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Effect of Posterior Tibial Nerve Stimulation on Overactive Bladder Among Multigravida Mothers

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Abstract

Background and objective: To evaluate the efficiency of posterior tibial nerve stimulation on multigravida mother's overactive bladder.Urine urgency, excessive urination, and urinary urgency in nights are the hallmarks of overactive bladder syndrome (OAB), a urological condition that may or may not be followed by urinary incontinence (UI).This is a chronic disease that affects millions of women worldwide, with the risk of death increasing as they become older.Despite the fact that there is no immediate danger to life, it significantly impacts the health. In multigravida mothers, the lower urinary system, which includes the bladder and urethra, functions as a single functional unit. A technique for symptom evaluation called theoveractive bladder symptom score OABSS aims to sum up all OAB symptoms into a single score.

Method: This pilot study was conducted at Saveetha medical college and hospital. Using inclusion and exclusion criteria samples were selected for the period of 4 weeks. Before and after the conclusion of treatment, the patients' OABSS were evaluated. Then the patients were treated with transcutaneous electric nerve stimulation for 4 weeks.

Results: Comparing pre-test and post-test values in the experiment group revealed a statistically significant difference, according to statistical analysis of quantitative data, ($P<0.0001$) in OAB symptom score was recorded in multigravida women.

Conclusion: This study concludes that posterior tibial nerve stimulation is effective in overactive bladder among multigravida mothers measured using OAB symptom score.

Keywords

Overactive bladder, Multigravida mothers, Posterior tibial nerve stimulation, Overactive bladder symptom score

Introduction

Urine urgency, excessive urination, and urinary urgency in nights are the hallmarks of overactive bladder syndrome (OAB), a urological condition that may or may not be followed by urinary incontinence (UI), according to the International Classification of Diseases (ICD-11) (Bhide et al., 2020; Agost et al., 2021; Blaivas et al., 2007). This is a chronic disease that affects millions of women worldwide, with the risk of death increasing as they become older (Eapen et al., 2016). Despite the fact that there is no immediate danger to life, it significantly impacts the health. (Sexton et al., 2011; Abrams et al., 2000). OAB has a global prevalence of

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16–23%, rising to 15% in those over the age of 40 and 30–40% in those over the age of 75, while it can be detected in people of all ages. Women are more likely than men to experience this. Uncontrollable urine spilling and a lack of ability to control urination are both symptoms of UI, as are detrusor muscle contractions (Bykoviene et al., 2018)。

Treatment for OAB can take a variety of forms: Antimuscarinic, anticholinergic, and b-adrenergic medications, whereas injections of onabotulinumtoxin A and transcutaneous electrical stimulation were considered third-line treatments. Electrical treatment of the posterior tibial nerve causes retrograde activation of the sacral plexus nerve fibres that supply the bladder and detrusor muscle. This strategy could be advantageous in the treatment of patients with OAB. The hypothesis is that retrograde impulses during TPTNS reach the sacral micturition centre and block parasympathetic motor neurons, inducing detrusor relaxation, because the S2-S4 nerve roots (mainly S3) offer motor supply to the bladder and the posterior tibial nerve contains S3 fibres (Amarenco et al., 2003). With a length of 200 US and a frequency of 200 Hz, the electrical current employed is of the continuous sq. wave type. Severity is determined by the patient's best tolerable level. The stimulation treatments are thirty minutes long. Posterior tibial nerve stimulation (PTNS) is a newer, less invasive, and less expensive peripheric neuromodulation technique with little side effects. McGuire et al (1983) were the first to describe the use of this approach to inhibit detrusor activity. Through reduction of somatic sacral and lumbar nerve fibre depolarization, it inhibits involuntary detrusor contractions without disrupting the micturition reflex. (Groen et al., 2001; Chaudhry et al., 2012).

In multigravida mothers, the lower urinary system, which includes the bladder and urethra, functions as a single functional unit. Various investigations have shown that symptoms of the lower urinary tract are found quite frequently during pregnancy. These symptoms could be due to changes in the urinary bladder and urethra caused by pregnancy, or they could be a sign of cystitis or urethritis. The anatomy and function of the urinary system change dramatically during pregnancy. Blood volume growth is accompanied by increases in the glomerular filtration rate (GFR) and urine production. The massive production of hormones, particularly progesterone1,2, induces the ureters to relax tonic. Increased urine excretion, decreased bladder capacity, and increased intravesical pressure create lower urinary tract symptoms, while urodynamic studies have recently revealed abnormal detrusor activity during pregnancy (Hung et al., 2013). According to a study, the most common problem was abnormal voiding pattern (diurnal frequency and/or nocturia), which was reported by 84 percent of women. Increased urine excretion during pregnancy, decreased bladder capacity, lower urinary tract symptoms are frequently experienced by pregnant people and have all been attributed to increased intravesical pressure; however, urodynamically an increased prevalence of abnormal detrusor activity during pregnancy has recently been established.

The OABSS is a tool for measuring symptoms that attempts to classify OAB symptoms into a single number (Homma et al., 2011; Homma et al., 2006). Morning frequency (2 points), nocturnal frequency (3 points), urgency (5 points), and UUI are the four OAB symptoms listed on the survey, with possible values ranging from 2 to 5 points. Higher numbers indicate more severe symptoms, and the overall score ranges from 0 to 15. (Amarenco et al., 2003).

Methodology

Participants and selection criteria

The study was conducted in SIMATS and collection of samples was conducted in neuro IPD and physiotherapy OPD at Saveetha medical college and hospital. A total number of 15 subjects were selected according to inclusion and exclusion criteria.Patients of multigravida mothers with overactive bladder between age groups 24 to 36, OAB symptom score >3, and intact genitals and voiding sensation females are set as inclusion criteria.Patients with urinary tract infection, stress or mixed incontinence, bladder lithiasis, a history of anti-incontinence surgery, pelvic tumors, open injury at stimulation site, active implants including cardiac pacemaker, and significant cognitive impairment as indicated by a mini mental state test score <20, and men were excluded.

Procedure

Participants were given with the intervention of posterior tibial nerve stimulation using the electrode pad of size 50mm x50mm. The active electrode was put below and above the medial malleolus, whereas the inactive electrode was positioned on top of the foot (calcaneal region). The stimulation was given in bilateral leg using four electrodes (quadripolar method). At a frequency of 10 Hz and a pulse width of 200 ls, continuous stimulation was used. An appropriate sensory input was delivered to the patient's ipsilateral foot by adjusting the amplitude. Duration for the stimulation was 30mins which was given alternative days i.e., 3 days in a week. The outcome measure is the overactive bladder symptom score. Four symptoms—morning frequency, nocturnal frequency, urgency, and urgent incontinence—were selected for the symptom questionnaire based on the OAB syndrome definition.The impact of each urine symptom on everyday living was asked about and assessed by the residents as none, minimal, moderate, or a lot. The relative weighing of symptoms was based on a positive rate of influence (influence assessed minor or greater). The total duration of the study was4 weeks and the outcomes were measured before initiating the treatment and then assessed every week. Then the post intervention measurement was made at the end of 4^{th} week and analyzed statistically.

Results and Discussion

After statistical analysis of the quantitative data, there was a significant difference between the pre-test and post-test outcomes. Furthermore, there was statistical significance in post-test values. The study involved 15 female participants with an average age of 30.4 years. The statistical mean value for the pre-test was 11.13 (SD 1.77), whereas the statistical mean value for the post-test was 5.87 (SD 0.92). The pre and post intervention data was significant with P value less than 0.0001 with a t value of 17.540 (Table1 & Figure 1). It is detected that the posterior tibial nerve stimulation was found to be beneficially in Over Active Bladder among multigravida mothers.

Table 1. Pretest and posttest score for OABSS

	Mean	SD	T-Value	P Value
Pre-test	11.13	1.77		
Post-test	5.87	0.92	17.540	<0.0001

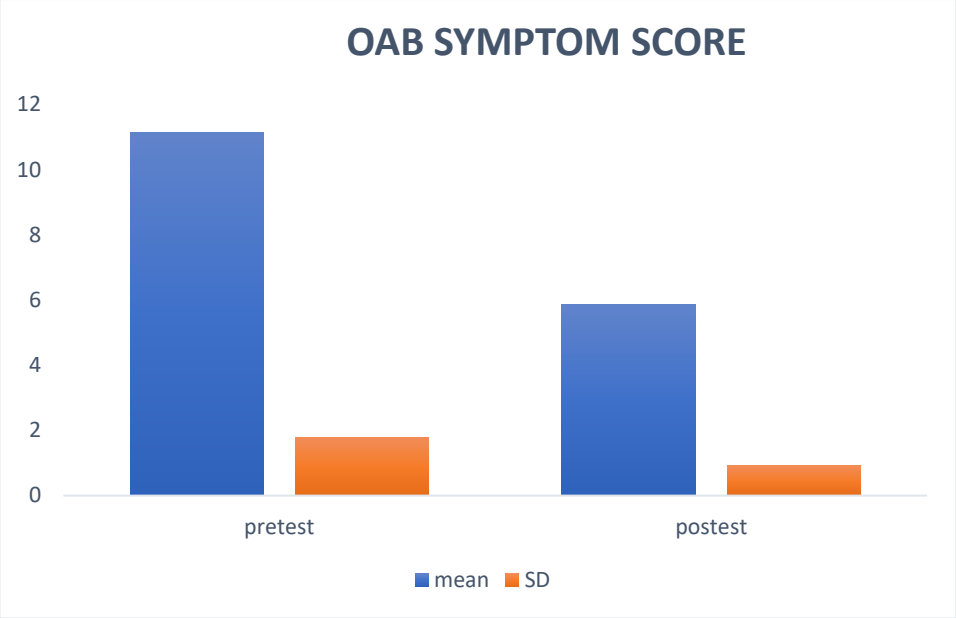

Figure 1. Pretest and posttest score for OABSS

The goal of this study was to see if posterior tibial nerve stimulation could help multigravida mothers with overactive bladder. According to Jacomo et al. (2020), a 3-day bladder diary shown the effectiveness of transcutaneous tibial nerve stimulation in treating overactive bladder.

Also, Yang et al. (2021) showed in their study that TTNS is effective as PTNS on treating overactive bladder. Furthermore, the most recent research indicates that treating overactive bladder without side effects with transcutaneous tibial nerve stimulation is just as successful as treating it with percutaneous tibial nerve stimulation. Li et al (2022) proved that transcutaneous tibial nerve stimulation was shown to be effective, safe, and comfortable in individuals with overactive bladder. They showed that treating OAB patients with transcutaneous tibial nerve stimulation, who had refused conventional treatment, is both safe and efficacious.

Results from Amarenco et al. (2003) study demonstrated that stimulation of the posterior tibial nerve affects urodynamic parameters in a direct and measurable manner. A strong case for using posterior tibial nerve stimulation as a non-invasive therapeutic alternative in clinical practice is the improvement of bladder overactivity. According to Garcia et al(2018) study, electrostimulation of the posterior tibial nerve is an effective, non-invasive physical therapy treatment for treating overactive bladder. It is less intrusive than other therapies, and patients tolerate it better. An efficient non-invasive physiotherapy method for treating overactive bladder is called ESPTN. It is less invasive than other therapies, and the patients tolerate it well.

In our study posterior tibial nerve stimulation is effective in Over Active Bladder among multigravida mothers. As our results showed a significance improvement in post intervention b. Our finding suggests that using posterior tibial nerve stimulation resulted in a significant improvement in the OAB Symptom Score after four weeks. Furthermore, this therapy has been shown to be beneficial in Over Active Bladder among multigravida women.

Conclusion

The study found that posterior tibial nerve stimulation is an effective treatment for overactive bladder. It was discovered that transcutaneous electrical nerve stimulation has a substantial clinical and statistical effect on decreasing symptom of overactive bladder among multigravida mothers.

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