

Catheterising the male urethra

L. I. Okeke

Department of Surgery, University of Ibadan and University College Hospital, Ibadan, Nigeria

Reprint requests to: Dr. L. I. Okeke, Department of Surgery, University College Hospital, P. M. B. 5116, Ibadan, Nigeria. E-mail: okeke@skanet.com; llokeke@yahoo.com

Introduction

Over the years with each new batch of medical graduates coming in for their pre registration internship we receive increasing number of patients who sustain traumatic urethral ruptures during efforts at urethral catheterization. Less frequently but on a regular basis too, we receive patients referred by general practitioners who are bleeding per urethram following urethral catheterization or have come with one of the many complications that may follow urethral catheterization. Catheterization of the male is therefore discussed here in the hope of making it a safer procedure.

Indications for male urethral catheterisation

This could be diagnostic as in performance of cystograms/ micturating cystograms, or therapeutic as in relieving urinary obstruction, resting the bladder in severe disturbing urinary frequency or urinary incontinence, or intravesical delivery of cytotoxic agents for superficial carcinoma of the bladder. Patients may also need to be catheterized to monitor urine output.

Choice of catheter material

Catheters made of rubber

Usually amber colored, are the most readily available in the market. When inserted into a patient, they can be safely allowed to remain in place for a maximum of 4 weeks. At the end of 4 weeks, they should be removed and if the indication for catheterization still exists, they should be replaced with another catheter under antibiotic cover. Replacing these catheters before 4 weeks would amount meddlesome interference, inconvenience to the patient, exposure of the patient to complications and economic wastage. On the other hand, if they are allowed to remain for more than 4 weeks, encrustations may occur on the portion of the catheter within the bladder. This may grow to become a stone making it impossible for the catheter to be removed even after the balloon has been deflated. Encouraging the patient to be on high oral fluid intake of at least 3 liters a day will reduce the risk of this occurring especially in patients who are predisposed to stone formation. When catheters overstay, the body heat may alter the rubber material especially of the catheter balloon channel, making deflation of the balloon impossible. This may also occur if the

balloon is inflated with any other fluid other than ordinary water. Antiseptic solutions are corrosive to the rubber material and will encourage the inflation channel to glue together making deflation of the balloon impossible. Normal saline may lead to crystallization of sodium chloride and consequent blockage of the channel. The use of sterile water is safe but is an unnecessary waste. Clean water is adequate. External clamping, crushing and kinking can also damage the inflation channel.²

Catheters made of silicon

Light blue in color. They are much more tolerated by the body. They can be allowed to remain in the body for up to 6 months, requiring to be changed only twice a year until the indication for catheterization ceases to exist. They are expensive and are not easy to come by. Instead what we may get is rubber catheters coated with silicon. These are better tolerated than the rubber catheters but not as well as the pure silicon catheters.

Catheters made of red rubber material

These are the worst. They are poorly tolerated by the urethral mucosa and within hours could cause chemical urethritis and ultimately lead to the worst type of urethral strictures, affecting the entire urethra. If red rubber catheters are the only ones available, they should be removed as soon the bladder is emptied.

Catheters made of portex

These are usually stiff and are not used for routine bladder drainage. They are usually used for bladder drainage after prostatectomies and to negotiate the shelf of the bladder neck which otherwise would be difficult without introducer.

Choice of catheter size

Most adult urethras will easily accept size FG16 or FG18 Foley type catheters.

These are the most commonly used sizes for drainage of urine. If the catheter is for drainage of blood, however, bigger sized catheters like FG20, FG22, FG24, or even FG26 can be used. It should however be noted that these should not be allowed to remain for longer than 24 – 48 hours. If they remain for longer than that, the large/over sized catheters cause urethral damage by two different mechanisms.

Firstly, by overstretching the urethra, they cause urethral mucosal ischaemia, causing ischaemic damage and healing by fibrosis (stricture). Secondly, they impair the free drainage of the numerous periurethral glands. This leads to accumulation of secretions in these glands. These accumulated secretions become secondarily infected leading to multiple periurethral abscesses. These will eventually heal by fibrosis leading to very severe urethral strictures. On the other hand, if catheters smaller than FG 16 are used, they may be too floppy to be able to negotiate the urethra, like trying to catheterize the urethral with sewing thread. Urethral catheters are only available in even number sizes.

Urethral catheterisation

Preparation

The patient should be lying supine. The entire external genitalia is exposed and cleaned along with the adjoining lower abdomen and upper thighs. A soapy antiseptic like chlorhexidine (savlon) is adequate but one should be aware that skin allergies and life threatening anaphylaxis to chlorhexidine have been reported.³ Methylated spirit will cause an uncomfortable burning sensation and is only used on the external genitalia if an operation is contemplated. Iodine should never be used on the external genitalia for any reason as it burns the delicate penile and scrotal skin just like boiling water would do. Povidone iodine is safe but is not used for this purpose. Sterile drapes should be applied exposing the penis.

The hands of the attending physician should ideally be scrubbed but washing the hands clean with soap and water is usually considered adequate. Wearing a sterile gown is desirable but not necessary. A pair of sterile gloves should be worn.

Need for antibiotic prophylaxis

The distal penile urethra is not sterile. It is inhabited by a host of organisms, which remain nonpathogenic as long as they remain confined to the distal urethra. However, during the act of urethral catheterization, the catheter mechanically carries the distal urethral organisms proximally into the otherwise usually sterile portions of the urethra. In this new location, these organisms cause infection of the mucosa of the proximal urethra and the bladder leading to urethritis and urinary tract infection. It is therefore essential that the patient receives antibiotic prophylaxis preferably parenterally before the urethra is catheterized. Quite often, we are much more comfortable with the assumption that despite the antibiotic prophylaxis, a urinary tract infection is established. Based on this assumption, therefore, we usually give a therapeutic course of antibiotics for 5 days after urethral catheterization. Failure to give antibiotic prophylaxis often leads to infective complications including acute epididymitis, cystitis, upper urinary tract infection and gram-negative septicemia.

Need for urethral anaesthesia and lubrication

It is very important to have the urethra anaesthetised and lubricated. Both can be obtained by squeezing in a tube of 2% lignocaine (xylocain^R) jelly into the urethra, preventing it from flowing out from the urethra by the application of a penile clamp for about 3 to 5 minutes. If a penile clamp is not available, the same objective can also be achieved by manual pressure using the thumb and index finger of the left hand (right handed operator).

The anesthetic jelly can be milked into the more proximal parts of the urethra by gently stroking the urethra underneath the penile shaft from near the glans penis proximally towards the root of the penis.

Opening the urethral catheter pack

The catheter is usually packaged in a double sterile pack. The assistant should open the outer pack from one end indicated by the manufacturer, ensuring that the inner transparent pack is not contaminated in the process. If there is no assistant, the operator should open the catheter pack and deliver the catheter with its sterile pack onto a sterile tray before putting on his/her sterile gloves. With sterile gloved hands, the second sterile cover of the catheter over the catheter tip is opened.

Inserting the catheter into the urethra

Every effort should be made to ensure that the catheter is not touched. This is the non-touch technique. Holding the penile shaft with the left hand, gradually introduce the catheter with the right hand into the external urethral meatus holding the catheter by its sterile sheet. The sterile sheet over the catheter is gradually withdrawn as more of the catheter is introduced into the urethra. The entire length of the catheter should be introduced until the junction of the stem of the catheter with the arm for balloon inflation aborts on the external urethral meatus. By this time usually the urine is flowing through the catheter but this is not a guarantee yet that the catheter has been properly inserted.

Inflating the balloon of the catheter

How do you know the amount of water to use for inflating the catheter balloon? The volume of the balloon is usually written both on the outer catheter pack and on the catheter distal to the junction for balloon inflation. This volume should not be exceeded because of the risk of balloon rupture.

Usually, inflating the balloon to half

or two thirds of the indicated volume is adequate. The best fluid to use is sterile water but ordinary clean is adequate. While inflating the balloon, all attention should be on the patient's face to detect any facial expression of inconvenience, which will mean that the catheter balloon is probably in the urethra and not in the bladder. If any change in facial expression suggests inconvenience, the balloon should be deflated immediately, the catheter further advanced into the bladder and another attempt made to inflate the balloon again. If this warning is ignored and the balloon inflated in the urethra, urethral rupture will occur, usually evidenced by urethral bleeding following the catheterization. Even in the unconscious patient, watching the face may still indicate when the balloon is inflated wrongly in the urethra.

Is it tidal or continuous drainage?

Tidal drainage means that the catheter is blocked and only opened for urinary drainage after which it is blocked again. A spigot is usually used for the purpose of blocking the catheter and the catheter is said to be spigotted. For continuous drainage, the catheter is connected to a urine bag. Urine from the bladder drains continuously through the catheter to the urine bag, which is then emptied from time to time. Continuous drainage is usually preferred for situations when the patient needs to rest, for example if the indication for catheterization is excessive, disturbing urinary frequency, or there is a need to rest the urinary bladder like in the presence of a leaking suprapubic cystostomy wound or a diabetic in chronic retention of urine.

What should be the duration of catheterisation?

The patient should be catheterized for as long as the indication for catheterization

still exists. If this period is going to exceed one month, the catheter should be changed at the end of one month as previously described depending on the type of catheter material.

Failed urethral catheterisation

If all efforts to catheterize the urethra fail, one should review the situation by answering the following questions:

1. Catheter size: is the catheter too big or too small?
2. Urethral anesthesia: Is the urethra adequately anaesthetised or is the patient having pain? If the patient is having pain, he becomes uncooperative, tightens his external urethral sphincter while straining and makes it impossible for the catheter to go beyond the external sphincter. It will just be like trying to pass through a locked gate!
3. Is lubrication adequate? If the lubrication is inadequate, there will be a lot of friction between the catheter and the urethral mucosa. The catheter will tend to coil up in the urethra and cannot be advanced into the urinary bladder.
4. Is your patient relaxed? Sometimes every other thing appears to be alright but the patient is very tense and anxious leading to closure of the external urethral sphincter. Encouraging such patients to be taking deep breaths in and out may help to relax the external sphincter. Asking the patient to try to void may relax the external sphincter and the catheter can then be introduced at that moment beyond the external sphincter into the urinary bladder. Distracting the patient's attention by discussing a different topic may help occasionally but at such times the patient's attention tends to be fixated on the procedure.

If all these maneuvers fail, one should attempt mounting the catheter on an

introducer and if this also fails, one should leave the urethra alone and perform a suprapubic cystostomy and thereafter perform a retrograde urethrogram to identify the nature of the urethral obstruction that made the urethral catheterization impossible.

Complications of urethral catheterisation

All the possible complications of urethral catheterization are preventable and include:

1. Gram-negative septicemia: This can be prevented by making sure that you do not catheterize an infected urethra. Purulent urethral discharge is an absolute contraindication to urethral instrumentation including urethral catheterization. Catheterizing an infected urethra milks the pus in the urethra directly into the periurethral venous plexus leading to pyaemia and gram negative septicemia. This manifests with shivering and severe drop in the blood pressure progressing to shock. One should set up an intravenous line of normal saline to run as fast as possible and give intravenous gentamycin 280mg or any other intravenous antibiotic known to be active against gram-negative bacteria, which is immediately available.
2. Retained urethral catheter. This is managed as previously described.^{1,3}
3. Urethral rupture. Leave the urethra alone and perform a suprapubic urinary diversion. Refer to a urologist thereafter.
4. Urinary tract infection. Give appropriate antibiotics.
5. Urethritis. Give appropriate antibiotics.
6. Bladder calculus. Refer to a urologist.
7. Epididymitis. Give appropriate antibiotics.
8. Carcinoma of the bladder.

References

1. Shapiro A. J, Soderdahl D. W, Stack I. S, North jr J. H. Managing the non-deflating urethral catheter. *J Am Board Fam Pract* 2000; 13: 116-119.
2. Stephens R, Mythen M, Kallis P, Davies D. W. L. Egner W, Rickards A. Two episodes of life-threatening anaphylaxis in the same patient to a chlorhexidine-coated central venous catheter. *Br J Anaesth* 2001; 87: 306-308.
3. Adebamowo C. A, Okeke L. I. The retained urinary catheter. *Trop Geogr Med* 1993; 45:186-188.