

One Shot Non Fluoroscopy Urethrography for Anterior Urethral Stricture: A Case Report

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ABSTRACT

Urethral stricture is a relatively common disease in male causing lower urinary tract symptoms. In most practice, fluoroscopy is the standard imaging technique to assess urethral stricture. However, it is not available at our local hospital. We present a case of 72-year-old male patient who reported hematuria after suffering a straddle injury. A one shot x-ray non fluoroscopy contrast injection urethrography was found partial stricture of the bulbous urethra. The patient was performed urethroplasty. Three months after operation, the patient has been able to void spontaneously. One shot x-ray non fluoroscopy contrast injection urethrography revealed remarkable widening and no contrast extravasation was apparent. It can be concluded that one shot x-ray non fluoroscopy contrast injection urethrography is a useful modality for diagnosis urethral stricture. The advantages of this examination are that it uses fewer staff and minimal radiation exposure. Meanwhile the disadvantages are the lack of accuracy and are operator dependent.

Keywords: *urethral stricture, non fluoroscopy urethrography, case report*

INTRODUCTION

Urethral stricture is an abnormal narrowing of the urethra resulting from fibrosis in the surrounding corpus spongiosum. It can develop anywhere along the length of the male urethra and can be due to many etiologies.^[1] Urethral strictures have a prevalence of 229-627/100,000 males worldwide and can be classified into

anterior and posterior, with the anterior ones comprising 92.2%. Most patients present with progressive obstructive voiding symptoms, but may be present with acute obstruction, mostly hematuria.^[2] Retrograde urethrography (RUG) and voiding cystourethrography (VCUG) use fluoroscopy to take pictures of the urinary system while the bladder is filled with liquid contrast medium.^[3] Although fluoroscopy is consider the standard imaging techniques to assess urethral stricture, it is not available in every hospital. This study used one shot x-ray non fluoroscopy contrast injection urethrography as an alternative modality to assess urethral stricture. Thus, the aim of this study is to explore the advantages and disadvantages of one-shot x-ray non fluoroscopy contrast injection urethrography in the diagnosis of urethral stricture.

CASE PRESENTATION

A 72-year-old male patient presented to the emergency department at Bangli General Hospital with complaint of hematuria. The patient reported suffering a straddle injury after falling in a sitting position and hitting his groin on protruding floor. Physical examination revealed blood dripping from the urethral meatus. General status was normal. The patient was diagnosed with anterior urethral rupture and was planned to undergo suprapubic catheterization, but the patient refused so a suprapubic puncture was done in the emergency department.

One month after his presentation, the patient came back with inability to void and had a suprapubic catheterization (cystostomy) in the operating room. The results of laboratory examination were as follows: Hb 14 g/dl, leucocyte $5.4 \times 10^9/l$, thrombocyte $216 \times 10^9/l$, hemostatic function was normal, BUN 18 mg/dl, and creatinine serum 0.75

mg/dl. One day after suprapubic catheterization, the patient has no complaints and his vital sign was normal. Urology status in urinary vesicle showed the presence of cystostomic catheter no. 16 Fr, urine flowed was normal and clear. External genitalia revealed that penis and scrotum were normal.



Figure 1. One shot x-ray non fluoroscopy contrast injection urethrography of a 72-year-old male patient with straddle injury shows partial stricture of the bulbous urethra (arrows). (a) when contrast media is injected through the urethra; (b) when contrast media is injected through the cystostomic catheter.

On July, 2 the patient underwent one shot x-ray non fluoroscopy contrast injection urethrography in the imaging room. The examination revealed partial stricture of the bulbous urethra (Figure 1). From those results the patient was diagnosed with partial anterior urethral stricture. On August, 26 urethrotomy interna (urethroplasty) operation was done and lower urethral catheter was installed. During his stay, the patient received injection of ceftriaxone 2 x 1 gr, ketorolac 3 x 30 mg, pantoprazole 1 x 40 mg and tranexamic acid 3 x 500 mg. Five days postoperatively, the patient was allowed to discharge in a good general condition. Urethral catheter was maintained for 1.5 months and cystostomic catheter was replaced with the new one each 2 weeks.

After urethral catheter was removed, the patient was trained for independent catheterization (Clean Intermittent Self-Catheterization (CIC)), twice a day on morning and afternoon. Each visiting time the patient demonstrated her ability to do independent catheterization before the doctor. Two months after operation, she was

able to urinate from urethra with closed cystostomy catheter and no history of enuresis. Three months after urethroplasty the patient has been able to void spontaneously, so that the catheter was removed. One shot x-ray non fluoroscopy contrast injection urethrography performed six months after urethroplasty revealed remarkable urethral widening, no urethral stricture and no contrast extravasation was apparent.

DISCUSSION

Anterior urethral stricture is a relatively common disease, causing lower urinary tract symptoms, including urinary retention. The bulbar urethra is the most common site of anterior urethral stricture (46.9%), followed by the penile urethra (30.5%), or a combined of bulbar and penile stricture (9.9%), and finally pan-urethral strictures (4.9%). Urethral strictures can occur in both sexes but are rare in females. The etiology is divided into four major groups; idiopathic, iatrogenic, inflammatory, and traumatic, with the idiopathic and iatrogenic being the most common at 33% each. Following them

are the traumatic causes comprising 19% and finally inflammatory, causing 15% of them. Post-traumatic anterior urethral strictures most commonly affect the bulbar urethra and are frequently due to straddle injuries compressing the bulbar urethra against the symphysis pubis.^[2]

In most practices, diagnosis and treatment planning for urethral stricture are based on findings at RUG and VCUG.^[3] The combination of these examination yields a good image of the entire urethra. It provides information about the location, number, length, and severity of strictures and are usually the most definitive diagnostic tools.^[2] These studies use direct fluoroscopic to take pictures of the urinary system while the bladder is filled with liquid contrast medium. It is a dynamic procedure which allows for live assessment of the urethra as contrast is delivered.^[4] However, fluoroscopy is not available in every hospital, including in our local hospital. So to overcome this, we carried out an alternative examination that could assess urethral strictures, that is one shot x-ray non fluoroscopy contrast injection urethrography.

One shot x-ray non fluoroscopy contrast injection urethrography is a radiological examination that use contrast medium to assess the presence of abnormalities in the urethra and urinary bladder. The technique of injecting contrast medium is done through two channels, the upper channel through the urinary bladder by cystostomic catheter and the lower channel through the urethra. The technique of inserting contrast medium in this method is carried out because of abnormalities or disorders that block urine from the bladder to the urethra, so that if contrast medium is only inserted through the urethra, it is very likely that the contrast medium will not reach the bladder. Some indications for one shot x-ray non fluoroscopy contrast injection urethrography include: urethral stricture, urinary retention, congenital abnormalities, fistule, and tumor. One shot x-ray non fluoroscopy contrast

injection urethrography was done with the following steps:

Preparation of Tools and Materials

The tools and materials that must be prepared include: X-ray machines, cassettes and films, grids, markers, sphygmomanometer, oxygen tube, patient gowns. Tools for inserting contrast media, consisting of sterile and non-sterile aids. The sterile tools needed include: 20 cc syringe, gauze, alcohol cotton, anti-histamine, catheter. While non-sterile aids include: nierbeken, plaster and gloves. The contrast medium used was a positive iodine water-soluble contrast medium.

The examination

1. The patient was placed in the supine position on the examination table.
2. A suppository analgesic was given to the patient and the patient should not move.
3. Examination field was disinfected.
4. An 8 Fr catheter was inserted into pars naviculare and the balloon catheter then was inflated with 1-2 cc of aquabides until it feels full.
5. Scout image was carried out to insure proper position and exposure before contrast injection.
6. 10 mL of contrast medium was injected through the urethral catheter slowly with a syringe 20 mL where the penis is under gentle traction and take a shot.
7. Then, the pelvis is positioned obliquely to the right or left approximately 35-40 degrees, according to the intended position.
8. Another 10 mL of contrast medium was injected through the urethral catheter slowly and then take a shot.
9. While the patient is still in a oblique position, VCUG was performed by injecting 100 mL of 50% diluted contrast medium with normal saline through the suprapubic cystostomy catheter.
10. Contrast and saline mixture were hanged about 1 m above the examination table to naturally instill it into the emptied bladder.

11. Instill contrast and saline mixture until the patient has a strong sensation to void.

12. Then, during voiding, take a shot.

Patient positioning during the examination is critical. The patient should be in an oblique position (35-45 degrees) to maximize visualization of the bulbar urethra. If a stricture is identified, the patient position should be adjusted, as needed, to display the entire length of the stricture. Suboptimal obliquity can underestimate stricture length. Scout images can help assure appropriate patient position prior to contrast injection and identify calcification and other high-density structures that may be confused with contrast medium.^[5]

The one-shot x-ray non fluoroscopy contrast injection urethrography using a blind technique so the level accuracy of taking images is not as good as fluoroscopy because it does not allow a real time assessment of the urethra. So that if the time when taking the photo is not accurate, the examination procedure must be repeated. On the other hand, the number of the staff in the room can be reduced because with the blind technique you can use only 2 staff, whereas for fluoroscopy at least 3 staff. The exposure time to radiation can also be minimized because the time needed to carry out the examination is shorter than fluoroscopy. Fluoroscopy usually uses radiation that is high enough compared to other examinations so that it can pose a risk of cancer in the future. In addition, fluoroscopy examination also requires a longer time so that radiation exposure can cause hair loss and redness of the skin.

The obstacles encountered in this examination are highly dependent on the general condition and level of patient cooperation. One shot x-ray non fluoroscopy contrast injection urethrography is an invasive technique so caution in working is needed, tools and preparations must be prepared. Sometimes there is a leak in the cystostomic catheter causing the contrast to spill out, sometimes the patient's

screams of pain result in the staff's concentration disturbance and the contrast medium difficult to enter.

CONCLUSION

One shot x-ray non fluoroscopy contrast injection urethrography can be used as an alternative modality to diagnose anterior urethral stricture by defining stricture location, length, number, and severity. A thorough understanding of urethral anatomy and appropriate radiological technique is essential to diagnose urethral stricture. Patient positioning and the time of taking the images are things that must be considered when carrying out this examination. The advantages of this examination are that it uses fewer staff and minimal radiation exposure. Meanwhile the disadvantages are the lack of level accuracy and are operator dependent.

Declaration by Authors

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