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The Medical Rehabilitation of Overactive Bladder after Transurethral Resection of the Prostate: A Case Report

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ABSTRACT

Introduction: Overactive bladder is a syndrome of increased urinary frequency and nocturia with or without incontinence in absence of obvious pathology. Transcutaneous Tibial Nerve Stimulation (TTNS) is one of the neuromodulation used to treat overactive bladder. We report the medical rehabilitation program in overactive bladder post-Transurethral Resection of The Prostate (TURP). The medical rehabilitation program consisted of pelvic floor muscle exercise and TTNS that may reduce the overactive bladder symptoms. This study aims to determine whether TTNS and pelvic floor muscle exercise will reduce overactive bladder symptoms after TURP.

Case Presentation: a 40-year-old Asian man who developed overactive bladder symptoms after TURP had the medical rehabilitation program consisting of pelvic floor muscle exercise and TTNS. The pelvic floor exercise was given twice a day and TTNS was given twice a week for 12 cycles and repeated for 12 cycles. He was followed up by Over Active Bladder Symptoms Score (OABSS) to assess the severity of symptoms.

Conclusion: The medical program rehabilitation that consisted of pelvic floor muscle exercise and TTNS reduced 50% in the severity of overactive bladder symptoms after TURP. No complications have been reported. Need further research to know the definitive result.

KEYWORDS: Overactive Bladder; Transurethral Resection of the Prostate; Transcutaneous Tibial Nerve Stimulation; Pelvic Floor

I. PRELIMINARY

The International Continence Society (ICS) defines overactive bladder syndrome as a syndrome characterized by the presence of nocturia and urinary frequency, with or without urgency urinary incontinence, but no urinary tract infection or other pathologies. (1) Patients who had Transurethral Resection of the Prostate (TURP) may have overactive bladder symptoms that disturb the quality of life and affect the performance of daily activities and social functions such as working, traveling, physical exercise, sleeping, and sexual function. [2]

Overactive bladder is a highly prevalent condition affecting 16,6% of the European population and incidence increases with age. [3] Coyne, et al reported a prevalence of overactive bladder up to 27% in men and 43% in women older than 40 years of age. There were significant differences by ethnic groups with the overactive bladder being highest in African Americans. [4-5]

Transurethral resection of the prostate (TURP) is the most efficacious surgical treatment for benign prostatic hyperplasia (BPH). TURP is still the gold standard to provide a significant, sustained reduction in lower urinary tract symptoms (LUTS) and improvement of urodynamic parameters.[6] However, voiding and storage symptoms during the postoperative period negatively affect the quality of life. [7] Taylor, et al reported that overactive bladder symptoms persisted in 20-35% of cases after TURP. [8]

Several treatments for overactive bladder are Tibial Nerve Stimulation (TNS) and pelvic floor muscle exercise. Posterior tibial nerve stimulation (TNS) has become a third-line therapeutic option in patients who have overactive bladder symptoms.[9–12] The stimulation could be delivered to the posterior tibial nerve (PTN) through 2 distinct routes such as using a surface electrode called Transcutaneous Tibial Nerve Stimulation (TTNS) [13] or using a gauge needle called Percutaneous Tibial Nerve Stimulation (PTNS).[14] Although PTNS has proven to be acceptable and effective to overcome overactive bladder symptoms, the alternative to TTNS may be more feasible and comfortable. [15]

Booth, et al reported that TTNS provided greater benefit for overactive bladder symptoms than behavioral interventions.

Tibial nerve and sacral foramen stimulation were equally effective but combined stimulation was the most effective intervention. Significant reductions in overactive bladder symptoms were reported by 48-93% of participants. No adverse events were reported. [16]

Fitz, et al showed that pelvic floor muscle exercise gave reductions in the urinary symptoms of the pad test, urinary loss, and nocturia. Reduction in urinary symptoms was assessed according to the OAB-V8 questionnaire. [17]

We report a case of a 40-year-old man who developed overactive bladder symptoms after TURP and had a medical rehabilitation program consisting of TTNS and pelvic floor muscle exercise.

II. METHOD

A 40-year-old Asian man was consulted at Medical Rehabilitation Clinic by Urologist who was diagnosed with overactive bladder symptoms. He complained of urinary urgency, frequency, urge urinary incontinence, and nocturia after he had been performed by TURP 1 month ago and manifested as a biopsy of Benign Prostatic Hyperplasia. He reported no fever, urinary leakage in situations of stress (coughing, sneezing, laughing, squatting, weight lifting, walking, and running), hematuria, dysuria, sandy urine, and constipation. He also reported no history of the sexually transmitted disease, urinary calculus, diabetes, neurological disease, and cardiovascular disease but he reported a history of hypertension.

He was also assessed by Overactive Bladder Score System (OABSS) to follow up on the severity of overactive bladder symptoms. He answered 7 questions relate to all overactive bladder symptoms, including 1 each on urinary frequency and nocturia, 3 on urgency, 1 on urge incontinence, and 1 generic question about bladder control.

On the initial physical examination, he got hypertension but he was afebrile. There were no abnormalities in the abdominal examination, cardio-pulmonary examination, or neurological examination.

Urinalysis was performed to exclude the other pathologies that may cause overactive bladder symptoms. His urinalysis was normal (table 1).

This study aims to determine whether the medical rehabilitation program consisting of TTNS and pelvic floor exercise may reduce overactive bladder symptoms after TURP.

Table 1. Urinalysis

Component	Result	Ref Range
Dipstick Urinalysis		
Color	Yellow	Yellow
Clarity	Clear	Clear
pH	7.0	5,0 – 7,5
Specific gravity	1.010	1.005 – 1.030
Ketones	Negative	Negative
Glucose	Negative	Negative
Blood	Negative	Negative
Protein	Negative	Negative
Urobilinogen	Negative	Negative
Bilirubin	Negative	Negative
Leukocyte esterase	Negative	Negative
Nitrite	Negative	Negative
Urine Microscopy		
White blood cells	2-4	0-4 per high-power field
Red blood cells	0	0-2 per high-power field
Cylinder	Negative	0-4
Crystal	Negative	Negative
Bacteria	Negative	Negative
Squamous epithelial cells	Negative	Negative

Table 2. Timeline

Timeline	Place	Complaints/ Follow Up
May 2022		Hesitancy, urinary straining, slow stream, terminal dribbling, frequency, and nocturia.
July 21st 2022	Urology Clinic	Urinary retention Abdominal USG: Benign Prostatic Hyperplasia Diagnosis: Urinary retention caused by presumptive Benign Prostatic Hyperplasia
July 28th 2022	In hospital	Transurethral Resection of the Prostate (TURP) Biopsy: Benign Prostatic Hyperplasia
July 31st 2022	Out of hospital	Maintain urinary catheterization for a week
August 8th 2022	Urology Clinic	Urinary catheterization removal
September 8th 2022	Urology Clinic	Frequency, urinary urgency, urge urinary incontinence, and nocturia for 1 month Diagnosis: Overactive Bladder Follow-up plan: Consult to Physiatrist
September 9th 2022	Medical Rehabilitation Clinic	- Assessment Functional Test - Urinalysis: Normal Result - Planning of Medical Rehabilitation Program: Pelvic Floor Muscle Exercise Transcutaneous Tibial

		Nerve Stimulation (TTNS)
October 28th 2022	Medical Rehabilitation Clinic	Follow up on the program
January 6th 2023	Medical Rehabilitation Clinic	Follow up on the program

The medical rehabilitation programs given to the patient were pelvic muscle exercise and TTNS.

Pelvic floor exercise was given in 2 times a day and repeated at home. The pelvic floor muscle exercise consisted of 2 parts:

1. Kegel exercise
   The patient lay on the floor with a flat back. He started contracting and holding pelvic floor muscles for 8 seconds. After holding for 8 seconds, he slowly and completely relaxes the muscles for 3 seconds. He repeated this process 8 times, at least 2 times a day.
2. Glute bridge
   The patient lay on the floor with a flat back against the ground and knees bent at a 90-degree angle. His feet were flat on the floor with arms at his side, palms facing down. He pushed through his heels and raise his hips off the ground by squeezing his pelvic floor muscle, gluteus, and hamstrings. After pushing through, he held the position for 8 seconds. He returned to the first position slowly and completely. He repeated this process 8 times, at least 2 times a day.

TTNS was given twice a week for 12 cycles and could be repeated. TTNS was set up with a modified electrical stimulation device (Digitens Chungwoo-4STE0042-CWM602) for 30 minutes in biphasic square waves setting a pulse width of 200 microseconds and frequency of 20 Hz. It was given via two 32 mm electrode pads placed 5 cm above the medial malleolus.

The patient was followed up on October 28th, 2022, and January 6th, 2023. He was assessed by Overactive Bladder Symptoms Score (OABSS). OABSS has 7 questions consisting of 1 on the urinary frequency 1 on nocturia, 3 on urgency, 1 on urge incontinence, and 1 generic question about bladder control. The severity of urinary is identified in question number 2, the urgency is identified in question number 3 to 5, urge incontinence is identified in question number 6, and bladder control is identified in question number 7 (table 3).

III. RESEARCH RESULT

Table 3. Overactive Bladder System Score (OABSS) Questionnaire

No.	Question	Ref Score	Score before the intervention	Score on the 1st 12 cycles follow up	The score on the 2nd 12 cycles follow up
1.	How many hours do you usually urinate during the day?		4	3	2
	o no more often than once in 4 hours	0			
	o about every 3– 4 hours	1			
	o about every 2–3 hours	2			
	o about every 1–2 hours	3			
	o at least once an hour	4			
2.	How many times do you usually urinate at night (from the time patient goes to bed until wakes up for the day)?		2	1	1
	o 0 – 1 time	0			
	o 2 times	1			
	o 3 times	2			
	o 4 times	3			
	o 5 or more times	4			
3.	Why do you usually urinate?		4	2	2
	o out of convenience (I have no urge or desire to urinate)	0			
	o because I have a mild urge or desire (I can delay urination for over an hour if I have to)	1			
	o because I have a moderate urge or desire (I can delay urination for more than 10 but less than 60 minutes if I have to)	2			
	o because I have a severe urge or desire (I can delay urination for less than 10 minutes if I have to)	3			
	o because I have a desperate urge or desire (I must stop what I am doing and go immediately)	4			
4.	How long can you usually postpone urination comfortably?		4	2	2
	o more than 60 minutes	0			
	o about 30 – 60 minutes	1			
	o about 10 –30 minutes	2			
	o a few minutes (less than 10 minutes)	3			
	o must go immediately	4			

5.	How often do you get a sudden urge or desire to urinate that makes you must stop what you are doing and rush to the bathroom?		4	3	2
	○ never	0			
	○ rarely	1			
	○ a few times a month	2			
	○ a few times a week	3			
	○ at least once a day	4			
6.	How often do you get urine leakage or a wet pad in a sudden urge or desire to urinate?		4	3	2
	○ never	0			
	○ rarely	1			
	○ a few times a month	2			
	○ a few times a week	3			
	○ at least once a day	4			
7.	How good is your bladder control?		4	3	2
	○ perfect control	0			
	○ very good	1			
	○ good	2			
	○ poor	3			
	○ no control at all	4			

Adapted from Blaivas JG, et al. [18] J Urol 2007; 178:543-547

Table 4. Overactive Bladder System Score (OABSS) before the intervention and at the 12-cycle follow-up

No.	Overactive Bladder Symptoms	Before the intervention	The 1st 12 cycles follow up	The 2nd 12 cycles follow up
		Score	Score	Score
1.	Urinary frequency	4	3	2
2.	Nocturia	2	1	1
3.	Urgency	12	7	6
4.	Urge incontinence	4	3	2
5.	No bladder control	4	3	2
	Total Score	26	17	13

A 40-year-old Asian man who had overactive bladder symptoms such as urinary frequency, nocturia, urgency, urge incontinence and no bladder control got medical rehabilitation program consisting of pelvic floor muscle exercise and TTNS.

After the patient had done the first 12 cycles medical rehabilitation program, he was evaluated by OABSS. There was a 25% reduction in the severity of urinary frequency (the score decreased from 4 to 3); a 50% reduction in the severity of nocturia (the score decreased from 2 to 1); a 41,7% reduction in the severity of urgency (the score decreased from 12 to 7); a 25% reduction in the severity of urge incontinence (the score decreased from 4 to 3); and a 25% improvement in bladder control (the score decreased from 4 to 3). The total score before the intervention and the first 12 cycles of follow-up are 26 and 17. It showed a 35% reduction in the severity of overactive bladder symptoms. The program was repeated for 12 cycles.

After he had done the second 12 cycles medical rehabilitation program, he was evaluated by OABSS. There was a 50% reduction in the severity of urinary frequency (the score decreased from 4 to 2); a 50% reduction in nocturia (the score decreased from 2 to 1); a 50% reduction in urgency (the score decreased from 12 to 6); a 50% reduction in urge incontinence (the score decreased from 4 to 2); and a 50% improvement of bladder control (the score decreased from 4 to 2). The total score before the intervention and the first 12 cycles of follow-up are 26 and 13. It showed a 50% reduction in the severity of overactive bladder symptoms.

The result of the case showed that the medical rehabilitation program for the overactive bladder after TURP affects the reduction of the symptoms. No major complications have been reported during the program.

IV. DISCUSSION

The result of the medical rehabilitation program for overactive bladder after TURP affected the reduction of the symptoms. The severity of urinary frequency, nocturia, urgency, urge incontinence, and bladder control was reduced by 50% after the second follow-up.

Overactive bladder symptoms are commonly attributed to involuntary bladder muscle contractions called detrusor overactivity. The stretching of the detrusor muscle activates the micturition reflex, while control of the bladder is achieved through a complex interaction between the central and the peripheral nervous systems. OAB syndrome pathological conditions affect the bladder's sensory pathway and contribute to the urge. [19]

Transurethral resection of the prostate (TURP) is the gold standard to overcome the LUTS and the most effective surgical treatment for benign prostatic hyperplasia (BPH). Housami and Abrams reported that overactive bladder symptoms persist in 20-35% of cases post-TURP. TURP may affect the alteration of the afferent neurons responsible for initiating the involuntary detrusor contractions characteristic of detrusor overactivity and causing overactive bladder symptoms. [20]

The result of this case showed that TTNS and pelvic floor muscle exercise could reduce the overactive bladder symptoms after TURP. It was following the systematic review of Booth, et al that reported the benefits of TTNS. Significant reductions in OAB symptoms were reported by 48-93% of participants and no adverse events were reported. [16] However, Welk and McKibbon reported in a randomized, double-blind, sham-controlled study that TTNS did not appear to be effective for treating urinary symptoms of people with overactive bladder or neurogenic bladder dysfunction. [21]

TTNS is a neuromodulation treatment that stimulates lumbosacral nerves (L4-S4) which control the bladder detrusor and perineal floor via the posterior tibial nerve located near the ankle. Although the mechanism of neuromodulation is still unclear, it is believed that stimulation of the lumbosacral nerves via the posterior tibial nerve (PTN) located will alter the afferent and efferent pathways among the brain, brain stem, and pelvic organs. It eventually modulates the voiding reflex and facilitates storage. [22] The PTN is a distal branch of the sciatic nerve that originates in the pelvis (L5– S3 spinal roots) and descends towards the lower extremities. Stimulation of the PTN delivers retrograde neuromodulation to the sacral nerve plexus that controls bladder function. [23]

Wang et al. found urinary symptom reduction rates of about 50% in the isolated pelvic muscle floor exercise group and 51% in the electrostimulation. This study showed that electrostimulation was superior to the other groups. The pelvic floor muscle exercise involves the contraction of the puborectalis muscles, as well as the external urethral and anal sphincters. Studies showed that contraction of these muscles leads to suppression of detrusor contraction. [24]

V. CONCLUSION

The medical rehabilitation program consisted of TTNS and pelvic floor muscle exercise may reduce overactive bladder symptoms after TURP. Need further research to know the definitive result.

Consent: Written informed consent was obtained from the patient regarding the publication of the case history. All the patient identifiers were removed from the case report and images to maintain patient confidentiality.

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