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THE URETHROSCOPE IN THE TREATMENT OF STRICTURE *

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MY contribution is a plea for wider recognition of the value of the urethroscope in the diagnosis and treatment of fibrous stricture of the urethra.

In acute gonorrhœa use of the urethroscope is limited to searching for the cause of a discharge excessively prolonged, or of a relapse after cessation of treatment, and in a small number of cases appropriate treatment can be applied through this instrument. I do not think it is generally known that the situation of an obstruction of the urethra, its character, and its permeability can be investigated properly only by urethroscopy, and also that almost all cases of stricture which are impermeable by the blind method of dilatation can be successfully dilated through the urethroscope.

Out of 250 cases of stricture which I have treated in the last few years, fifty were men whom I dilated through the urethroscope after they had been sent to me because all attempts to penetrate the stricture by the ordinary methods of dilatation had failed.

In describing the employment of urethroscopy in fibrous contraction of the urethra, it will be necessary for me to refer briefly to my urethroscope and the accessory instruments.

The endoscope is "Luy's" pattern, except that it has, in place of a flat plate, a hollow, conical projection for attachment to the body of the instrument by taper fit. There is an upright pin on the flange to engage in the slot cut in the base of the body, in order that the lamp stem may lie evenly in the groove of the endoscope. The upper end of the body accommodates the examination lens or operating lens, which are removable. The

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first is a simple convex lens, for examination purposes only, and it is exchanged for the operating lens when treatment through the urethroscope is necessary. The operating lens is perforated midway between the centre and the circumference by a short metal tube, threaded on its upper end to take a cap which encloses a rubber washer. This washer is just large enough to admit the copper probe and stems of the urethroscope knives, and is lubricated with a spot of Lubafax to ensure easy movement. The probe can be passed down through the lens when the body is in position, but the body must be removed for the urethrotome knives to be passed through from underneath. A small handle with a set-screw is then fastened on the upper end of the knife or probe, the set-screw being placed on the right hand in order not to obstruct the view. The position of the operating lens in the body is correct when the perforation is between the attachment for the lead and the air tube.

So far the only difference between my instrument and any other later patterns lies in the arrangement for operating measures. An operating mechanism is found in them all, but the perforated lens affords a better means of passing a filiform bougie through a stricture than other types do. Dilatation of stricture through the urethroscope is an adoption of the well-known method of using a fine bougie as a guide for a larger dilator. With the urethroscope we have the advantage of being able to pass the filiform under direct vision, and after removal of the urethroscope the filiform remains as a pilot for a larger instrument.

An important accessory for this operation is the guide tube. It is a tube 13 cm. in length, which is passed down through the operating lens. Its purpose is to act as a channel for the filiform pilot, which otherwise could not be directed into the stricture. At its upper end is a screw cap, enclosing a perforated rubber washer. Its lower end is cut off obliquely and has a slight bend, so that the end of the pilot can be brought into view.

The instruments I employ are divided into two classes, pilots and dilators. The pilots are made in two lengths, 19 to 22 inches and 12 inches. The long pilots are either whalebone or gum elastic, and the diameter is about the size of a No. 4 French catheter. The shorter ones are the smallest possible diameter in whalebone, and are olive

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ended. They were originally intended to be used in numbers for packing the urethra, each one in turn being pushed down on the chance of finding the opening through the stricture.

As for the dilators, I have adopted or modified certain instruments, and have devised others which are more particularly adapted for the purpose in view. Teevan's silver catheter is especially suitable, as the pilot is threaded through it. It is generally made in No. 6 English, but so long as the point is kept to a diameter which just admits a pilot the shaft of the instrument can be increased to any size. The pilot for this instrument should possess a certain amount of rigidity, and I use a whalebone filiform or a fairly stiff ureteral bougie, the point of which is less likely to be caught up in the deep urethra.

The Fenwick instrument consists of a metal dilator, into which the end of a fine gum-elastic pilot is screwed. The threaded end of the pilot has been specially reduced in diameter in order that it may pass down through the guide tube. There is one objection to the use of this instrument, the weak point being the junction of the filiform with the metal end, as it is apt to bend acutely and the metal end may be forced into the urethral mucosa when it is passed down, and with repeated use this junction may become weakened and break. The rounded end of the catheter also is somewhat large and may not pass easily through a very small stricture. I do not use the Fenwick instrument very frequently, and only in those cases where the rigid pilot is obstructed in the deep urethra. I have devised two dilators for use with the short olivary whalebone pilots, one being metal and the other gum elastic. They have a special kind of device for attachment to the pilot. It consists of a perforated tapered metal collar, which screws on to the end of the dilator. Inside the collar is a metal chuck with three jaws. The end of the filiform is pushed up into the collar, which has previously been unscrewed for a few turns. The end engages in the chuck, and as the collar is screwed back on the dilator the jaws of the chuck are compressed, thus firmly gripping the end of the filiform.

You will see that this method of attachment is perfectly secure—no amount of force short of breaking the filiform

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can detach it. The great advantage of this instrument is that the pilot is reduced to a very small diameter, and thus is much more likely to pass through a small stricture. The metal dilator for this pilot is slightly curved and is hollow, and is made in two sizes. Great care must be taken with all these pilots to see that they have not perished in any way, and that the attachment is perfectly secure before passing the dilator in the bladder.

Another dilator which I have lately taken into use is a straight instrument, slightly longer than the ordinary anterior urethral dilator. Its lower end is tapered, and it is bored to allow the passage of the long filiform pilot.

TYPE OF CASE IN WHICH THIS METHOD OF PENETRATION OF STRICTURE IS APPLICABLE

As a student I was taught that in all cases of retention the first instrument to be used should be one of moderately large calibre, 8 or 9 English. This rough-and-ready rule is not sound. It is of the greatest importance to find out from the patient something about the size of the stream before retention took place. If the stricture has been of long standing and the stream has gradually and continually diminished to a very fine flow, the obstruction must have progressed to a considerable degree, and an instrument of a comparatively large size can only pass through it by force and chance. Fibrous tissue is rigid and resistant, and the healthy tissue at the side of the stricture will give way before the stricture does, and, especially if a metal instrument is used, the operator may make a false passage, and then enter the urethra beyond the stricture. Many cases of retention are relieved in this way, but as soon as the catheter is withdrawn and the bladder fills up again the stream is no larger than before. Recently I have had a case where the patient had been dilated day after day through a false passage, but, of course, without any lasting effect on the size of the stream. In time a portion of the false passage may become lined with epithelium to some extent, but if left alone it soon closes up. Most cases of stricture are quite straightforward and present no difficulty to dilatation either by rigid or flexible bougies, and it is only when the stricture is impermeable that I suggest operation through the urethroscope. Almost always the men are suffering

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from retention of urine, and are in hospital after many attempts at catheterisation have been made, either with or without a general anæsthetic. The urethroscope reveals that the mucosa has been damaged by unsuccessful attempts to dilate the stricture, and sometimes there are false passages extending beyond the stricture opening, making it impossible to guide anything into the bladder. In these cases, if the patient is quite unable to pass urine, retention must be relieved by suprapubic puncture until the urethra has recovered to a sufficient extent to make urethroscopy safe.

Obstruction of the urethra is rarely absolute, retention being caused by rapid filling of the bladder and temporary closing of the stricture through congestion or spasm, so that after the bladder is emptied by suprapubic puncture the patient will be able to pass urine, although the stream may be very small.

At this stage one must proceed very cautiously to try and ascertain what damage has been done. If the damage is slight, the search for the stricture opening can be prolonged. If there is much bleeding and the opening cannot be seen, further attempts must be delayed for a week or more. The treatment in the meanwhile depends entirely on the patient's condition. If he can pass urine, even although the stream is small, this delay will not make him any worse. If retention occurs again, the bladder may be emptied by aspiration, or by a small catheter tied in a suprapubic opening. During this period of waiting, the urethra is irrigated daily and, if necessary, gradually dilated down to the obstruction until the 48 endoscope can be passed without much difficulty. The majority of cases can be dealt with in about a week or a fortnight, but I have records of some patients where I have had to wait for three or four weeks.

The actual technique is as follows. The largest endoscope which the meatus will admit is passed down to the obstruction. The inside of the endoscope is then swabbed dry and the amount of bleeding ascertained. Sometimes a swab of adrenalin will stop the bleeding, but if it continues to the extent of filling the field it is advisable to postpone further measures until the conditions are favourable.

Generally the urethroscopic field shows an opening through more or less dense fibrous tissue, but often the

detection of the real passage may be exceedingly difficult. There may be old or recent false passages, and there may be depressions in the stricture, any one of which may look like the real opening. The stricture may spread itself entirely across the lumen of the urethra like a dead white floor, without at first showing any sign of an opening whatsoever. The true opening may not be through the floor at all, and it can only be seen by withdrawing the urethroscope, when it appears like a hole in the wall of a well.

The opening recognised, the position is carefully noted, and I proceed as follows: The body of the urethroscope is removed and the examination lens is changed for the operating lens, into which the guide tube has been inserted. The lens must be fitted in the correct position to the observer's right hand, so that the guide tube, when it is passed down, will just clear the lamp stem. The guide tube, with a filiform in position, is then passed down through the lens, but not to its full extent. The filiform should project about 1 to $1\frac{1}{2}$ inches below the end of the guide tube, and it is directed into the stricture by movement of the guide tube, and as soon as the tip is engaged the guide tube is pushed down to its limit to ensure that the portion of the filiform not controlled by the guide tube is as short as possible in order to prevent bending. Usually the pilot passes on easily into the bladder, but sometimes the point is caught up further down the urethra. If so, the filiform should be removed and a slight bend given to the tip. If this fails, then the gum elastic pilot may be used. When the filiform has been passed into the bladder, leaving about 9 inches outside the urethra, the screw cap and washer at the end of the guide tube are removed to allow the easy withdrawal of the urethroscope without causing traction on the filiform. If the semi-rigid pilot has been used, it is threaded through the Teevan's dilator; if the soft filiform with a threaded end, the Fenwick's instrument is screwed on to it. The dilator is then passed carefully down the urethra. Very rarely is there any difficulty at this stage, but once or twice it has been necessary to change the pilot for one that can be attached to a urethrotome in order to divide the stricture.

In a few cases it is necessary to divide a fibrous band with a urethroscopic knife, but it is important to re-

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member that when this is done the supply of air must always be turned off in order to prevent air embolism. In all operations through the urethroscope with full air distension the danger of air embolism is present, especially in those cases where the mucosa has recently been damaged. Air may pass into the veins of the penis, its upward journey through the inferior vena cava to the heart is rapid, and a sufficient volume will stop the heart's action, or pass through the heart into the lungs.

I have had four cases where the patient has suddenly alarmed us by gasping, complaining of tight feeling in the region of the heart, rapidly becoming unconscious, with almost complete cessation of breathing. This was in the early days ; it has not occurred in the last few years, but the danger of air embolism is always present in my mind. If a large quantity of air is allowed to escape very rapidly from the bellows, an outlet must be found for it, and if it cannot escape out of the urethra or into the bladder, it must pass into the tissues. My assistant keeps control of the supply of air from the bellows by pressure between his finger and thumb on the rubber tube, and only allows it to pass along under my direction.

I have never had a fatality due to air embolism, but two deaths have occurred, one case being a man who came up for an examination for stricture. I passed the endoscope down the urethra for about an inch, when its progress was obstructed. There was no bleeding, and I had just time to see a dense stricture and to show it to a friend, when the man suddenly died, the whole operation not having taken more than five minutes. Post-mortem I found this was the only stricture, the bladder was greatly hypertrophied, the ureters were widely dilated, the pelves of the kidney were enormously enlarged, and the cortex much diminished. I think in this case death was due to either shock by the insertion of the endoscope, or to shock by rapid air distension of the ureters and kidneys. One other death took place under an anæsthetic, and there was no evidence in this case that death was due to the operation. Surgical emphysema has occurred on one occasion, emphysema in the superficial fascia extending over the whole anterior wall of the body up to the neck.

In the last five or six years I have had no anxiety,

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because I have learned to take greater precautions. I always use a local anæsthetic in preference to general anæsthesia. If the patient is under a general anæsthetic the earliest signs of air embolism may not be recognised in time.

It is not to be expected that this operation is invariably easy or successful. Occasionally one comes across a case where the whole urethra is strictured, and it is impossible at first to get anything through, and much patience is required in gradually dilating the urethra. Occasionally, too, urethral calculus is a complete obstacle to penetration, and I would emphasise that the patient's general condition must always be taken into consideration before submitting him to urethroscopy.