the chair, while the patient is sitting in the chair fully dressed.

Because of all the benefits that this method has compared to electrical stimulation, the magnetic stimulation is regarded as a safe, non-invasive alternative treatment for urinary incontinence. The results presented in this paper confirm that. Our study based on patients personal observations, but majority of them were satisfied after the treatment, which is the most important. The success of treatments varies according to the severity of the muscle weakness. Mild weakness can be improved by appropriate pelvic muscle exercises. Moderately weakened muscles can be strengthened either by exercise and biofeedback. With help of electromagnetic chair patients also learned how to perform pelvic floor muscle exercises themselves. This is going to help them to maintain the strength of the muscles after the conclusion of the therapy. The 8 week therapy block presents a good basis for the long term pelvic floor muscles ability for urine flow control. However, muscles need to stay active to maintain their strength and function [13]. This is achieved by regular and right exercise of Kegel exercises by the patients themselves.

One of the limitations of the present study is the lack of a control group. It is difficult to design an effective placebo treatment because the patients are aware of the strong contractions of the pelvic floor muscles during the treatment.

5. Conclusions

According to presented patients' improvement and their positive feedback it can be said that magnetic stimulation is an effective non-invasive therapy for all types of incontinence. It is, however, required to emphasize that the results presented in this paper are based on patients personal observations revealed in a questioner. Since the patients' satisfaction is an important part of every rehabilitation and medical treatment, the goal is reached with magnetic stimulation therapy. Further studies are required to determine other diagnostic parameters and to include a control group. However, based on the presented results, it can be concluded that the magnetic stimulation therapy offers a suitable alternative treatment option for all types of female urinary incontinences.

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