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Research Article

EVALUATION OF MALE URETHRAL STRICTURES USING SONOURETHROGRAPHY - COMPARITIVE STUDY WITH CONVENTIONAL RETROGRADE URETHROGRAPHY

Abhilash Peddu., Armel Arputha Sivarajan* and Nagaraj B.R

Department of Radiodiagnosis, Mahatma Gandhi Medical College and Research Institute, Sri Balaji Vidyapeeth,
Pillayarkuppam, Pondicherry - 607402

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ARTICLE INFO

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A research study on evaluating anterior male urethral strictures using Sonourethrography comparing with Conventional Retrograde Urethrography .

Key Words:

Retrograde urethrography,
Sonourethrography, Anterior male urethra,
Strictures.

ABSTRACT

This study was undertaken to explore the uses of sonourethrography with high-resolution ultrasound in evaluating stricture disease of the male urethra and comparing it with retrograde urethrography.

The present study was carried out in a single center as a cross sectional comparative design with prospective recruitment of 40 male patients with urethral strictures for a period of 14 months. Urethral stricture evaluation (Location, Length, Number and Type of strictures) was primarily done on retrograde urethrography and then compared with sonourethrography for correlation.

Out of 40 patients in this study, 35 had single stricture and 5 had multiple strictures. Similar findings were found in both SUG and RGU in this study. Hence the sensitivity, specificity, positive predictive value and negative predictive value were 100% and Kappa value of 1.0 which meant a very good agreement.

In this study it was found that Sonourethrography was as efficacious as retrograde urethrography in diagnosing of anterior urethral strictures. Sonourethrography technique did not involve the use of contrast medium for imaging and devoid of radiation exposure too. Present study findings recommend that RGU can be replaced with sonourethrography imaging in diagnosing of anterior urethral strictures.

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INTRODUCTION

Pathologies afflicting the urethra, and specially strictures are commonly seen in the young males in adulthood and are a source of substantial morbidity to the patients causing them serious discomfort. Urethral strictures are relatively common in adult men, with an estimated prevalence of 229-627 per 100 000 males Santucci et al.¹.

In developed countries, majority of stricture cases were caused due to Lichen sclerosus whereas in developing countries, it was due to external trauma (Stein et al.³) (Fenton et al.⁴)

Imaging techniques play a very significant role in the diagnosis of male urethral strictures. Not all pathologies can be diagnosed through urethroscopy but imaging techniques can be useful in most of the diagnosis finding. The male urethra especially the anterior portion can be beautifully demonstrated by retrograde urethrography (RGU) under fluoroscopic guidance.

RGU has some limitations such as it involves radiation, and since the imaging findings of urethral strictures are quite variable and non-standardized it is difficult to accurately

evaluate and diagnose this condition. The variations are mainly due to the degree of stretching of the penis during the study and with respect to position of the patient the strictures appear different in images. Moreover the information regarding the peri urethral structures is severely limited.

In the year 1988 McAninch et al.⁵ proposed Sono-urethrography, a novel technique for imaging of the male anterior urethra by using high frequency ultrasound.

Proper diagnosis is necessary for planning of management and planning the appropriate surgical procedure. Diagnosis of strictures involves the identification of exact length of involvement, diameter of the stenosed segment and its location. For successful outcome of urethroplasty, along with the information on the stricture, additional information regarding the presence of diverticulum, fistulous communications or sinuses or presence of calculi or polyps within the urethra is significant.

Three-dimensional dynamic SUG study, because of the absence of the hazards associated with radiation exposure and contrast use, can be repeated any number of times to arrive at a proper

*Corresponding author: **Armel Arputha Sivarajan**

Department of Radiodiagnosis, Mahatma Gandhi Medical College and Research Institute, Pillayarkuppam, Pondicherry - 607402

diagnosis. Hence, SUG is much more advantageous compared to RGU and also is free from risks associated with radiation exposure and contrast reaction.

Aim and Objectives

Aim

This study was undertaken to explore the uses of sonourethrography with high-resolution ultrasound in evaluating stricture disease of the male urethra and comparing it with retrograde urethrography.

Objective

To see how efficacious sonourethrography in evaluating male urethral strictures compared with retrograde urethrography.

METHODOLOGY

This study was carried out as a cross sectional comparative design with prospective recruitment of 40 patients in Mahatma Gandhi Medical College and Research Institute, Pondicherry, India, from November 2016 to August 2018.

RGU was performed on 1000mA Shimandzu Flexavision Fluoroscopy Machine, SUG was performed on GE Logiq S7 ultrasound machine.

Inclusion criteria

All patients with clinical diagnosis of urethral stricture.

Exclusion criteria

- Male patients with symptoms suggestive of acute urethritis are excluded.
- Patients who are allergic to contrast (OMNIOPAQUE).

Statistical Analysis

- Data was entered in MS Excel 2013 and analysed using SPSS version 21.0. Descriptive statistics was depicted in the form of proportions and means with standard deviation.
- Difference between proportions was tested by using chi square test and p value <0.05 was considered statistically significant.

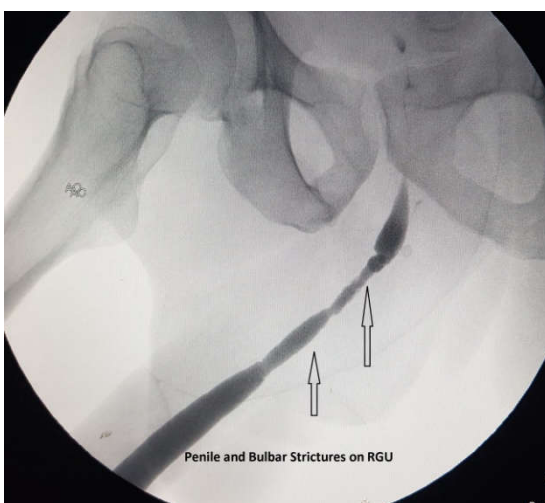


Figure 1.1 Multiple Penile and Bulbar Strictures on Retrograde Urethrography



Figure 1.2 Luminal narrowing of the penile urethra on Sonourethrography.

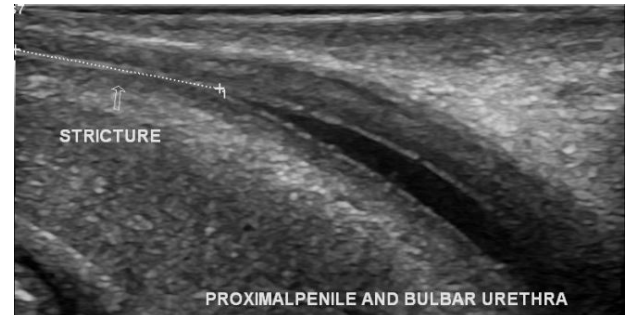


Figure 1.3 Proximal penile and bulbar urethra stricture on Sonourethrography.



Figure 2.1 Multiple penile urethral strictures noted on Retrograde Urethrography

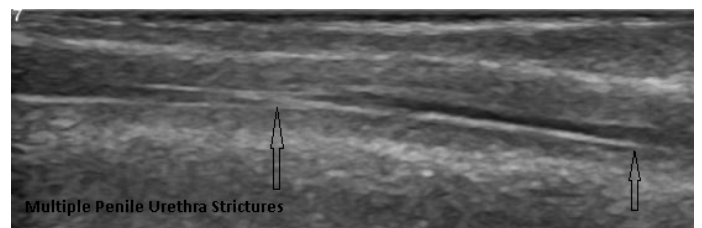


Figure 2.2 Multiple penile urethra strictures noted on Sonourethrography.



Figure 3.1 Bulbomembranous stricture demonstrated on Retrogradeurethrogram.

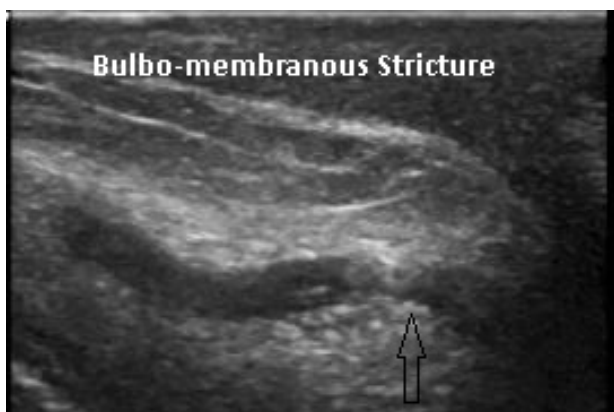


Figure 3.2 Bulbomembranous stricture on Sonourethrography.

RESULTS

Table 1 Distribution of participants based on age group (n=40) study

Age (in years)	Frequency	Percentage
20-30 years	7	17.5
30-40 years	7	17.5
41-50 years	3	7.5
51-60 years	10	25.0
61-70 years	8	20.0
>71 years	5	12.5
Total	40	100.0

Maximum study participants were in the age group of 51-60 years 10 out of 40 (25.0 %) and 61-70 years 8 out of (20.0%).

Table 2 Distribution of study participants based on location of strictures (n=40)

Location of stricture	Frequency	Percentage
Penile	10	25.0
Bulbar	27	67.5
Complex	3	7.5
Total	40	100.0

Most of the patients 27 out of 40 (67.5%) had their urethral strictures in bulbar urethra followed by penile urethra 10 out of 40 (25.0%)

Table 3 Distribution of patients based on length of strictures in RGU (n=40)

Length of stricture	Frequency	Percentage
Short	33	82.5
Long	5	12.5
Complex	2	5.0
Total	40	100.0

Majority 33 out of 40 (82.5%) of the study participants in retrograde urethrography had short urethral stricture.

Table 4 Distribution of patients based on type of strictures in SUG (n=40)

Type of stricture	Frequency	Percentage
Short	35	87.5
Long	4	10.5
Complex	1	2.0
Total	40	100.0

During sono-urethrography, majority patients 35 out of 40 (87.5%) showed short type of stricture followed by long stricture which was seen in 4 out of 40 (10.5 %).

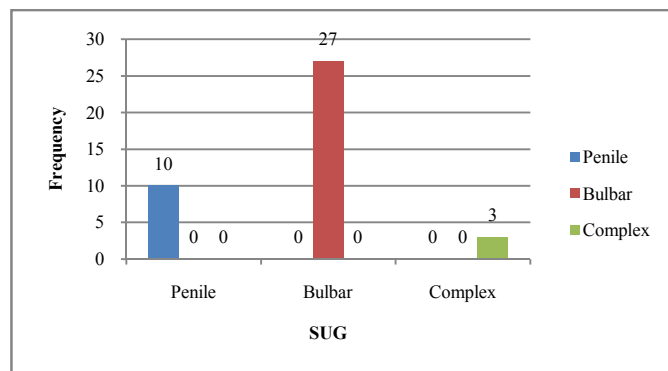


Figure 4 Association between RGU and SUG Findings (N=40)

All the findings on retrograde urethrography and on sono-urethrography were similar and no difference was found while diagnosing the type of stricture. Kappa value for this association is 1.0 which means that it has very good agreement.

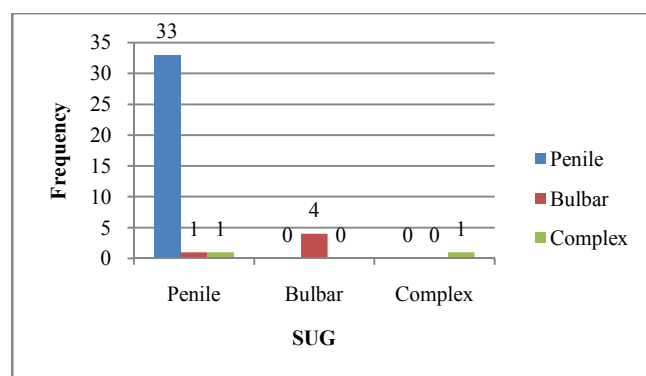


Figure 5 Association between RGU and SUG Based On Type Of Stricture (N=40)

Most of the findings in retrograde urethrography and sono-urethrography had similar findings and there was no difference was found while diagnosing the type of stricture. Kappa value for this association is 0.80 which means it has very good agreement.

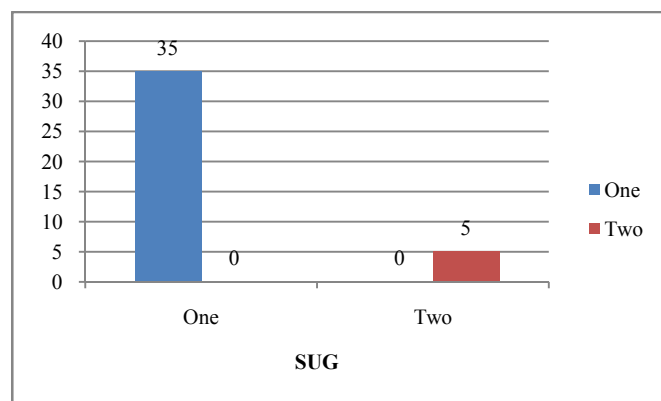


Figure 6 Association between RGU and SUG Based On Number Of Strictures (N=40)

All the findings in retrograde urethrography and sono-urethrography had similar findings and no difference was found while diagnosing the number of stricture. Kappa value for this association is 1.0 which means it has very good agreement.

Table 5 Statistical evaluation of study for sono-urethrography

Sl.No	Character	SEN (%)	SPE (%)	PPV (%)	NPPV (%)	K value	Agreement
1	Location	100	100	100	100	1.0	Very good
2	Number of strictures	100	100	100	100	1.0	Very good
3	Length of stricture	76.7	90.5	98.1	98.2	0.81	Very good

The statistical evaluation in present study was done by finding the sensitivity, specificity, positive predictive value and negative predictive value.

Strengths and Limitations

Strengths

The Advantage of this study is male patients who were being evaluated for anterior urethral strictures by SUG can be avoided with radiation and not only the length of the strictures even the diameter of the lumen of the patent urethra and the stricture can be evaluated.

SUG also detects spongiofibrosis which is helps in giving better patient care

Limitations

In RGU, additional information was available about the posterior urethra which could not assessed in SUG studies, which is a major limitation.

CONCLUSION

- In this study it was found that Sonourethrography was as efficacious as retrograde urethrography in diagnosing of anterior urethral strictures.
- Sonourethrography technique did not involve the use of contrast medium for imaging and devoid of radiation exposure too.
- Present study findings recommends that RGU can be replaced with sonourethrography imaging in diagnosing of anterior urethral strictures.

Recommendations

- SUG is recommended for primary evaluation of the anterior male urethra, as it gives not only information about the length and width of the strictures accurately, but also gives an additional information if the patient is having spongio fibrosis, this additional information facilitates the urologists to decide about the further line of treatment for the betterment of the patient
- Secondly there is no radiation in this procedure that is SUG which is another advantage to the patient and can be repeated many times for follow up, compared to performing repeated RGU investigations which causes significant radiation to the patient especially when performed on young patients in the reproductive age group, and also adverse reactions like urethritis due to contrast used in RGU can be avoided.

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