

## **Is ascending urethrogram mandatory for all Urethral Strictures ?**

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### **Abstract**

**Objective:** To determine the role of ascending urethrogram in decision making for patients with suspected urethral strictures

**Methods:** Medical Records were reviewed of male patients presenting with lower urinary tract symptoms who were subjected to ascending urethrogram and selected cases for cystourethroscopy from January 2001 to December 2002. Cystourethroscopy was performed on those patients who complied with treatment for urethral stricture or who had persistent low flow of urine despite ascending urethrogram reporting no urethral stricture. Data was analyzed on SPSS 10.0. Sensitivity, specificity, positive and negative predictive values were calculated for ascending urethrogram as a measure to evaluate urethral stricture.

**Results:** Ascending urethrogram was done on 92 patients. Of whom 55 were reported to have urethral stricture. The mean age of patients was  $42.8 \pm 13.2$  years. Of the 92 patients who had ascending urethrogram, 62 were subjected to cystourethroscopy proceed optical internal urethrotomy(OIU) in cases of stricture. It was that out of 45 reported urethral strictures on ascending urethrogram, 5 did not have stricture on cystourethroscopy ( $P=0.001$ ). Likewise in the same group of 62 patients, 17 patients were reported to have no stricture on ascending urethrogram, whereas subsequent cystourethroscopy revealed stricture in 4 patients. The calculated sensitivity of ascending urethrogram was 91% and specificity 72%. The calculated positive and negative predictive values were 89% and 76% respectively.

**Conclusion:** The study concluded that Ascending Urethrogram does not completely rule out urethral stricture(Negative Predictive Value 76%). It was also observed that urethral stricture may be non-existent even though suggested in Ascending Urethrogram (Positive Predictive Value 89%). With a sensitivity of 91% and a low specificity of 72% of the ascending urethrogram for diagnosing urethral stricture, it would be advisable to subject the patient to cystourethroscopy proceed Optical Internal Urethrotomy in cases of urethral stricture. This will save cost, avoid infection reduce risk of radiation and contrast related hypersensitivity reaction (JPMA 58:429;2008).

### **Introduction**

Urethral stricture has been variously defined clinically. But none has been universally accepted. However it was Nielsen and Nordling who provided the most acceptable definition. They define it as any portion of urethra calibrating less than 22Fr. This was based on a study

of over 4000 male Urethrae. It is suggested that stricture becomes symptomatic only after its caliber narrows down to 18 Fr or less.<sup>1</sup>

Besides history and physical examination, ascending urethrogram remained the Gold Standard for evaluating Urethral Stricture.<sup>2</sup> However some authors have reported that this imaging study is not ideal for posterior urethral

strictures. For posterior urethra, combining ascending urethrogram with MCUG is more rewarding<sup>2</sup>, and for anterior urethral strictures it under estimates the length of proximal Bulbar urethral stricture. This has been elaborated as this segment of urethra is fixed in the same axis as pelvis. This leads to an 'End-on View' of bulbar strictures radiographically, which reduces their apparent length.<sup>3,4</sup>

With our clinical experience while dealing with urethrogram and urethral strictures, we hypothesized that Urethrogram is not mandatory for the evaluation of all urethral strictures. With this hypothesis we reviewed records of patients who underwent urethrogram and assessed the need in the light of this evaluation the further management.

### Patients and Methods

Medical Records were reviewed of male patients presenting with lower urinary tract symptoms who were subjected to ascending urethrogram and selected cases for cystourethroscopy from January 2001 to December 2002 .

Cystourethroscopy was performed on those patients who complied with treatment for urethral stricture or who had persistent low flow of urine despite ascending urethrogram reporting no urethral stricture.

Data was analyzed on SPSS 10.0 .Sensitivity ,specificity ,positive and negative predictive values were calculated for ascending urethrogram as a measure to evaluate urethral stricture .

### Results

Ascending Urethrogram was done on 92 patients .Of these 55 were reported to have urethral stricture(Table 1). The mean age of selected patients was 42.8+13.2 years.

Of the 92 patients who had ascending urethrogram, 62 were subjected to cystourethroscopy proceed optical internal urethrotomy (OIU) in cases of stricture (Table 2) .It

**Table 1. Number of cases of Urethral Stricture in patients undergoing Ascending Urethrogram and Cystourethroscopy.**

	Urethrogram n=92	Cystourethroscopy n=62
Stricture	55	44
No Stricture	37	18

**Table 2. Comparison of yield of Ascending Urethrogram with Cystourethroscopic Finding for Urethral Stricture.**

Ascending Urethrogram	Cystourethroscopy		P Value
	Stricture	No stricture	
Stricture	45	05	0.001
No Stricture	17	13	0.001
Total	62	18	

**Table 3. Sensitivity ,specificity ,Positive Predictive value and Negative predictive value of Ascending urethrogram for urethral stricture.**

Ascending Urethrogram	Cystourethroscopy		
	Stricture	No stricture	
Stricture	45	05	Sensitivity 91%
No Stricture	17	13	Specificity 72%
			+ve Predictive Value 89%
			-ve Predictive Value 76%
Total	62	18	

was found that out of 45 reported urethral strictures on ascending urethrogram in this group, 5 did not show stricture on cystourethroscopy(P=0.001) (Table3).Likewise in the same group, 17 patients reported to have no stricture on ascending urethrogram,where as subsequent cystourethroscopy revealed stricture in 4 patients (Table 2).

The calculated sensitivity of ascending urethrogram was 91% and specificity 72%.The calculated positive and negative predictive values were 89% and 76% respectively (Table 3).

### Discussion

Definition of Urethral Stricture as proposed by Neilsen and Nordling becomes controversial as Wright et al found that some patients may remain asymptomatic with their urethral calibers as low as 18Fr.<sup>5</sup> Evaluation tools for urethral stricture include Ascending Urethrogram, UFM, Ultrasound Urethrogram, CT scan and MRI. Ascending Urethrogram introduced by Cunningham in 1910<sup>6</sup>, is no doubt a simple and readily available investigation. But beside the issue of under estimation of bulbar stricture length, this study is not completely indolent. Ascending urethrogram contributes 0.6% to 1.6% to all hospital acquired infections. There is risk of contrast related allergic reaction and Radiation Exposure which is of 5-9 msv, equivalent to 2.5 years of background radiation and 230 chest Xrays.<sup>7</sup> This risk is often ignored by Urologist.

UFM, a noninvasive urodynamic test, reflects the final result of voiding. A number of variables influence UFM, which include strength of detrusor contraction, receptive relaxation of urethral sphincter and patency of urethra. Although UFM cannot be taken as the sole modality to diagnose Urethral Stricture, but with pertinent history and low Qmax, there can be a high index of suspicion.

Ultrasonourethrography was first popularized by McAninch in 1985.<sup>3</sup> Resolution is further refined in the current era with improved technology. Sonourethrography is presently done with standard small parts 7.5 MHz linear array transducer. Normal Saline is slowly instilled into the urethra by a catheter tip syringe, while at the same time real

time ultrasound imaging is sequentially performed from penile to deep bulbar urethral region. Stricture imaging is possible with sonourethrography even in completely disrupted urethra or severe fibrosis of urethral lumen. This procedure is well tolerated and its accuracy has been confirmed by many investigators.<sup>8</sup> However none of our patients underwent sonourethrography as the modality is not available in our centre.

MRI has been advised in special complex urethral trauma associated with crush injuries.<sup>9</sup> Here inference and planning for reconstruction can be improved by combining MRI with modalities like ascending urethrogram and MCUG.<sup>10</sup>

Recently with improvised technology, role of CT has been revisited in the evaluation of urethral stricture. CT voiding urethrography is a technique similar to conventional VCUG. Its protocol involves 0.75 mm collimation and reveals urethra in 6 seconds. And subsequent better quality of reformatted images has lead to what is named as virtual urethroscopy.<sup>11</sup>

In an acute setting of traumatic posterior urethral injuries, flexible cystourethroscope has been utilized both as a diagnostic and management tool.<sup>12</sup> But in sub-acute settings its role is predominantly diagnostic unless it is combined with LASER.

With inherent hazards of ascending urethrogram, including it as a routine investigation for urethral strictures should be reviewed. Efforts should be made to select less invasive modalities as sonourethrography.

### Conclusion

The study concluded that Ascending Urethrogram does not completely rule out urethral stricture(Negative Predictive Value 76%) . It was also observed that urethral stricture may be non-existent even though suggested in Ascending Urethrogram(Positive PrediditiveValue 89%) . With a sensitivity of 91% and a low specificity of 72% of

the ascending urethrogram for diagnosing urethral stricture, it would be advisable to subject the patient to cystourethroscopy proceed Optical Internal Urethrotomy in cases of urethral stricture .This will save cost, avoid infection reduce risk of radiation and contrast related hypersensitivity reaction.

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