
The Effect of Terazosin on Functional Bladder Outlet Obstruction in Women: A Pilot Study

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Purpose: We assessed the effect of terazosin (Hytrin®) on functional bladder outlet obstruction in women.

Materials and Methods: Functional bladder outlet obstruction was defined as a maximum flow rate of less than 12 ml per second combined with a detrusor pressure at maximum flow rate of more than 20 cm H₂O in pressure flow studies in the absence of neurological disorders or mechanical causes. In a prospective pilot study 15 women with functional bladder outlet obstruction were treated with terazosin. Terazosin was initiated at 1 mg daily and gradually increased to the maintenance dose of 5 mg daily during 2 weeks. Symptoms and urodynamic parameters were assessed before and 3 to 4 weeks after the initiation of α -blocker therapy.

Results: While on terazosin, voiding symptoms subjectively improved greater than 50% in 10 of the 15 women ($p = 0.002$). Median maximum urethral closure pressure at rest decreased significantly from 98 to 70 cm H₂O ($p = 0.001$), median maximum detrusor pressure decreased from 45 to 35 cm H₂O ($p = 0.008$), median detrusor pressure at maximum flow decreased from 34 to 27 ml per second and median post-void residual urine decreased from 120 to 40 ml ($p = 0.006$ and 0.002 , respectively). There was a significant increase in the median maximum flow rate from 9 to 20 ml per second and in median voided volume from 300 to 340 ml ($p = 0.0005$ and 0.021 , respectively). Storage symptoms, functional urethral length and maximum cystometric capacity did not change significantly with α -blocker therapy ($p > 0.05$). Overall terazosin resulted in a significant improvement in symptoms and urodynamic parameters in 10 of the 15 women (67%).

Conclusions: Terazosin had a significant symptomatic and urodynamic effect in two-thirds of our patients. These results suggest that terazosin may be an effective treatment option in women with voiding dysfunction due to functional bladder outlet obstruction.

Key Words: bladder, terazosine, bladder neck obstruction, female, urodynamics

Alpha-blocker therapy is an established treatment for BOO due to prostatic enlargement in men. However, little is known about the effect of α -blockers in women. Kumar et al¹ and more recently Pischedda et al² reported significant improvement in symptoms, Qmax and PVR in 50% and 56%, respectively, of women with functional BOO. Thus, α -blockers may be an effective treatment option for female functional BOO. Considering that high intravesical pressure may put the upper urinary tract at risk, addressing the urodynamic effect of α -blockers, especially on detrusor pressure, becomes imperative. In a prospective pilot study we assessed the effect of terazosin (Hytrin®) on functional BOO in women.

PATIENTS AND METHODS

Patients

In this prospective pilot study 15 women who presented predominantly with voiding symptoms and functional BOO were included. Functional BOO was diagnosed if neurological disorders or mechanical causes were excluded and Qmax

was less than 12 ml per second, combined with PdetQmax more than 20 cm H₂O in pressure flow studies, as initially described by Lemack and Zimmern.³ All patients were informed about the exact procedure and study purpose, and provided consent.

Clinical and Urodynamic Assessment

All patients underwent urological evaluation before treatment, including medical history, neurourological examination, urinalysis, urine culture, urethrocystoscopy, urethral diameter calibration, urodynamic studies, including pelvic floor electromyography in 9 that was combined with video-urodynamics in 6 with inconclusive electromyographic activity, and magnetic resonance imaging to exclude spinal cord pathology. Urodynamic investigations were performed according to the good urodynamic practices recommended by the International Continence Society.⁴ The urodynamic parameters assessed were functional urethral length and MUCP, which were measured by a microtip catheter, maximum cystometric capacity, Pdet, PdetQmax, Qmax, VV and PVR. All methods, definitions and units conformed to the standards recommended by the International Continence Society.⁵

α -Blocker Treatment

Terazosin (Hytrin®) was initiated at 1 mg daily and gradually increased to the maintenance dose of 5 mg daily during

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2 weeks. Voiding and storage symptoms, and urodynamic parameters were assessed before and 3 to 4 weeks after the initiation of α -blocker therapy.

Statistical Analysis

Due to the skewed distribution of data nonparametric statistical tests were performed and data are presented as the median and IQR. To compare related samples the Wilcoxon signed rank test was used for quantitative data and the McNemar test was used for dichotomous data with $p < 0.05$ considered significant. Statistical analyses were performed using SPSS® 11.5.1.

RESULTS

Median age in the 15 women was 33 years (IQR 26 to 46). All patients complained about voiding symptoms, including a slow or intermittent stream, hesitancy, straining and/or a feeling of incomplete emptying. In addition, 6 of the 15 women (40%) also had from storage symptoms, including increased daytime frequency, nocturia and/or urgency. Eight of the 15 women (53%) had a history of recurrent urinary tract infections but none had a urinary tract infection during the study period.

The urodynamic study before and during α -blocker therapy was well tolerated by all patients. No investigation related complications were observed. However, 2 of the 15 women reported slight fatigue and 2 noticed modest dizziness during the first days of terazosin intake. None discontinued α -blocker therapy.

While on terazosin, voiding symptoms subjectively improved greater than 50% in 10 of the 15 women ($p = 0.002$). Median MUCP decreased significantly from 98 to 70 cm H₂O, median Pdetmax decreased from 45 to 35 cm H₂O, median PdetQmax decreased from 34 to 27 ml per second and median PVR decreased from 120 to 40 ml (figs. 1 to 3). In addition, there was a significant increase in median Qmax from 9 to 20 ml per second and in median VV from 300 to 340 ml (fig. 4). Storage symptoms (6 vs 5 of the 15 patients, $p = 0.99$), functional urethral length (median 33 vs 34 mm, $p = 0.21$) and maximum cystometric capacity (median 450 vs 440 ml, $p = 0.99$) did not change significantly while on α -blocker therapy.

Pelvic floor dysfunction was found in 2 of the 15 women, including increased electromyographic activity in 1 and radiographic evidence of urethral narrowing with proximal dilatation during voiding in 1. However, this remained unchanged on terazosin, although α -blocker therapy had a symptomatic and urodynamic effect in each patient. Of the 15 women 13 had no electromyographic or videourodynamic signs of pelvic floor dysfunction before or during α -blocker therapy.

Overall while on terazosin, 10 of the 15 women (67%) had significant improvement in voiding symptoms, and in the urodynamic parameters MUCP, Pdetmax, PdetQmax, Qmax, VV and PVR. In the other 5 patients α -blocker therapy had no effect. In these women obstruction remained when applying our BOO criteria of Qmax less than 12 ml per second combined with PdetQmax more than 20 cm H₂O on pressure flow studies.

Maximum urethral closure pressure at rest (MUCP)

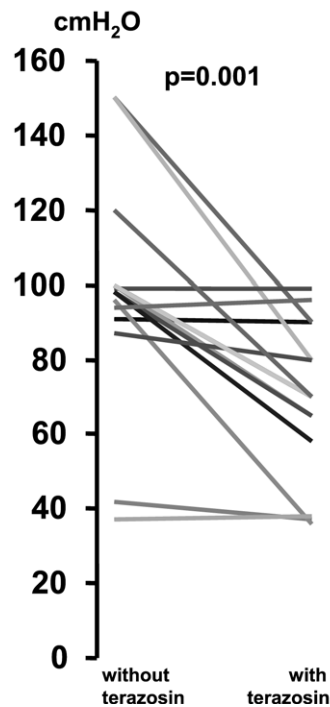


FIG. 1

DISCUSSION

Although BOO in women has traditionally been considered uncommon, recent studies suggest that it is an under diagnosed cause of female lower urinary tract symptoms with a prevalence of up to 29%⁶ in women undergoing urodynamic investigation. BOO can be classified as having a mechanical (anatomical) or functional (nonmechanical/nonanatomical) basis. In women mechanical causes include tumor, urethral stricture/bladder neck stenosis, urethral diverticulum, bladder calculus, urogenital prolapse and previous surgical intervention, especially anti-incontinence procedures. When there is a functional etiology, the pathophysiological mechanisms of female voiding dysfunction are poorly understood and no standard definitions or guidelines for diagnosis and treatment exist.⁷ Although the exact etiology of this entity remains unclear, it has been attributed to detrusor bladder neck and/or external sphincter dyssynergia, dysfunctional voiding, nonrelaxing urethral sphincter obstruction and intrinsic urethral sphincter overactivity, ie Fowler's syndrome.

In the current study functional BOO was diagnosed if neurological disorders or mechanical causes were excluded and Qmax was less than 12 ml per second, combined with PdetQmax more than 20 cm H₂O in pressure flow studies, as described by Lemack and Zimmern.³ We are aware that the original study by Lemack and Zimmern included patients with anatomical (mechanical) obstruction. Nevertheless, this BOO definition was used, considering the lack of generally accepted criteria for diagnosing functional BOO uro-

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