Synchronous Retrograde and Micturating Cysto Urethrography A Modification

Okpala OC, Okafor C, *Aronu ME

ABSTRACT

Background: *Retrograde Urethrography (RUG) combined with Micturating cystourethrography (MCUG) is imaging method of choice for studying the urethra and its abnormalities[1-9]. Though there are many modern imaging modalities that are also useful but these are not available in most developing countries. Even the standard method of doing the conventional Urethrography using penile clamp cannot be done in our centre because this is not also available. This led us to this study to help us maximize results by improvising on the available technique.*

Objective: *To demonstrate a local modification of method for synchronous/ combined RUG and MCUG.*

Method: *This is a method in which Foley's catheter, amputated needle cap, and syringe are used to inject contrast into the lower urinary tract to help define the calibre and outline of these structures during the combined RUG and MCUG.*

Result: *This combined technique demonstrates clearly, the anatomy of the lower urinary tract - urethra and bladder. It shows the length of stricture, where this exists.*

Conclusion: *This method of synchronous RUG and MCUG is cheap, available and readily transferable and helps to demonstrate various pathologies of the lower urinary tract. This is recommended in places where materials for other methods of urethrography are deficient.*

Key words: *Retrograde urethrography, micturating cysto urethrography, modification*

INTRODUCTION

Dysuria is a feeling of burning sensation in the urethra during voiding[1] or difficulty in micturition. This can be caused by various urological conditions ranging from congenital to acquired disorders. This usually leads to clinical consultations, resulting in various investigations involving laboratory and radiological studies. The various radiological investigations that are usually ordered include plain abdominal radiography, retrograde urethrography (RUG), micturating cystourethrography (MCUG) and other advanced methods of urethrography, like sono-urethrography, magnetic resonance urethrography (MRU), intravenous urogram (IVU), computed tomography (CT) and urodynamics may be added as available in each centre. Of all these radiological investigations of the urethra, RUG and MCUG are gold standards while cross-sectional imaging modalities like ultrasound (U/S), CT, MRU are very useful in also evaluating peri- urethral structures[2-10]. Combined RUG and MCUG is very good study to demonstrate at the same time anterior and posterior urethra and also show clearly the length of stricture. Each of these methods taken differently cannot suffice for these two taken together. RUG is the method of choice for anterior urethral abnormalities; the posterior urethra is best imaged by a combination of MCUG and RUG.

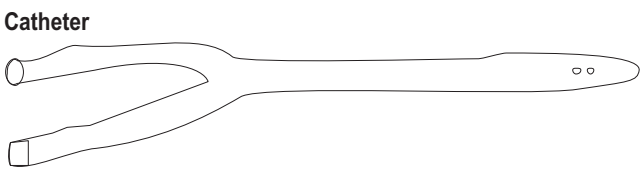
STUDY OBJECTIVE

To describe in detail a modified method of synchronous RUG and MCUG. This is with a view to encourage the use of this cheap, readily available and easily transferable technique in places where the equipments for other methods of conventional urethrography are lacking.

METHODOLOGY

Modified combined (synchronous) Retrograde Urethrography and micturating Cysto-Urethrography

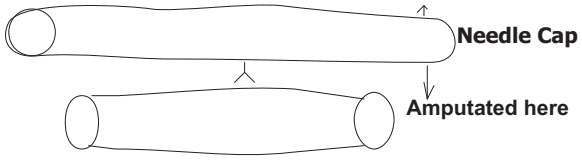
* Patient is properly counseled and consent obtained for the study.
* Patient is placed in the right posterior oblique position (RPO).
* External urethral meatus is prepared in the standard sterile fashion.
* Appropriate Foley's catheter size (depending on Patients age and size) is inserted following application of K-Y Jelly. This catheter has 2-way orifice and is adapted as shown in the legend.
* This is inserted so that the balloon is at the fossa navicularis.



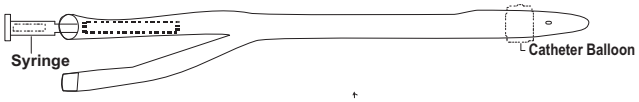
(Figure I)

The Sealed end of hypodermic needle cover is cut open and its proximal end is inserted into the irrigating route of the Foley's catheter. A syringe with diluted contrast is connected to its distal end.

Department of Radiology, Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, Anambra State, Nigeria.
***E-mail:** dctrmike@yahoo.com*



(Figure II)



(Figure III)

About 1-2mls of normal saline is used to inflate the balloon of the Foley's catheter located in the area of the fossa navicularis

RUG is done with 20-30mls of diluted contrast (urograffin76%) injected slowly. The contrast is diluted with normal saline because it gives a better outline of the margins of the urethral lumen with good definition of the membranes and stricture lengths.

Two lateral oblique views are taken at this point.

Following this the urinary bladder is filled with 300-500mls of diluted contrast (or filled till the patient feels the urge to micturate).

At this point patient is asked to bear down while contract is injected simultaneously through the urethra. Two lateral oblique views are also taken at this stage.

The urethral catheter is removed and the patient is asked to micturate. Another film is taken while micturating to outline the urethra and show the proximal level of the stricture if any.

RESULT

This study method shows both the anterior and posterior urethra clearly .The anterior urethra is usually a smooth tubular structure with a bend at the peno-scrotal junction. This marks the junction between the penile (pendulous) urethra with the bulbous urethra. The posterior urethra is further divided into membranous and prostatic urethra. Prostatic urethra is funnel shaped and best shown by MCUG.

With this combined technique of RUG/MCUG, the length of stricture is shown very clearly.

Figure IV is a film that shows well defined anterior and posterior urethra with a stricture at the bulbous urethra.

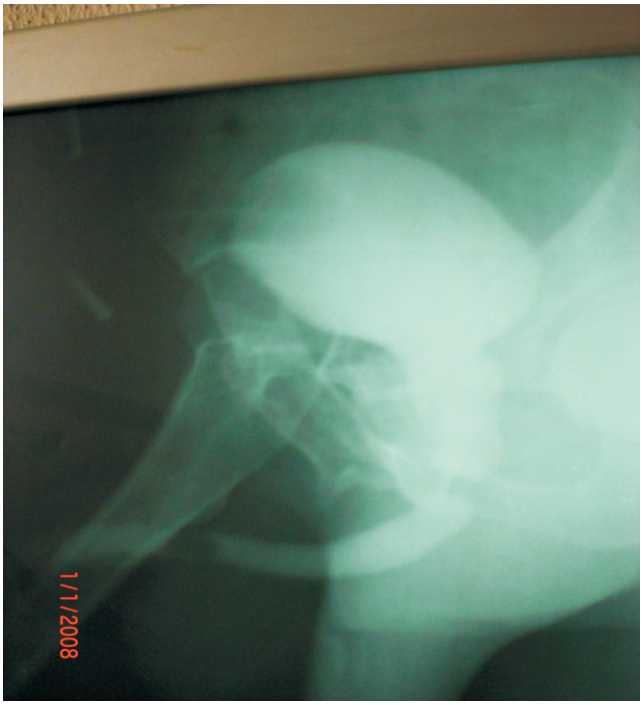


Figure IV

Figure V is a film that shows well defined posterior urethral stricture.

Figure V

Figure VI is a film that shows both anterior/posterior urethra and the urinary bladder on synchronous RUG and MCUG. A Bulbous urethral stricture and a diverticulum is demonstrated.

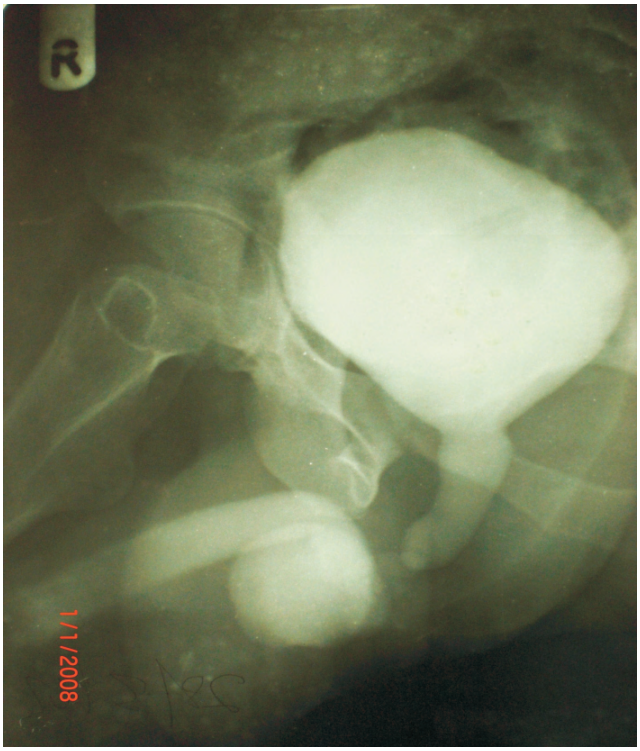


Figure VI

DISCUSSION

There are many methods of demonstrating the male urethra[11-16]. These, as listed in the introduction include the conventional urethrography and various cross-sectional imaging modalities. The conventional urethrography methods involve the use of Foley's catheter. This method has seen many modifications to overcome various local factors/equipment lack and patients' discomfort/peculiarities. Other benefits of modifications are to enhance results, reduce cost and reduce/remove hazards. This method of synchronous retrograde and micturating urethrography achieves most of the above purposes.

It combines both retrograde and micturating urethrography thereby demonstrating clearly the length of stricture which will enable one to make a good treatment plan. In this it compares favorably with modern imaging modalities like magnetic resonance urethrography and is better than ultrasonography which is good in demonstrating strictures with spongiofibrosis and other peri-urethral/defects in the anterior urethra but will not demonstrate the posterior urethra[17-21].

It will reduce radiation hazard to the patient since it reduces the amount of radiation the patient is exposed to by reducing the number of exposures taken. This agrees clearly with known radiation protection protocols.

It will reduce cost to the patient. This combined method is definitely cheaper than doing the two investigations separately.

This, when compared with the cost of MRI, Nuclear Medicine studies which are not available in our centre and even when available are beyond the reach of our people.[22] the equipment for carrying out the technique is cheap, locally available and the technique is easily transferable.

The only initial limitation of this technique is showing stenosis/defects in the distal urethra has been overcome by taking the last film as only micturating. This combined technique overcomes this in patient with no proximal stenosis/complete obstruction.

CONCLUSION

The result of this modified technique when compared with the results of other methods of conventional urethrography is favorable. More so with the fact that the equipment/material for this study is easily available and cheap and therefore affordable to majority of our patients. This method is also easily transferable and produce easily reproducible. This method should be recommended especially in centers with limitation of equipment for other methods of urethrography. While we encourage the upgrading of our equipment to international standards, we encourage the use of what is available and if possible develop modification of technique to meet the needs of the immediate environment.

REFERENCES

1. Kabala JE, Philip JA, Tim W, Grier D. The Urogenital tract, Anatomy and investigations: David Sutton (Ed). In: Textbook of Radiology and imaging 7th Edition Volume II, London, Elsevier Health services 2007. 885-928.
2. Menchi PI, Barozzi L. New imaging of anterior male urethra. Abdominal imaging 2003 March-April 28(2) 180-186.
3. Gallentine ML, Morey AF. Imaging of the male urethra for stricture disease. Urol Clin North America 2002 May 29(2) 62-372.
4. Murat T, Murat A, Diagnosis of Traumatic Urethral Stricture, Turk Urologi Dergisi, 2005 31(1) 107-112.

5. Juan D, Berna-Serna JD. A Perfected Device for Performing Retrograde Urethrography. Medical Devices, Evidence and Research 2008(1) 19-21.
6. Kawashina A, Sandler C, Wasserman NF, Leroy AJ etal. Imaging the Urethral Disease: a Pictorial Review.2004 Oct 24 Suppl.1 S195-216.
7. Pavlica P, Barozzi L, Menchi I. Imaging of male urethra. Eur. Radiol. 2003 July 13(7) 1583-96.
8. Bern JD, Aparicio M. Urethrography in the male: The clamp Method. Acta Radiological 2009. 50(2) 223-237.
9. Davson C, Whitfield H. ABC of urology. Urological Evaluation BMJ 1996 March 16. 312(7032) 695-698.
10. Usman U, El-Ghar MA, Mansur O, Refaie H, El Diasty. T. Magnetic Resonance urethrography in Comparison to Retrograde urethrography in diagnosis of male urethral Strictures. Is it Clinically Relevant? European Urology 2006 Sep. 50 (3) 587-593.
11. Santucc: RA, Joyce GF, Wise M. Male Urethral Stricture Disease. Journal of Urology 2007 May 177 (5) 1667-74.
12. Knutson F. On the technique of urethrography. Acta Radio. 10:437-441
13. Berna JD, Berna JD Jnr. A new device for retrograde urethrography in the male. Eur Radio (2003)13:1420-1422
14. Houghton AB. A penile clamp for retrograde urethrography using external compression by a balloon cather. Australas Radio (1997) 41:6.
15. Sala BX, Schorlemmer WC, Alvarez VR, Caretero GP. Barcelona retrograde Urethrography: A new device and technique. J Urol; (1999) 161:1863-1864
16. Kirshy DM, Pollack AH, Becker JA, Horowitz M. Autourethrography. Radiology (1991) 180 :443-445
17. Morey AF, McAninch J. Ultrasound evaluation of the male urethra for assessment of urethral Stricture J. Clinical Ultrasound. 1996 Oct. 24 (8) 473-9.
18. Ayu J, Kim B. MR imaging of the male and female urethra. Radio graphics. 2001 Sept-October 21(5); 1169-85.
19. Deng J, Med M, Hall-crags MA, Craggs MD, etal. Three dimensional MRI of the male Urethra with implanted artificial Sphincters: initial results. British Journal of radiology. (2006) 79,455-463.
20. Deuk JS, Yun Hwan K, Sung BC, Yu WO, etal. Obliterate Urethral stricture: MR Urethrography versus Conventional retrograde urethrography with voiding Cystourethrography. Radiology 2006.240 842-848.
21. Nash PA, Jack WM, Jeremy EB, Douglas KH. Sonourethrography in the Evaluation of anterior Urethral Strictures. The Journal of urology. 1995 (July) 154 :72-76.
22. Kristin BL, Ingelni B. Geographical Variation in Radiological Services; a national survey BMC Health Serve Res 2007. 7:7-21.