

Diagnostic Evaluation of Anterior Urethral Strictures in Males using Sonourethrography - A Comparative Analysis with Conventional Retrograde Urethrography

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Abstract: *The investigative modality of choice for diagnosing urethral strictures is retrograde urethrography, this can be replaced with Sonourethrography as it is equally efficacious in diagnosing anterior urethral strictures in males and also it has its own advantages over Retrograde urethrogram like contrast reactions, radiation exposure giving an advantage of repeating the investigation multiple times without effecting the patient care.*

Keywords: Retrograde urethrography, Sonourethrography, Anterior male urethra, Strictures

1. Introduction

Urethral pathologies in young males is a common entity and their prevalence is increasing annually (1). Most common cause being lichen sclerosus in developed countries and trauma in the developing countries (3,4), causing serious discomfort to the patient and substantial morbidity. Urethroscopy is not of diagnostic importance for all the pathologies, so imaging plays a significant role to achieve an accurate diagnosis. Retrograde Urethrography is the primary investigation of choice for diagnosing urethral strictures, however the accuracy is non standardized and variable due to degree of stretching of penis during the study and patient positioning, in evaluation of peri urethral strictures it has severe limitations.

Proper diagnosis is essential for appropriate surgical procedure and patient management. Diagnostic evaluation of strictures by sonourethrography gives us information about the length of the stricture, location and the diameter of the stenosed segment. These factors facilitate a good outcome of urethroplasty, additional information like fistulous communications or sinuses, presence of diverticulum, calculi or polyps within the urethra is provided (16).

2. Methodology

In this article, we reviewed various observational studies with search terms like, 'urethral strictures', 'Retrograde urethrography', 'Sonourethrography', we found 20 relevant articles and reviewed them.

Efficacy of evaluating anterior urethral strictures in males on sonourethrography when compared with conventional retrograde urethrography

Epidemiology

Urethral strictures are most commonly caused by trauma or a sequelae to infections. They are one of the most commonly seen urethral diseases in the clinical practice. Several Data

records have confirmed that there has been an increase in the incidence of urethral strictures from 5.8 per 100,000 in 2001 to 9 per 100,000 in younger males who are below 65 years (1).

The characteristic age trend of urethral strictures from data collected in Italy from 1,439 patients suggested that even though the mean age was approximately 45 years, the range was quite wide, varying from 2 to 84 years. (2).

Stein *et al.* (3) have examined retrospectively 2589 patients who had urethroplasty between 2000 and 2011 in India, United States and Italy. They also concluded that the mean age of presentation was 41.4 years. (Fenton *et al.* (4) and Shadab *et al.* (5) evaluated 50 cases with urethral strictures and concluded that the age group of 31-40 years represented the most commonly afflicted group (24%) closely followed by the 41-50 years age group (20.0%). The youngest recorded patient in these studies was 5 years old and 70 year old as the eldest.

John *et al.* (6) studied 75 patients suspected to have urethral strictures. Age group of patients varied from 18 to 84 years. Mean age was 49. Lowest age of a patient with a stricture was 24yrs and maximum age of a patient with a stricture was 84yrs. Largest number of the patients, 18 patients (24%) belonged to the age group 51-60 yrs. The largest number of strictures were in the age group 61-70 years, 22 strictures (32.84%).

Common sites of urethral stricture disease:

Shadab *et al.* (5) have evaluated 50 cases of urethral strictures and found that in the present series maximum number of strictures were found in bulbomembranous urethra (34%). Bulbar strictures were seen in 20%, meatal strictures in 16%, penile strictures in 14%, peno-bulbar strictures in 12% and prostatic urethral stricture were seen in 4% cases. Bulbar urethral strictures represented the most common category at 66% stand alone or combined with stricture in another portion of the urethra.

Length of the urethral stricture

John *et al.*(6) studied 75 patients suspected to have urethral strictures. The stricture length is categorized as short strictures less than 2.5 cm in length and long strictures, more than 2.5 cm in length. Most of the strictures in this study are short segment strictures. Long segment strictures are detected more on SUG. The length of strictures were more on SUG compared to RGU except in bulbomembranous junction in which the entire length could not be evaluated with SUG. The mean length of strictures on RGU was 1.0186cm and with SUG was 1.4297cm.

Priyadarshi *et al.*(8) have opined that SUG shows better overall sensitivity and accuracy in predicting stricture and the mean stricture length calculated on SUG was found closer to pre operative findings.

In a study by Fenton *et al.*(4), a total number of 194 anterior urethral strictures are identified in the 175 patients. The average stricture length overall is 4.1 cm. Bulbar strictures were more prevalent (n = 100, 52%) than those of the pendulous urethra (n = 59, 30%) or fossa navicularis (n = 35, 18%). Pendulous strictures (mean ~ 61 mm) are relatively longer on an average as compared to those in the navicular fossa (mean ~26 mm) and bulb (mean ~31 mm).

Number of the urethral strictures

Shahsavari *et al.*(9) have conducted a study on 97 patients who are provisionally diagnosed of having urethral stricture subsequently investigated with RUG. These patients also have been subjected to ultrasonographic evaluation. Both these methods were compared and RUG was kept as gold standard. 2 groups are created with regards to the length and total number of urethral strictures. One group was comprised of patients who had a stricture of less than or equal to 1 cm. The other group had multiple strictures or single stricture of more than 1 cm. The results concluded that 11 (50%) patients had local strictures, while the remaining 11 (50%) had multiple strictures or single stricture of more than 1 cm in length. While sonographic imaging of the urethra revealed 13 (56.6%) with local stricture, and 10 patients (43.5%) has multiple strictures or stricture > 1cm in length.

Diagnosis of Urethral stricture disease

McAninch *et al.* (10)who pioneered the technique of sonourethrography found that sonourethrography is more accurate than RGU. According to Ravikumar *et al.*(11) Sonourethrography is 100% sensitive and 100% specific, in identifying anterior urethral strictures, with both negative and positive predictive values being 100% each.

Previous research on uses of sonourethrography with high-resolution ultrasound for evaluation of male urethral strictures

In a study conducted by Talreja *et al.*(12), they have found that sonoelastography is better for estimation of stricture length and location as compared to SUG and RGU. It is also better than SUG for estimating the amount of spongiositis which has important prognostic implication for recurrence of strictures.

Maciejewski *et al.*(13)concluded that it is extremely important to accurately evaluate the urethral strictures and

their length and location pre operatively for proper surgical reconstruction and prevention of recurrence.

3. Conclusion

Most of the studies show Sonourethrography was as efficacious as retrograde urethrography in diagnosing and characterization of anterior urethral strictures. Sonourethrography do not involve the use of contrast medium for imaging and devoid of radiation exposure too. Sonourethrography imaging can replace RGU in diagnosing of anterior urethral strictures.

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