REFRESHER COURSE FOR GENERAL PRACTITIONERS

FREQUENCY OF MICTURITION

BY

H. P. WINSBURY-WHITE, F.R.C.S.

*Senior Surgeon, St. Peter's and St. Paul's Hospitals; Lecturer, Institutes of Urology and Child Health, University of London***BLADDER-NECK IRRITATION WITH LITTLE OR NO OBSTRUCTION**

The commonest type is the patient who has chronic frequency of micturition but in whom repeated examinations of the urine have failed to show any abnormality. This clinical entity is found at all ages and in both sexes. The frequency is usually more marked when the patient moves about than when sitting or lying; it is aggravated in bouts for no apparent cause; and it is associated with urgency. In children especially, the urgency sometimes results in diurnal incontinence and it may also be associated with enuresis; this last manifestation is sometimes carried on into adult life. Cerebral impulses, such as those due to the sound of running water or emotional disturbances, are more potent in initiating micturition in these patients than in normal individuals, and in some patients with enuresis profound sleep probably acts by lessening cortical control. There is as a rule no residual urine. In adults the bladder capacity rarely reaches above 4 to 6 oz. (114 to 170 ml.). The patients tend towards occasional attacks of cystitis.

In long-standing cases there are sexual disorders of various kinds, the commonest of which is impotence. Lumbar fibrositis (lumbago), sacro-iliac disease, sciatica, neuritis, and arthritic changes, especially in the digits and lumbar spine, may also occur; headaches and nausea, bouts of *Bact. coli* urinary infection, and some residual urine in the bladder are common. Because of the development of fibrosis at the bladder neck there are generally obstructive changes here.

In the early stages the frequency is commonly regarded as a form of nervous-system disorder, because the urine is sterile; later, when coliform bacilli begin to appear, the case is diagnosed as one of *Bact. coli* urinary infection; if one of the rheumatic manifestations dominates the clinical picture, the diagnosis is according to this.

Obviously the initial reason why this group of cases is not understood is that the examination of the urine throws no light on the case. It is only as a result of routine cystoscopy and more particularly of urethroscopy that it becomes clear that chronic inflammatory processes can exist in the posterior urethra without either evidence of their presence in the urine or a urethral discharge.

Pathology

The routine endoscopy of all cases of disturbances of micturition allows one to visualize the pathogenesis of these chronic cases, and since 1936 it has been my practice to carry out urethroscopy and cystoscopy in all children sent to me for investigation.

Boys.—Small granulomata or occasionally actual polypi are found in the prostatic sinuses or on the verumontanum; a smooth rounded projection (hillock) on the margin of the internal urinary meatus or on a lateral lobe of the prostate

is also not uncommon. The granulomata and polypi apparently arise at the orifices of normal or adventitious openings in the posterior urethra. Some hillocks are possibly associated with the lymphoid follicles found in the posterior urethra of children. In certain cases the verumontanum appears to be atrophied. The ceiling of the membranous urethra is at times conspicuously the seat of chronic inflammation, the gland orifices being dilated and the surrounding mucosa shaggy or covered with thickened epithelium. Congenital urethral stricture occurs most commonly in the mid-penile urethra. The narrowing is identified by noting the "gripping" in passing sounds; there is no localized area of scar tissue such as one sees in acquired strictures in adults, but a funnel-shaped narrowing. Sometimes there is a persistent small amount of residual urine in the bladder. The importance of chronic meatitis, seen from time to time in circumcised children, should not be overlooked. Sometimes there is an ulcer which may be very chronic and result in contraction of the meatus, inflammation of the urethra, and attacks of cystitis. After infancy a prepuce which is adherent to the glans invariably covers smegma; untreated, the condition persists indefinitely, and ultimately causes urethritis and cystitis.

Girls.—Urethral granulomata are not seen so often in girls as in boys, but they are quite common in women who have suffered from frequency of micturition or enuresis since childhood. In girls hillocks, generalized urethral narrowing, and residual urine in the bladder are seen from time to time. Some consider that it is not abnormal for children to be unable to empty the bladder completely, but the fact remains that such children are usually subject to disturbances of micturition. A simple chronic inflammation of the vulva is sometimes seen, which is generally associated with urethritis but not with vaginitis. Exceptionally, vaginoscopy will show a granuloma of the cervix. Many cases of enuresis fit into one or other of the above categories.

Women.—Disturbances of micturition are so usual and so chronic in women that they have been regarded as an almost inevitable part of adult life. In addition, the female urethra has commonly been considered a small and inoffensive part of the urinary tract. For more than 20 years it has been my practice to make a urethroscopic examination in all my women patients with disturbances of micturition, and this routine has made it obvious that the cause of the symptoms often lies in the urethra. In some there is a continuation of the pathological changes which are seen in childhood; in others the lesions have been acquired later. Before the urethroscope is introduced a size 24 Charrière metal sound is gently passed, when it can be noted whether there is any gripping, tenderness, or bleeding. On urethroscopy the commonest pathological finding is an inflammatory process involving the posterior urethra and the front of the trigone (urethro-trigonitis). In the more chronic cases inflammatory polypi are seen projecting around the internal urinary meatus; these are sometimes found only in a rudimentary form (hillocks), or there may be a rigidity of the internal urinary meatus (fibrosis).

Men.—When disturbance of micturition has been present since childhood, granulomata and polypi are generally conspicuous, patches of leucoplakia may be found anywhere in the posterior urethra, and hillocks are to be noted projecting from the lateral lobes of the prostate or at the

internal meatus. The meatus itself is often raised well above the floor of the prostatic urethra. Sometimes a generalized urethral narrowing is obvious on attempting to pass instruments. In old-standing cases rectal examination may show thickening in the regions of the prostate and seminal vesicles, but in early cases very often no change can be felt.

Bacteriology and Effect on Upper Urinary Tract

So far no specific organism has been identified to explain any of the inflammatory processes mentioned. These infections in most cases seem to establish themselves insidiously. This is in contrast to the cases in which frequency develops acutely with a urethral discharge and perhaps with terminal haematuria when a venereal origin is highly probable, although a scanty and intermittent gleet is common enough in adults in whom there is no such association.

Intravenous urograms often disclose persistent areas of poor renal function, indicating localized sclerosis; and moderate degrees of pelvic or calycine dilatation are common enough. These pathological changes manifest themselves clinically in attacks of pain or pyelitis.

Treatment in Children

In dealing with patients, whether children or adults, who show only the pathological changes described above, it will be found that, although antibiotics will sometimes cause the symptoms to lessen or to disappear for a short period, their recurrence is the rule.

Meatitis.—This requires a simple meatotomy. The cut should be made parallel with and just to one side of the fraenum, reaching almost to the coronal sulcus. No sutures are required, but the raw surfaces must be separated each day for five days by inserting the tip of a sound between them.

Granulomata or Polypi in the Posterior Urethra.—Dilatation of the whole urethra with metal sounds, on one or two occasions at intervals of not less than two months, is the best treatment. Very exceptionally fulguration of the polypi is required.

Small Amounts of Residual Urine.—When there is 2 oz. (57 ml.) or less, urethral dilatation as above should be carried out, except that this treatment may have to be continued longer.

Localized and Generalized Urethral Contraction.—The assessment of these cases will depend upon knowing what the urethral calibre, according to age, should be. In a child of 8 a size 16 Charrière sound should lie comfortably in the urethra without gripping. Ages and sizes then are as follows: add one size for each extra year; take away one size for each year less than 8. This gives the whole scale for children. Treatment should be by dilatation.

Adherent Prepuce.—The prepuce must be freed by gauze dissection, and the parts subsequently kept separate by the daily application of a liquid paraffin dressing and retraction of the foreskin over a period of at least five days.

Simple Vulvitis.—The daily application of penicillin or a sulphonamide ointment should be carried out for two weeks, and repeated after a week's rest if necessary.

Acute Cystitis.—Copious fluids, alkalis, and antibiotics are used during the acute stages. Later any local cause must be sought.

Treatment in Women

It is a very interesting fact that small hillocks and flimsy polypi will disappear from a woman's urethra as a result of a single instrumentation. This change is accompanied by an improvement in symptoms. Bulky hillocks and fleshy polypi, however, must be treated by coagulation through an operating urethroscope in the in-patient department.

Out-patient treatment is adequate in many of the cases. This consists of the original cystoscopy and urethroscopy,

and then urethral dilatation with straight metal sounds at steadily increasing intervals between the treatments. The intervals are conveniently arranged as follows in weeks: 3, 4, 6, 8, 13, 26, 39, 52. Wyndham Powell urethral dilators should be used. Three phases follow a urethral dilatation: reaction, improvement, and relapse. Any one of these phases may be short or prolonged. Unfavourable symptoms will be encouraged by unskilful treatment, due commonly to too frequent or excessive dilatation. It often takes the urethra two weeks to settle down after a properly conducted instrumentation, and that is why three weeks are allowed to elapse in the first instance.

Treatment in Men

The same method of treatment should be carried out with men, except that curved metal sounds are used. In treating men, however, it is a matter of experience that if all are investigated as out-patients a certain proportion will suffer complications of the instrumentation. This is because damage is sometimes done to an already diseased prostate. My rule therefore is to admit to hospital all men over 50 who require instrumental investigation. Post-prostatectomy and bladder-growth cases accustomed to regular inspection are exceptions to this rule. All the other investigations, however, are carried out in the out-patient department. Even with in-patients the same danger threatens, but this may largely be avoided by carrying out any necessary endoscopic examinations immediately before operation. For instance, when prostatectomy is indicated the gland is enucleated within 20 minutes or so of the cystoscopy. Those cases of bladder-neck irritation which are found not to require operation—that is, when the residual urine is not more than 4 oz. (114 ml.) and the gland is not adenomatous—are referred back to the out-patient department. They can usually be successfully treated by intermittent urethral dilatation.

BLADDER-NECK IRRITATION WITH OBSTRUCTION

Children

The finding of large amounts of residual urine in very young children is not uncommon in children's hospitals. In deciding treatment the first need is to determine whether or not the dilatation is due to a mechanical obstruction. This question should be approached by studying the bladder neck in cystograms. As the opaque medium in the bladder will take longer than usual to throw a shadow because the bladder is dilated by the residual urine, the exposures should not as a rule be started until an hour has passed; they can then be repeated at about hourly intervals until suitable pictures are obtained. It can then be seen whether the posterior urethra as well as the bladder is dilated; should this be the case, it may be assumed that posterior urethral valves are present. These are usually impossible to see through a urethroscope.

The absence of posterior urethral dilatation leaves the choice between neuromuscular derangement of the bladder wall and stenosis of the internal urinary meatus—and it is often difficult to decide which is responsible. Opening the bladder and excising the internal meatus usually results in a reduction in the amount of residual urine, but if a large quantity was originally present it can be expected that a considerable amount will still remain after operation. Transplantation of the ureters into the bowel, sometimes after a preliminary period of bladder drainage, may be the best course to follow.

Women

In women mechanical obstruction of the bladder neck definitely occurs occasionally, generally because of fibrosis; sometimes there are quite large amounts of residual urine, even to the extent of causing visible bulging of the lower abdomen. No treatment less than a bladder-neck resection

will suffice for these cases. I prefer to do a suprapubic extirpation with the diathermy needle, keeping a finger in the vagina while the removal is being accomplished. This is a safeguard against perforating the anterior vaginal wall. Small amounts of residual urine—under 4 oz. (114 ml.)—will in due course be cured by intermittent urethral dilatation.

Men

There are several main types of prostatic change: adenomatous, fibrous, fibro-adenomatous, and malignant. Any of these may be associated with prostatic calculi or vesical diverticulum, which are found most commonly with the fibrous prostate and least commonly with a malignant prostate.

Adenomatous prostates are characterized by a frequency of micturition which is nocturnal rather than diurnal and, on rectal examination, by the "elastic" enlargement of the gland. Unlike these cases, the fibrous prostate declares itself well before the age of 50. The frequency of micturition is equally marked by day and night; on rectal palpation the prostate is small and firm or cannot be detected at all; and cystoscopy does not reveal the typical projecting mass of adenomatous tissue. The two types of tissue in a fibro-adenomatous prostate can be recognized either on rectal or on cystoscopic examination. Hardness, irregularity, and fixity are the characters of well-developed malignant disease of the prostate, but quite a proportion of these cases are discovered only on microscopy of enucleated or resected tissue. Irregular projecting masses on the front of the trigone, seen at cystoscopy, may give rise to the first suspicion. Prostatic calculi are usually discovered only on x-ray examination.

Treatment of Prostatic Obstruction

It is always best to enucleate an adenomatous gland. Whichever route is employed the following principles should be observed: on the basis of blood, urine, clinical and x-ray tests decide whether a one- or two-stage operation is to be done; avoid pre-operative urethral instrumentation, except as an immediate preliminary to operation; after the gland is out, excise a wedge of tissue from the posterior margin of the prostatic cavity, keeping a finger in the rectum while this is done; stop all bleeding and remove tags under direct vision. With this routine thrombotic complications are rare, and most cases are properly done in one stage. If attention has been paid to all these points a very narrow suprapubic drainage tube can be used and thus convalescence hastened. If, however, the bladder is subsequently drained entirely by urethral catheter then a well-trained team who thoroughly understand catheter management is essential for the convalescence. The ease with which clot due to secondary haemorrhage can be removed and the adequate control of a renal infection stress the advantage of suprapubic over urethral drainage. When all goes well, urethral catheter drainage undoubtedly shortens convalescence, but there are many cases in which the course is not straightforward and the convalescence is therefore prolonged. Sometimes this means that the urethral catheter has to be left in unduly, and this adds to the danger of subsequent urethral stricture. In all cases it is necessary to know what instrumental precautions to take as an extra safeguard against post-prostatectomy obstruction.

Transurethral resection operations for adenomatous prostates set special problems to the surgeon, particularly in the control of primary haemorrhage. Many surgeons, therefore, wisely reserve this form of treatment for fibrous prostates in cases in which residual urine is not excessive—personally, not above 8 oz. (227 ml.). When there are larger amounts there is a good deal of uncertainty about how often resection will have to be done. With the latter type of case I prefer to do a wide suprapubic resection of the fibrosed tissue with a diathermy needle.

A malignant prostate does very well without any operation at all, if the patient can empty the bladder. Many of these cases keep wonderfully well for years, simply on

stilboestrol. If there is residual urine a transurethral resection may be necessary. Bad cases—that is, those with much residual urine—may require a suprapubic resection.

OTHER CAUSES OF FREQUENCY OF MICTURITION

Certain other important though less common causes of increased frequency of micturition require mention. All are easily identifiable.

Primary Upper Urinary Tract Disease.—As a cause of frequency upper urinary tract disease will be detected by evidence of it in the urine or on x-ray examination. It must not be forgotten, however, that renal changes are often secondary to lower urinary tract disorders.

Genito-urinary Tuberculosis.—Frequency with this condition will be accompanied either by characteristic bladder lesions visible on cystoscopy or by palpable changes in the genitals which are equally characteristic. Discovery of the tubercle bacillus in the urine is the final proof.

Diabetes.—Thirst, frequency, and polyuria in a child, and the discovery of sugar in the urine, are the essential features. In adults thirst may not be remarked upon.

Vesical Calculus.—In this part of the world to-day vesical calculus is nearly always secondary to a bladder-neck obstruction which dominates the clinical picture. In the stone areas of the Orient, however, where vesical calculus occurs commonly in young children as a deficiency disease, as it did in the last century in this country, there is in addition to the increased frequency the characteristically persistent terminal haematuria.

Foreign Body.—This is generally seen in a young patient, from whom the history of the insertion of an object is not always forthcoming. Radiography and cystoscopy may be necessary.

Urethral Stricture.—In addition to the frequency, difficulty in micturition and perhaps an intermittent urethral discharge are likely features. Obstruction in the anterior urethra to instrumentation is diagnostic.

New Growth of the Bladder.—When frequency is associated with a new growth haematuria is an outstanding feature; in such a case the growth is usually malignant. Cystoscopy at once directs the further procedures along the right lines.

Retention of Urine with Overflow.—This is mentioned mainly to stress the importance of placing the hand on the lower abdomen in the course of a urinary investigation.

Pelvic Tumours.—Pressure of tumours from outside the bladder tends to cause symptoms which are more marked in the erect posture. Bimanual pelvic examination generally makes the diagnosis clear.

Vesico-vaginal Displacement.—The downward drag of the bladder in the erect posture causes an aggravation of the symptoms which may be associated with some degree of incontinence of urine. Restoration of urethral support should accompany the colporrhaphy.

Cystalgia.—An irritable bladder without a local cause is something which is seen less and less as the surgeon's skill in searching improves; but a solitary vesical inflammatory lesion (Hunner's ulcer) is exceptionally present.

Conclusion

By far the commonest causes of frequency of micturition are bladder-neck changes and a localized irritation in the posterior urethra. The latter is commonly a mild simple chronic inflammatory state, but later may be followed by other changes.

Children as well as adults are affected.

Urethroscopy is essential in many cases.

The great majority of patients respond to local treatment.

Next Refresher Course Article.—"Anaesthesia for Minor Procedures," by Dr. William W. Mushin.