

# Single Dose Silodosin Prior to Voiding Cystourethrogram: A Pharmacological Adjunct to Enhance Visualization of Posterior Urethra

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## ABSTRACT

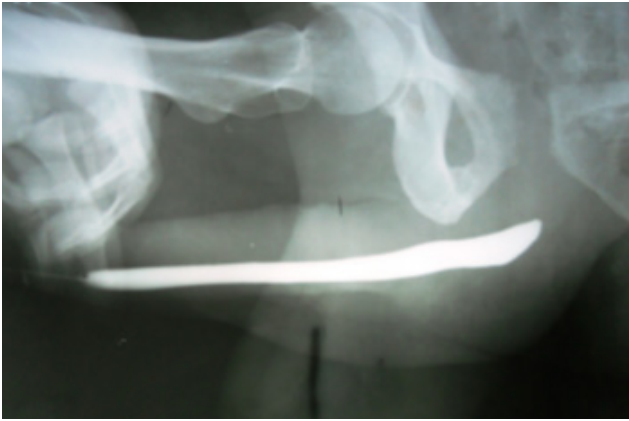
Voiding cystourethrogram (VCUG) is needed to ascertain the upper end of urethral stricture. Occasionally, a patient is unable to open the bladder neck with resultant failure of the test. Realizing the strong and prompt alpha antagonistic action of silodosin, we evaluated single 8 mg dose as a pharmacological adjunct prior to VCUG to overcome this problem.

**Keywords:** voiding cystourethrogram; silodosin; posterior urethra.

## INTRODUCTION

Voiding cystourethrogram (VCUG) is a commonly used technique to image the posterior urethra. In contrast to the retrograde urethrogram, opening of the bladder outlet and distension of the posterior urethra are achieved during VCUG. Sometimes patient is unable to void and open the bladder outlet with resultant failure of contrast to reach the upper end of the obliteration. This makes assessment of length of the stricture difficult especially in a case of pelvic fracture urethral distraction defect (PFUDD). Various methods have been used to overcome this problem such as passing a bougie through the suprapubic route, passing ureteric catheter antegradely under cystoscopic guidance into the posterior urethra followed by instillation of contrast and magnetic resonance imaging (MRI). However, these alternative methods are invasive except for MRI.

Silodosin is a highly selective  $\alpha_{1A}$ -blocker which acts on  $\alpha_{1A}$  receptors on bladder outlet and prostate. Silodosin, with rapid onset of action and with its time to peak concentration approxi-



**Figure 1.** Retrograde urethrogram showing complete obliteration at the junction of bulbo-membranous urethra in a man with pelvic fracture urethral distraction defect.

mately being 2.6 hours,<sup>(1)</sup> we explored the usefulness of silodosin prior to VCUg to improve the opening of bladder outlet and delineate the posterior urethra.

## MATERIALS AND METHODS

All men attending the urology clinic with pelvic fracture urethral distraction defect and stricture urethra with complete obliteration of urethral lumen requiring VCUg were included in the study. Children, men who voided per urethra, men with neurogenic bladder/ vesical calculus or having contraindication to the use of silodosin (severe hepatic or renal impairment) and who refused to give consent were excluded from the study. All men initially underwent VCUg in the conventional manner. Men who failed to open the bladder outlet during conventional VCUg were done repeat VCUg the next day with a single dose of silodosin 8 mg administered three hours prior to repeat VCUg. VCUg was performed by filling the bladder with contrast medium (made by 76% sodium diatrizoate with distilled water in the ratio of 1:4) through an indwelling suprapubic catheter. When the patient felt the normal desire to void, voiding command was given and a conventional X-ray film was taken. The X-ray films were reviewed by a senior urologist to note the opening of bladder outlet and visualize the posterior urethra. Baseline demographic characteristics, indication for VCUg, duration of suprapubic catheter and amount of contrast used to fill bladder were noted.

The results are presented in means ( $\pm$  SD) and proportions with its 95% confidence intervals.

## RESULTS

Forty men met the inclusion criteria from August 2011 to February 2012. Their demographic data are presented in Table. The mean age was 41.8 years with an average body mass index of 23.12 kg/m<sup>2</sup>. The various indications for performing VCUg were PFUDD 20/40 (50%), post traumatic bulbar urethral stricture 7/40 (17.5%), lichen sclerosis 6/40 (15%) and post catheterization stricture 7/40 (17.5%). All men had a suprapubic catheter (SPC) and the mean duration of SPC was 3.5 months. On an average 326.5 mL of contrast was used to fill the bladder to initiate voiding. Of participants 28/40 [70%, 95% confidence interval (CI): 56%-84%] men were found to have bladder outlet opened. A total of 12 men couldn't initiate voiding at the first VCUg (Figures 1, and 2A). After administration of single dose 8 mg silodosin 3 hours prior to VCUg, opening of bladder outlet was achieved in 10 out of 12 men (83.3%, 95% CI: 55%-104%) thus helping in assessing the stricture length (Figure 2B).

All men completed the study. None of the men reported any adverse effect following administration of the drug. The most prevalent adverse effects of silodosin are hypotension and ejaculatory disturbances. We looked at postural hypotension by measuring blood pressure at baseline, 0, 5 and 10 minutes after administration of drug. There was no significant drop in the blood pressure after administration of drug and none of the patients complained of ejaculatory disturbances because they were not sexually active during the study period.

## DISCUSSION

It is important to define the length of the stricture before operating a case stricture urethra or PFUDD. Various methods such as combined retrograde urethrogram and micturition cystourethrogram,<sup>(2)</sup> passing of curved metal sound,<sup>(2)</sup> magnetic resonance imaging<sup>(3)</sup> and antegrade urethrogram<sup>(4)</sup> have been used to overcome this problem. Although combined RGU and VCUg is useful, sometimes bladder outlet does not open because of reduced bladder capacity due to long standing SPC and inability to tolerate the bladder distension sufficient enough to open the bladder outlet voluntarily.<sup>(5)</sup> Pass-



**Figure 2A.** Voiding cystourethrogram shows failure of bladder outlet to open in same patient.

ing of curved metal sound may be deleterious in some cases with inadvertent injury to the bladder outlet. Antegrade urethrograms are also useful but are an invasive procedure, require expertise and a cystoscope which may not be available at the site of radiology suite to pass the ureteral catheter in posterior urethra. Although MRI is non-invasive, it is costly and urologists are not familiar in interpreting an MRI. Also, at MR imaging it is not easy for the patients to open their bladder outlet continuously by straining and increasing the abdominal pressure.

Silodosin is a new  $\alpha$ -adrenoreceptor (AR) antagonist and has been approved by the US Food and Drug Administration in 2008 for the treatment of lower urinary tract symptoms associated with benign prostatic hyperplasia. Silodosin with its favorable pharmacological profile having rapid onset of action within 2 hours<sup>(6)</sup> and higher affinity for  $\alpha_{1A}$  adrenergic receptors compared to tamsulosin and alfuzosin<sup>(7)</sup> is ideal in this circumstance to relax bladder outlet and prostatic urethra



**Figure 2B.** Voiding cystourethrogram shows opening of bladder outlet and delineation of proximal urethra after administration of silodosin.

to initiate voiding. In the present study 10 out of 12 men who failed to initiate voiding, voided with the use of silodosin thus substantiating the role of a single dose of silodosin prior to VCUG. In two patients SPC was in situ for more than 10 months and contrast back leaked by the side of SPC despite all maneuvers to prevent it. The probable cause for failure to void was the presence of SPC for long term which caused a low compliant and overactive bladder which did not allow the bladder to be filled to its normal capacity.

The factors which influence the opening of bladder outlet include amount of urine in the bladder and an intact nervous system facilitating the micturition process. The micturition process is innervated by parasympathetic nerves (detrusor contractility), sympathetic nerves (bladder outlet relaxation) and somatic nerves (urethral sphincter relaxation). The beneficial effects of  $\alpha_{1A}$  AR blockers are associated mainly with relaxation prostatic and urethral smooth muscle. However the bladder outlet also consists of bladder neck, prostate, intraprostatic urethra and external sphincter. These outlet structures contain  $\alpha_{1A}$  AR.<sup>(8)</sup> Therefore, blocking these receptors reduces resistance and facilitates voiding. During VCUG, few individuals are anxious because of unnatural position and unfamiliar surroundings with resultant increased sympathetic drive which may preclude opening of the bladder outlet and failure of the test. Highly selective  $\alpha_{1A}$  blockers with short peak onset of action such as silodosin are effective in such circumstances when administered prior to performance

**Table .** Demographic data of men undergoing voiding cystourethrogram.

Variables	Voiding cystourethrogram, n = 40
Age, years (mean)	41.8 (20-70)
Etiology, no. (%)	
Pelvic fracture urethral distraction defect	20 (50.0)
Bulbar urethral stricture	20 (50.0)
Post traumatic	7 (17.5)
Lichen sclerosus	6 (15.0)
Post catheterization	7 (17.5)
Duration of suprapubic catheterization, months (mean)	4 (1-6)
Volume of contrast instilled into bladder to initiate voiding before voiding cystourethrogram, mL	326.5 (150-450)
Bladder outlet opened on initiation of voiding	28/40 (70%, 95% CI: 56%-84%)
Bladder outlet opened on initiation of voiding with silodosin	10/12 (83.3%, 95% CI: 55%-104%)

Key: CI, confidence interval.

the test.

In the study by Tsumura and colleagues<sup>(9)</sup> patients with prostatic cancer who had prostatic implants as part of brachytherapy were prophylactically administered silodosin showed significant improvement in the post void residual urine at 6 months vs. tamsulosin. In another study Uchiyama and colleagues<sup>(10)</sup> have prospectively studied the effect of silodosin on lower urinary tract symptoms in female and have found silodosin to be effective in improving voiding, storage symptoms and quality of life. Uroflowmetry parameters improved in most patients along with significant reduction in postvoid residual urine.

One of the limitations in the present study was that there was no control group. Also, there are no similar studies to the best of our knowledge to compare our results. Randomized, placebo controlled trial are required to further confirm our findings.

## CONCLUSION

The use of single dose silodosin (8 mg) to effectively open the bladder outlet and visualize the posterior urethra prior to VCUG.

## CONFLICT OF INTEREST

None declared.

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