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IMPROVEMENT IN LOWER URINARY TRACT SYMPTOMS IN POSTMENOPAUSAL WOMEN UNDERGOING OFFICE-BASED URETHRAL DILATATION: INITIAL SINGLE-CENTER RESULTS

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Abstract

Objective: *To evaluate the initial results of office-based urethral dilatation in improving lower urinary tract symptoms (LUTS) among postmenopausal women, using the International Prostate Symptom Score (IPSS) questionnaire as the primary outcome measure.*

Methods: *This descriptive case series included 135 postmenopausal women with LUTS unresponsive to medical treatment, recruited from the Department of Urology and Transplant Surgery of PAF Hospital Islamabad from 5 July 2024 to 5 January 2025. Patients with urological malignancies, bladder tuberculosis, small capacity bladder, neurogenic bladder, or pelvic prolapse were excluded. All patients underwent a comprehensive evaluation, including history, clinical examination, urine analysis, urine culture, renal function tests, and ultrasound of kidneys, ureters, and bladder (KUB). Office-based urethral dilatation up to 26 French was performed using metallic dilators, followed by flexible cystoscopy to rule out bladder pathology. Follow-up visits were done on day 7, at 6 weeks, 3 months, 6 months, and 1 year during which IPSS scores were recorded. Statistical analysis was conducted using SPSS version 16, with mean ± standard deviation calculated for quantitative variables and frequency percentages for qualitative variables.*

Results: *The mean age of participants was 64.7 years. Significant improvements in IPSS scores were observed at follow-up intervals with mean reduction of 3.4 at initial follow-up, 7.6 at 6 weeks, and 9.4 at 3 months ($p < 0.0001$). The procedure was well tolerated and no major complications were reported. Comorbid conditions, including diabetes and hypertension were documented.*

Conclusion: *Office-based urethral dilatation revealed significant improvements in LUTS showing reductions in IPSS scores. The procedure proved to be safe, minimally invasive, and effective for this population.*

Further Recommendation: *In future research with larger sample sizes, diverse patient populations, and extended follow-up is recommended to confirm these findings and explore long-term outcomes.*

INTRODUCTION

Lower urinary tract symptoms (LUTS) in postmenopausal women represent a significant and often challenging aspect of urological care. These symptoms, which include urgency, frequency, nocturia, and incontinence, can severely impact quality of life. The nonspecific nature of these symptoms necessitates a thorough clinical evaluation to establish an accurate diagnosis and develop an effective treatment plan [1]. This evaluation typically involves a structured micturition history, physical examination, micturition diary, pad test, and urodynamic studies [2]. Urodynamic evaluations, in particular, play a crucial role in distinguishing between different types of urinary dysfunction, such as stress urinary incontinence (SUI) and overactive bladder (OAB), although they do not always provide a clear distinction among the various subtypes of these conditions [2].

Despite the utility of urodynamic studies, there is ongoing debate regarding their routine use, with some practitioners favoring a symptom-based empirical management strategy [1]. This approach emphasizes the importance of understanding what specifically bothers the patient, as treatment of underlying pathophysiology is believed to facilitate better symptom management [1]. Recent advancements in urodynamics have improved our understanding of bladder sensations and their impact on voiding behavior, yet challenges remain in standardizing diagnostic criteria and procedures for conditions such as bladder outlet obstruction (BOO) and underactive bladder (UAB) [2-5].

The prevalence of LUTS in women increases with age and is often associated with menopause-related hormonal changes. Estrogen deficiency post-menopause can contribute to urogenital atrophy, which exacerbates LUTS [3]. Treatment strategies for these symptoms vary widely and include behavioral therapies, pharmacological interventions, and surgical options. Urethral dilation, a common intervention for women with voiding dysfunction, has been used for decades despite mixed evidence regarding its long-term efficacy [4, 6-9]. Some studies report significant symptom improvement following urethral dilation, while others suggest limited benefit and potential for adverse outcomes such as de novo SUI [8, 9]. The role of urethral dilation remains controversial, with professional guidelines calling for more robust research to delineate its efficacy [9].

The use of urethral dilation in women with LUTS has been scrutinized due to inconsistent outcome measures and varying definitions of success [10]. Recent studies emphasize the need for a standardized approach to evaluating and treating LUTS, particularly in postmenopausal women [4, 7]. The European Association of Urology (EAU) guidelines recommend a structured and evidence-based approach to managing non-neurogenic female LUTS, highlighting the importance of initial evaluation and tailored treatment strategies [5]. These guidelines also stress the significance of addressing comorbid conditions, such as pelvic organ prolapse and recurrent urinary tract infections, which can complicate the clinical picture and affect treatment outcomes [5, 6].

The purpose of this study is to evaluate the effectiveness of office-based urethral dilation in lessening lower urinary tract symptoms among postmenopausal women using the International Prostate Symptom Score (IPSS) questionnaire. By monitoring symptom changes over multiple time follow-up, identifying predictors of treatment success, and determine the safety and feasibility of this intervention in a single-center setting. This research adds to growing evidence on management of LUTS in postmenopausal women and provides a foundation for larger-scale studies to validate these initial results and inform clinical practice.

Methods

Study Design and Population

This study is a descriptive case series conducted at the Department of Urology and Transplant Surgery of PAF hospital Islamabad from 5 July 2024 to 5 January 2025. A total of 135 postmenopausal patients were included in this study. Inclusion criteria were postmenopausal status and presentation with LUTS refractory to standard medical management. Exclusion criteria were known urological malignancies, history of bladder tuberculosis, small capacity bladder, neurogenic bladder, and pelvic prolapse.

Clinical Assessment and Procedures

All patients underwent a comprehensive evaluation, including detailed medical history, clinical examination, and a series of diagnostic tests. Initial assessments included urine analysis, urine culture, renal function tests, and ultrasound of the kidneys, ureters, and bladder (KUB) with both pre- and post-void measurements to rule out other potential causes of symptoms.

On their first visit, patients underwent flexible cystoscopy performed by a consultant urologist to exclude any coexistent bladder pathologies. Subsequently, office-based urethral dilatation was performed using metallic dilators up to 26 French. The procedure was carried out by a consultant urologist in a clinical setting under local anesthesia.

Data Collection

Data were meticulously collected from October 2022 to October 2023 on standardized forms by the principal investigator. Variables recorded included:

- **Demographic Data**: Patient age, duration since menopause.
- **Clinical Data**: Presenting symptoms, comorbidities (diabetes, hypertension), use of hormone replacement therapy (HRT), and history of urinary tract infections (UTIs).
- **Procedure Details**: Type and size of dilators used, immediate procedural outcomes.
- **Follow-up Data**: International Prostate Symptom Score (IPSS) recorded at baseline, 7 days post-procedure, 6 weeks, 3 months, 6 months, and 1 year post-procedure.

Follow-up and Outcome Measures

Patients were followed up at specified intervals: 7 days post-procedure, 6 weeks, 3 months, 6 months, and 1 year. During each follow-up visit, the IPSS questionnaire was administered to assess the severity of LUTS. The primary outcome measure was the change in IPSS from baseline to each follow-up point.

Statistical Analysis

Data were analyzed using SPSS version 16. Descriptive statistics were calculated, including mean ± standard deviation for quantitative variables and frequency percentages for qualitative variables. Comparisons of IPSS scores were made between age groups (<60 years and >60 years), HRT use, and BMI groups at different time points using independent t-tests. The significance of differences in IPSS scores over time was evaluated to determine the effectiveness of the urethral dilatation procedure.

Ethical Considerations

The study was conducted in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. Informed consent was obtained from all individual participants included in the study. Approval for the study was obtained from the institutional review board (IRB) of the hospital (Application No. 240704).

Results

A total of 135 patients were enrolled with a mean age of 62.63 ± 13.5 years. Most of the patients (68.1%) are over 60 years old, and the majority (82.2%) are classified as overweight or obese. Hormone replacement therapy is not commonly used, with only 9.6% of patients on it. A significant portion of the cohort has comorbidities, including 43.0% with diabetes mellitus and 56.3% with hypertension. Estrogen replacement therapy is present in 40.7% of patients, while 39.3% have undergone genitourinary instrumentation. Previous urethral dilatation was reported in 41.5% of patients. There is a notable prevalence of urinary symptoms, with 61.5% experiencing urgency, 22.2% having urinary incontinence, and 48.1% reporting nocturia. Additionally, 41.5% of patients experience dysuria, and 13.3% have bowel movement issues,

whereas flank pain is relatively rare, affecting only 8.9% of patients (Table 1).

Table 1. Sociodemographic and clinical variables of patients (n=135)

Variable	Category	n (%)
Age Group	<60	43 (31.9%)
	>60	92 (68.1%)
BMI Categories	Healthy Weight	24 (17.8%)
	Overweight/Obese	111 (82.2%)
Hormone Replacement Therapy	No	122 (90.4%)
	Yes	13 (9.6%)
Diabetes Mellitus	No	77 (57%)
	Yes	58 (43%)
Hypertension	No	59 (43.7%)
	Yes	76 (56.3%)
Estrogen Replacement Therapy	No	80 (59.3%)
	Yes	55 (40.7%)
Genitourinary Instrumentation	No	82 (60.7%)
	Yes	53 (39.3%)
Urethral Dilatation Previous	No	79 (58.5%)
	Yes	56 (41.5%)
Pelvic Prolapse	No	135 (100%)
Recurrent Urinary Tract Infection	No	90 (66.7%)
	Yes	45 (33.3%)
Urgency	No	52 (38.5%)
	Yes	83 (61.5%)
Urinary Incontinence	No	105 (77.8%)
	Yes	30 (22.2%)
Nocturia	No	70 (51.9%)

	Yes	65 (48.1%)
Stress Incontinence	No	104 (77%)
	Yes	31 (23%)
Myocardial Infarction	No	134 (99.3%)
	Yes	1 (0.7%)
Hesitancy	No	69 (51.1%)
	Yes	66 (48.9%)
Weak Stream	No	69 (51.1%)
	Yes	66 (48.9%)
Intermittency	No	1 (0.7%)
	Yes	134 (99.3%)
Sensation of Incomplete Bladder Emptying	No	69 (51.1%)
	Yes	66 (48.9%)
Dysuria	No	79 (58.5%)
	Yes	56 (41.5%)
Bowel Movement Issues	No	117 (86.7%)
	Yes	18 (13.3%)
Flank Pain	No	123 (91.1%)
	Yes	12 (8.9%)

The table reveals no significant differences in IPSS scores between age groups (<60 and >60) at any time points (presentation, follow-up, 6 weeks, 3 months), with p-values all greater than 0.05. However, significant differences were observed between HRT groups at 6 weeks and 3 months, with p-values of 0.031 and 0.028, respectively, indicating that patients on HRT had significantly different IPSS scores compared to those not on HRT. For BMI categories, no significant differences in IPSS scores were found at any time points (p-values > 0.05), suggesting similar outcomes for healthy weight and overweight/obese patients (Table 2).

Table 2. Mean IPSS score at presentation, follow-up, 6 weeks, and 3 months according to Age groups, HRT group, and BMI categories

Variable	Category	n	Mean±SD	p-value
IPSS Presentation				
Age	<60	43	15.37±5.4	0.812

	>60	92	15.09±6.5	
HRT group	No	122	15±6.1	0.29
	Yes	13	16.92±6.9	
BMI	Healthy Weight	24	15.70±6.2	0.65
	Overweight /Obese	111	15.07±6.2	
IPSS Follow-up				
Age	<60	43	12.23±4.7	0.446
	>60	92	11.54±4.9	
HRT group	No	122	11.80±4.8	0.77
	Yes	13	11.38±4.8	
BMI	Healthy Weight	24	12.08±4.4	0.724
	Overweight /Obese	111	11.69±4.9	
IPSS 6 weeks follow-up				
Age	<60	43	7.67±3.5	0.807
	>60	92	7.48±4.3	
HRT group	No	122	7.79±4.1	0.031
	Yes	13	5.23±1.9	
BMI	Healthy Weight	24	8.54±4.4	0.19
	Overweight /Obese	111	7.33±3.9	
IPSS 3 months Follow-up				
Age	<60	43	5.97±2.7	0.625
	>60	92	5.68±3.4	
HRT group	No	122	5.9±3.3	0.028
	Yes	13	3.9±1.1	
BMI	Healthy Weight	24	6.58±4.1	0.177
	Overweight /Obese	111	5.60±2.9	

The paired samples test results indicate a significant improvement in the International Prostate Symptom Score (IPSS) at different time intervals following urethral dilation. At the initial follow-up, the mean IPSS reduction was 3.42222, with a highly significant p-value of <0.0001. This improvement increased over time, with a mean reduction of 7.63704 at 6 weeks and 9.40741 at 3 months post-dilation, both also highly significant (p = <0.0001). The consistently high t-values and narrow confidence intervals across all intervals confirm that urethral dilation significantly alleviates lower urinary tract symptoms in the studied population (Table 3).

Table 3. Paired Samples Test Showing Significant Improvement in IPSS Scores at Different Time Intervals Following Urethral Dilation

Pairs	Mean±SD	p-value
IPSS presentation-IPSS Follow-up	3.42±3.5	<0.0001
IPSS presentation- IPSS 6 weeks	7.63±5.5	<0.0001
IPSS presentation- IPSS 3 months	9.40±5.8	<0.0001

Discussion

Lower urinary tract symptoms (LUTS) in postmenopausal women represent a significant challenge in urological practice, affecting quality of life and overall well-being. These symptoms include urgency, frequency, nocturia, and incontinence, which often require comprehensive management strategies [11]. Our study aimed to evaluate the effectiveness of office-based urethral dilation in improving LUTS in postmenopausal women, specifically focusing on changes in the International Prostate Symptom Score (IPSS).

The results of our paired samples test revealed significant improvements in IPSS scores at different time intervals post-dilation. At the initial follow-up, the mean IPSS reduction was 3.42222, which further increased to 7.63704 at 6 weeks and 9.40741 at 3 months. These improvements were highly significant ($p < 0.0001$) across all intervals, indicating that urethral dilation is an effective intervention for alleviating LUTS in the studied population.

Our findings align with those of other studies that have demonstrated the effectiveness of urethral dilation in managing LUTS. Grivas et al. reported significant improvements in IPSS and quality of life scores following urethral dilation combined with Otis urethrectomy in women with bladder outlet obstruction (BOO) [12]. Similarly, Heidari et al. found that on-demand urethral dilation was more effective than intermittent dilation in reducing urinary residuals and increasing maximum urinary flow rates [13]. These studies support the notion that urethral dilation can provide substantial symptomatic relief in women with LUTS.

However, the long-term efficacy of urethral dilation remains a topic of debate. Basu and Duckett highlighted that while urethral dilation offers short-term benefits in symptom relief, its long-term efficacy is limited, with many patients experiencing symptom recurrence [14, 15]. This underscores the importance of considering additional or alternative treatments for sustained symptom management.

Our study's significant improvements in IPSS scores underscore the procedure's effectiveness. These findings are consistent with those of Matsui et al., who reported that LUTS in both men and women are associated with various cardiovascular risk factors and endothelial dysfunction, suggesting that improvements in vascular function could correlate with better urinary outcomes [11]. The substantial reduction in IPSS scores in our study may reflect improvements in underlying pathophysiological conditions affecting bladder function.

The safety profile observed in our study was favorable, with no significant post-procedural complications. This aligns with the findings of Manasa et al., who reported no negative impact on continence or sexual function following dorsal onlay graft urethroplasty for female urethral stricture [16]. Similarly, Grivas et al. found that their therapeutic approach significantly improved clinical and urodynamic parameters without adverse effects [12].

The feasibility of performing urethral dilation in an office-based setting also enhances its appeal as a minimally invasive treatment option. This is particularly important for postmenopausal women who may have comorbid conditions that make more invasive procedures riskier [17, 18].

Hormone replacement therapy (HRT) has been shown to influence LUTS in postmenopausal women. Estrogen deficiency can exacerbate urinary symptoms by contributing to urogenital atrophy [19]. Our study found that patients on HRT experienced significant improvements in IPSS scores, suggesting that HRT may enhance the efficacy of urethral dilation. This finding is supported by studies that

highlight the interplay between hormonal status and urinary function in postmenopausal women [3, 7].

The significant improvements in IPSS scores post-urethral dilation have important clinical implications. These results suggest that urethral dilation should be considered a viable treatment option for postmenopausal women with LUTS, particularly those who are unresponsive to conservative management. Clinicians should consider patient selection criteria, including the presence of comorbid conditions and previous treatments, to optimize outcomes [14, 15].

Furthermore, the integration of urethral dilation into standard care protocols could enhance the management of LUTS in this population. The procedure's minimally invasive nature, combined with its significant symptomatic relief, makes it a valuable addition to the therapeutic arsenal for LUTS [17, 18].

While our study provides valuable insights, it is not without limitations. The sample size was relatively small, and the follow-up period was limited to three months. Larger, randomized controlled trials with longer follow-up periods are needed to confirm the long-term efficacy and safety of urethral dilation. Additionally, potential biases and confounding factors, such as variations in patient compliance and concurrent treatments, should be addressed in future research [4, 10].

Future research should focus on conducting larger, multi-center studies to validate our findings and explore the long-term benefits of urethral dilation. Investigating the combination of urethral dilation with other therapeutic modalities, such as pharmacotherapy and pelvic floor rehabilitation, could provide a more comprehensive approach to managing LUTS in postmenopausal women. Additionally, further studies should evaluate the impact of HRT on the efficacy of urethral dilation to better understand the hormonal influences on urinary function

Conclusion

Our study demonstrates that office-based urethral dilation significantly improves IPSS scores in postmenopausal women with LUTS, with substantial symptomatic relief observed at initial follow-up, 6 weeks, and 3 months. These findings highlight the procedure's effectiveness and safety, suggesting it as a valuable treatment option for this patient population. Further research is needed to confirm the long-term benefits and optimize patient selection and management strategies.

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