DISCUSSION ON LOWER URINARY OBSTRUCTION*

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My contribution to this discussion is concerned with obstructions in the anterior urethra: they are not very common, but because we are so often concerned with congenital obstructions of the posterior urethra and of the bladder neck there is a tendency to overlook anything between the external meatus and the external sphincter. I shall not comment on meatal stenosis which is well known to us all, save to remark that a useless meatotomy had been performed on several of my cases where the obstruction was actually placed much further back, and it is clear that meatal stenosis is sometimes diagnosed without justification and without adequate investigation.

The first group of anterior obstructions to be considered are the 'obliterations' in which the whole urethra is atretic and without lumen over a considerable length. Two cases of absent abdominal muscles in my series had complete obliteration of the urethra, and of course a severe upper tract dilatation leading to death in the neonatal period: these very serious cases are in much the same situation as the posterior urethral valve cases discussed by Rickham. Of more immediate surgical interest are the partial obliterations of which the following case is an example. A boy of 10 months had never thrived and had suffered recurrent pyrexia with urinary infection. An intermittent very fine jet of urine had been seen to emerge from a tiny sinus in the perineum. The bladder was distended and an intravenous pyelogram showed advanced upper tract dilatation. On attempted instrumentation and later exploration, it was found that almost the whole of the urethra in front of the bulb was atretic with a minute lumen lost altogether at times, while the sinus in the perineum led to the dilated posterior urethra. A skin tunnel was brought up to the dilated segment; bladder emptying is now satisfactory, but the ultimate prognosis cannot be good.

Perhaps the most interesting group of anterior urethral obstructions comprises the congenital

diverticula and the anterior urethral valves. These are not always distinguishable, as may become clear if we review a series of six children whom I have treated.

We may first look at the voiding urethrogram of a boy of 2 years with what seems to be a diverticulum (Fig. 1a); it is perhaps more of a saccular dilatation, the margin between the diverticulum and urethral lumen being sharply defined only at the distal end. Here there is a valvular effect, for as the diverticulum fills, the urethra is compressed from without and the voiding stream is, therefore, very thin. The 'neck of the sac' is very long, however, and the proximal margin is not so definite, and reaching up to it is the dilated obstructed urethra.

In what we call anterior urethral valve there is no true diverticulum formed, but the sudden point of narrowing is similar; again there is a length of saccular dilatation, although much less severe, which is faintly demarcated from the normal, though obstructed, urethra proximally.

If at operation through a midline ventral incision in the penis and scrotum, we open only the diverticulum, the appearance is shown in Fig. 2a: the sharp edge is the distal valvular margin of the diverticulum. The urethral lumen beyond it is not narrowed to the passage of sounds, it only becomes compressed by the distended diverticulum. If, however, we make the incision through a greater length of the urethra, opening up the channel distal to the diverticulum, we then have the appearance in Fig. 2b. The sharp valvular edge has been cut across in the midline and opened out: it therefore shows as a ridge on either side. Following the ridges around to the dorsal wall of the urethra, they unite in the midline.

This ridge was the same in all six cases: though the saccular or diverticular element in the proximal dilatation was more evident in three. The ridge was never a high mucosal flap: rather it was a hard demarcation between the normal urethra and the weak bulging area behind it. Histological examination had little to add to this picture of the clinical pathology.

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FIG. 1a.—Micturating cysto-urethrogram in a boy aged 4 years with anterior urethral diverticulum.

FIG. 1b.—Postoperative urethrograms, two years after treatment.

The youngest child presented at 4 days, four more during the first three years, and one only came up as late as 12 years. The complaints were characteristic of lower urinary obstruction, i.e. dribbling incontinence from a distended overflowing bladder. Upper tract dilatation was present in four, markedly

asymmetrical in three, because one ureter allowed reflux which the other did not. Urinary infection was present in two. The blood urea in the newborn infant was up to 150 mg./100 ml. on admission, but fell rapidly with drainage, and in none was the renal damage as severe as is common in posterior

FIG. 2a.—Diagrammatic view of the diverticulum of the anterior urethra opened by a midline perineal incision.

FIG. 2b.—The appearance of diverticulum or valve cases when the urethra distal to the lesion is laid open through the same incision

urethral valves. In the older children difficult micturition and evident straining were features, and in two a swelling could be seen in the perineum during attempts to micturate. The diagnosis may be established by a micturating or expression urethrogram, and is confirmed by endoscopy when the sharp valvular ridge is easily seen. It is only necessary to be on the look out for the condition to recognize it.

In one of the early cases I made the mistake of thinking the obstruction was a mucosal valve which had only to be cut to eliminate the obstruction. The description which I have given of the pathology makes it clear, however, that this is an incorrect approach. The ridge must not only be interrupted, but its ring must be widened, while the saccular dilatation must be narrowed down. I have, therefore, treated subsequent cases as in Johanson's operation for stricture (Johanson, 1953): the urethra was opened out and the mucosa was stitched to the skin at the first stage. Skin was added to the urethral strip at the level of the valve at the second stage, while further back some of the redundant mucosa was excised. The postoperative condition is illustrated in Fig. 1b.

In the six cases described, the lesion was at the level of the peno-scrotal junction: another diverticulum, however, presented at the end of the penis in a newborn child. As soon as pressure was made on the distended bladder, the swelling appeared and a thin stream only of urine emerged from the external meatus. On exploration there was no definite distal obstruction, the distal urethral wall seemed simply to be extremely lax until it entered the glans penis when some narrowing was inevitable. This apparently rather innocent lesion was associated with very advanced dilatation of the upper urinary tract with kidneys already largely destroyed at birth, and the child succumbed on the seventh day of life, despite bladder drainage.

The weakness of the urethral wall was the striking abnormality here, and perhaps the cases of megalo-penis are examples of the same malady carried a stage further. Here the whole anterior urethra is enormously capacious and the overlying skin redundant (Fig. 3), but the corpora cavernosa are not seriously abnormal. The skin and redundant anterior urethra were cut down to size and now, three years later, the penis of this boy appears almost normal. He also suffered from urinary obstruction and required a bladder neck Y-V plasty.

Going on now to the true strictures, trauma seems to be the commonest cause and, regrettably, urological instrumentation is a cause of trauma. In the child, the narrowest part of the urethra, apart

FIG. 3.—Megalo-penis in a boy aged 4 weeks.

from the external meatus, is in the region of the peno-scrotal junction: it is here that instruments stick if they are too big, and here that strictures occur if too much force is used or if a tight catheter is left in. A pull should never, of course, be put on a catheter in a child in the treatment of rupture of the membranous urethra, unless a perineal urethrostomy is employed to short-circuit the distal urethra. By contrast, instrumental strictures in the adult are often seen much further back in the bulb.

I have studied five cases of instrumental stricture in children, due to my own or someone else's misdeeds. The salient features were these: the onset of obstruction was insidious and might not become serious until two or three years after the injury. The symptoms were, of course, similar to those due to the original obstruction, and it was at first thought that treatment of the bladder neck had been inadequate. The stricture was always soft and often so easily dilated that one might be in doubt of its existence: it is difficult to know whether one is simply dealing with a naturally small urethra or with a true stricture. Even endoscopy may give no definite lead after a dilatation has been performed. The expression or voiding cystogram was a very poor way of demonstrating the presence of a stricture; whereas

FIG. 4.—Viscous medium urethrogram showing a stricture at the peno-scrotal junction.

the injection urethrogram using a viscous medium showed it well (Fig. 4). These last two points are of great importance, since in so many posterior urethral obstructions the expression cystogram performed after catheterization is the best method of demonstration, and this may be misleading in a stricture case.

Strictures in the bulb are often due to urethral rupture, partial or complete, due to falls astride. Strictures of unknown origin are also found at this level: two of my cases had an appearance characteristic of traumatic stricture, but no history whatever of trauma. One of these was again a very soft stricture, which was so readily dilated by instruments that I overlooked it on the first examination: there is always the danger that we concentrate too much on the study of the bladder neck, expecting to find a congenital abnormality. Stricture in one case followed an attack of retention due to impaction of the urethra with sulphamerazine crystals: a disorder which now, happily, seems to have disappeared. Operative treatment for all these strictures has followed the general principles introduced by Johanson of introducing healthy skin into the urethral circumference by a two-stage procedure. In the penile and peno-scrotal cases, the original operative method has been used and has given excellent results. In the bulb, the method of Hamilton Stewart was used for one (Stewart, 1960), the others were treated with greater satisfaction by

Turner-Warwick's (1962) modification. The essential of this procedure is drawing back the posterior part of the scrotum as a single broad flap: a sagittal opening is then made within this flap and its margins stitched to the opened-out urethral strip. Gossamer nylon sutures are used, which, although they require to be taken out under anaesthesia, cause none of the reaction one sees around cat-gut, and healing is thereby facilitated.

In the second stage I have found it better not to follow the original Denis Browne principle of burying an open strip: if this is done, the urethra at the level of repair often becomes too big and lax. Urine is held up in the dilated area and dribbles out after micturition, causing considerable discomfort. It is better to decide how much skin should be included to make a full calibre urethra and then to close it as a tube. In the bulb, the bulbo-spongiosus muscle should also be reconstituted so that it can perform its normal function.

In addition to these remarks about the anterior urethra, my part in this discussion must contain reference to one posterior urethral lesion: that described by Bodian (1957) as urethral fibroelastosis and believed to be the cause of 'Marion's disease'. The lesion consists of a change in the developing prostatic tissue, and a sheath of fibroelastic tissue surrounds the entire posterior urethra from the bladder neck to the bulb below. The bladder neck muscle hypertrophy then appears to be secondary and part of the general detrusor reaction to obstruction to the free outflow of urine. The pathological evidence for this lesion in post-mortem material from some male infants dying of severe lower urinary tract obstruction is incontrovertible; the difficulty is in relating these findings to clinical observation. Biopsy specimens may be taken from the ventral wall of the posterior urethra during Y-V plasty, but the bulk of the fibroelastosis is in the dorsal wall and equivocal results may be obtained. In only two cases have I secured adequate cysto-urethrograms in cases subsequently proved to be examples of this lesion; in neither was there an appearance entirely characteristic of bladder neck obstruction as ordinarily recognized; rather there was a tapering dilatation of the posterior urethra. In typical bladder neck obstructions biopsies have been negative or doubtful.

REFERENCES

- Bodian, M. (1957). Some observations on the pathology of congenital 'idiopathic bladder-neck obstruction' (Marion's disease). *Brit. J. Urol.*, 29, 393.
- Johanson, B. (1953). Reconstruction of the male urethra in strictures. In *Modern Trends in Urology*, ed. E. W. Riches (First Series), p. 344. Butterworth, London.
- Stewart, H. H. (1960). Reconstruction of the urethra in the treatment of severe urethral strictures. *Brit. J. Urol.*, 32, 1.
- Turner-Warwick, R. (1962). Posterior bulbar urethroplasty. *Brit. J. Urol.* In the press.