URETHRAL DILATATION

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J.Talati (Department of Surgery, Aga Khan University of Health Sciences, Karachi.)

The Anatomy of the Urethra

The female urethra is relatively short and straight and allows the easy passage of a catheter or dilator. The male urethra in contrast is long and curved, and the membranous urethra does not meet the spongy urethra end on; it is almost as if the end of the membranous urethra has been anastomosed to the side of the spongy urethra. (This is the undoing of many a dilatation). The sigmoid curve of the male urethra necessitates the use of a special maneuvre during dilatation. The male urethra is 8 - 9 mm in diameter. The external meatus is 8 mm in size, but normally appears as a vertical slit. The portion of the urethra immediately behind it, in the glans, is 10 — 11 mm in diameter. This fusiform dilatation, the fossa navicularis, has folds of mucosa which form blind pockets in its roof, and could arrest a dilator tip passed upwards. The coronal extremity of the fossa is again narrow. The pendulous urethra in the corpus spongiosum is 9—10 mm in diameter and contains blind pockets similar to those in the fossa navicularis. The bulbous urethra situated at the proximal end of the corpus spongiosum is 11—12 mm in diameter. The membranous urethra is 9 mm in diameter, short in length (1.5—2.0) and fixed. Surrounded by the external sphincter, it acts as a fulcrum during dilatation. It is particularly vulnerable to stricture formation. The prostatic urethra 5.5 cm long is again fusiform and wide. The blind prostatic utricle (the remnant of the Mullerian duct in the male) and the ejaculatory ducts open posteriorly on the verumontanum. They pose no problem during dilatation. The mucosa of the urethra is surrounded by the thin submucosal layer, which, in turn, is surrounded by the very vascular corpus spongiosum and glans. This intimate relation to the blood spaces is responsible for the ease with which bacteria can enter the blood stream during a traumatic dilatation. In fact, the conimonest cause of bacteraemia and septic shock is probably urethral instrumentation or catheterisation.

Radiological Anatomy

The urethra can be delineated by retrograde urethrography in which dye is injected through a Foley catheter placed in the distal urethra. In this procedure inflation of the balloon of the catheter in the fossa navicularis helps prevent escape of dye at the meatus. Alternatively an antegrade urethrogram can be obtained by radiography during voiding of a dye-filled bladder in the last stages of an i.v. urogram. The membranous urethra shows up as a constriction on the urethrogram and this should not be mistaken for a stricture. If local anaesthesia is not used the spasm of the external sphincter will prevent dye progressing further proximally in a retrograde examination and lead to an erroneous diagnosis of a stricture. A detailed study of the conical termination of the bulb in a dynamic retrograde urethrogram (taken during injection of dye) is helpful in delineating strictures.[11]

Indications for dilatation

1. The commonest indication for dilatation is a stricture of the urethra.
2. Occasionally dilatation is done prior to the passage of a large instrument such as a lithotrite or resectoscope through the urethra.
3. Dilatation in females has a therapeutic effect in non-specific trigonitis and the urethral syndrome, even in the absence of unequivocal proof of a stricture.
4. The passage of dilators with a conically bulbous tip (bougie-a-boule) may be used to calibrate the urethra.
5. The dilator is used at times to delineate the urethra just prior to doing a diverting urethrotomy, as is occasionally done in hypospadius repairs.

Optical Urethrotomy as an alternative to dilatation in the primary treatment of stricture.

Whilst it is appropriate to recommend that all strictures be treated by optical internal urethrotomy, this

is not economically feasible in Pakistan where blind dilatation with sounds will continue to remain the main technique. (A dilatation at a private hospital in Karachi costs anywhere betweenT Rs. 75/- to 300/—). Perhaps Optical urethrotomy should be reserved for the tight strictures which are difficult to dilate.[10]

Preoperative assessment

Usually a careful correlation of the past history with obstructive symptoms and the age of the patient is adequate to establish the need for dilatation on clinical grounds. A urethrogram may be helpful in confirming the presence of a stricture, determining its characteristics and deciding whether dilatation would be suitable.

Contraindications to dilatation

1. Repeated dilatation is contraindicated in children because of the need for general anaesthesia, and refractoriness of the stricture[1,13,14].
2. Urethral dilation should not be persevered within adults who need frequent (an established frequency greater than once in 3 months) and painful dilatations in those who need dilatations with filiform bougies and in those in whom urinary tract infection cannot be eradicated.
3. Complicated strictures associated with fistulae usually need some form of urethroplasty, although dilatation may be tried in selected cases[2].
4. Urethral dilatation should be avoided in urinary infection especially in acute urethral infections.
5. In acute retention, it is preferable to avoid dilatation in all but the simplest cases and one should relieve retention by suprapubic puncture.

Types of 'Blind' dilators

Metal Clutton, lAster and Millin
(Millin not recommended except in expert hands).
Gum Elastic-Gum Elastic bougies Fiiform bougies

The prepared trolly for dilatation

The equipment needed for dilatation is simple and can easily be accommodated on the top of a Mayo's stand. As with catheterisation, a pre-sterilised pack is of value. This will be double wrapped, and autoclaved and will contain:

- A set of dilators;
- Two gallipots, or small bowls; one for the lubricant, one for savlon;
- A glass syringe with luer lock, and needle; the barrel and piston should be individually wrapped;
- A cleaning forceps (or sponge holder), gauze square and cotton wool balls.
- Two sterile towels

In addition, an assistant will need to hand out the gloves, Savlon, a 10 cc syringe lignocaine solution and lubricant.

Technique of dilatation

The easiest position for dilatation is the supine position described for urethral catheterisation[3]. The patient is prepared and draped as previously described. Patient reassurance and relaxation are of great help. I routinely use local anaesthesia but no sedation. 4-10 cc of 4 percent hgnocaine solution are instilled into the urethra with the tip of a 10 cc syringe and retained there for minutes by pinching of the external meatus. I would not hesitate to use general anaesthesia in the apprehensive patient who struggles and lifts his buttocks off the table during dilatation. Over the past 15 years, I have used general anaesthesia in less than 5% of cases. The operator stands on the right side of the patient and grasps the penis wrapped in sterile gauze in his left hand. The first dilator to be used is of size 6/9 '(English gauge) or 1 6(French gauge). This has a bulbous blunt tip and its weight often automatically dilates a urethral stricture. If this does not succeed, progressively thinner dilators are used, using greater care as the sharp point of the smaller sized dilators can easily traumatise the urethra. The dilator is passed beak down (towards the floor of the urethra), till it is arrested, then a rapid rotatory movement

away from the operator is used to bring the dilator around, 180 degrees, so that the tip now points towards the roof of the urethra, and at the same time the handle of the dilator is depressed. The dilator easily enters the bladder by this maneuvre. After leaving the dilator in for a few seconds, to allow elastic tissue to elongate and bundles of collagen to slip over each other and widen the urethra, the next dilator, one number up, is used proceeding gradually to size 9/12 E or 22Fr.

The gauges

The French system of marking dilator size appears to be a rational one. Size 18 Fr. indicates that the circumference of the dilator is 18mm. The English system' indicates the relative sizes of the tip and shaft (7/10) and not the circumference in mm. There is little to choose between various dilators Clutton or Listers and it is a question of personal preference and availability. (The Mum bougies should only be handled by experts. Starting on a fine metal tip, the bougie expands to a size 18 Fr. at its shaft. The tip can be grossly traumatic in inexperienced hands).

Dilatation with filifoun guide and bougies

Filiform bougies are fine (3 Ch.) gum elastic bougies. They may have a straight, curved or spiral tip. Their other end receives dilators of varying sizes which may be screwed on. When successful, filiform dilators allow a very gentle, atraumatic dilatation, but I have found their use limited to relatively easy strictures of the distal penile urethra. Because they are soft and thin, it is difficult to negotiate them through strictures in the region of the bulb. The technique involves passage of a filiform upto the point where it arrests in the urethra. This is followed by a second one, passed beside it. If this also fails to fmd the strictured passage and reach the bladder, a third and successive filiforms are passed until one ultimately enters the bladder. To this filiform, progressively increasing sizes of followers are attached. A word of caution: the dilators are imported, made of gumelastic, and do not withstand environmental temperatures easily. They stiffen with time, and may fragment in the bladder, necessitating endoscopic removal.

Dilatation using various sizes of cystoscopic sheaths.

The general armamentarium of a urological unit in a hospital is likely to include at least two sizes of cystourethroscope sheaths. It is common practice to use a finer sheath when examining for, say, hematuria in the older (prostate) age group, and a larger sheath when performing retrogrades bilaterally. Thus the 17 and 21 Fr. sheaths are often both available . These could be used to advantage in urethral dilatation, introducing first the smaller and then the larger sheath under direct vision.

Bapats endoscopic urethral dilator

Bapat from Pune (Poona, India) has designed an ingenious dilator. Similar to cystourethroscope sheath in other respects the tip is infolded towards the centre so as to provide a semblance of a blunt end. Readers are referred to his interesting article[9].

Lubrication - a must

The passage of a dilator or dilating instru. ment is greatly facilitated by adequate lubrication. In the past we have used sterilised liquid paraffin and this remains the cheapest and the most easily available lubricant. Increasing evidence appears to point to paraffm as a cause of stricture itself, through the production of oleogranulomas. K Y Jelly is an adequate substitute, and although available in India at low cost it is not manufactured here. Its advantage is that it is water soluble, and can be mixed with lignocaine. The anaesthetic lubricating jeffies Novesine and Xylotox, are not always available.

Complications

Bleeding per urethram, ranging from a slight pink stain on the dilator to torrential hemorrhage is one of the commonest complications of dilatation. The cause could be a simple tear at the site of the stricture, occurring from too rapid a dilatation or an actual penetration of the spongy urethra, or prostate with a resultant false passage. Bleeding can be prevented by gentle handling. Occasionally severe trauma to the prostate may occur, necessitating transurethral resection down to the false passage. Transient baceraemia probably occurs in every urethral dilatation. Sometimes the enmasse introduction of a large number of bacteria into the blood stream (their multiplication there, and subsequent death) with release

of their endotoxins, could result in septicemic shock and even death. One should therefore avoid dilatation in a patient with grossly infected urethra. In every case where bleeding occurs, one should be on the lookout for septicaemia with a drop in blood pressure. This is specially common in seriously ill or old patients. Epididymitis could occur as a result of infection introduced through the urethra. Sudden absorption of large amounts of local anaesthetic could cause drug-related problems.

Post-dilatation Care

Following dilatation we keep the patient at the clinic or hospital for half to one hour and ensure that he has an escort to take him home. If excess bleeding or rigors occur, the urethra is traumatised or there is a significant amount of pus on the dilator, one should consider admitting the patient overnight. Excessive bleeding can be controlled by pressure on the perineum, but this may be followed later by retention once the patient goes home. It is wiser to catheterise such a patient for a few days.

Antibiotic prophylaxis

Should antibiotics be used prophylactically? The urethra is never sterile and we do not lavage with antiseptic fluid prior to dilatation. In a simple repeat dilatation, which is usually atraumatic, an antibiotic is not necessary. If the urethra is infected, pus is seen on the dilator on withdrawal, the urethra is traumatised or the patient has a past history of chills after dilatation, an antibiotic should be used. After dilatation, if the need for catheterisation is felt, it is often difficult to introduce a soft, Foley catheter unless it is supported on a guide. Boxer[15] has devised an ingenious catheter. This is a Foley catheter with a reinforced tip with a hole in it. Through the length of the catheter and out at the tip, a long filiform follower is inserted. A fthform is first inserted into the bladder, then the catheter—follower unit is screwed on, and the entire unit pushed into the bladder. The Foley balloon is inflated and the filiform and follower are pulled out leaving the catheter in.

How frequently should one dilate a stricture ?

The frequency of dilatation is adjusted policy is to repeat dilatation first at 2—6 weeks, and then at intervals of 8-12 weeks, for a year. Following this 6 monthly dilatation is advised. Patient compliance is variable and there are many defaulters.

Hospital vs. Office and Inpatient vs. Outpatient Dilatation.

Patients dilated under local anaesthesia do not need admission . Admission to a day care area or a ward will be necessary for patients dilated under general anaesthesia. Easy dilatations may be done in. the doctors office, but when problems are expected, and in the aged or poor risk patients a hospital setting should be used so that transfer to a ward is possible.

Conclusion

Expert bougienage (dilatation) is becoming a lost art in many of the technologically advanced countries. Whilst optical urethrotomy often tempts us with its magnificent view and precision, the expenses involved restrict its use to specialised units. Strictures will, for the next decade, have to be treated by general surgeons, working often in far flung areas with no technological support. Here the bougie, well tried and trusted will be his best friend. The bougie has been found in the tombs of the Pharoahs[4] and till today, there is no safer, more reliable or cheaper method than expert, regular, gentle dilatation. [5] Our efforts should also concentrate on eliminating the need for dilatation. The eradication of gonorrhoea wifi leave us two problems to tackle; the iatrogenic strictures and trauma. The increasing use of transurethral resection will bring in its wake difficult strictures. Catheters and lubricants bought at reduced prices, may because of surface toxic products lead to strictures. [6-8]. Care and concern about these matters will' keep the incidence of strictures at a low level.

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