RETENTION OF URINE.*

BY

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RETENTION of urine is one of the most distressing symptoms affecting the human race. It is, moreover, a symptom which may be overlooked when present, or diagnosed when absent. The first of these pitfalls is due to retention with overflow being mistaken for true incontinence. I once saw a patient in the padded room of a mental ward, whither he had been transferred from a general hospital, where the diagnosis of mania had been made. The patient was rolling about the floor and scratching his hypogastrium with his finger-nails. He had been in the padded room about twelve hours. The attendant in charge of him informed me that the patient had been passing urine freely, but that he was incontinent. On examining the patient I found that his shirt was soaked with urine and that his bladder reached about to his umbilicus. He was barely able to appreciate what was said to him, his prostate was enlarged and in spite of treatment he died of uraemia. It cannot be too strongly emphasized that retention of urine with overflow must be distinguished from incontinence of urine. Before a diagnosis of incontinence is made a catheter should be passed. In true incontinence there will be, at most, a few ounces of urine under no great pressure. An error that is less often made is to mistake suppression of urine, a more rare condition, for retention of urine, because in this condition a catheter is almost invariably passed and the true state of affairs revealed.

Retention of urine may be complete or partial. In complete retention efforts at voluntary micturition will be unsuccessful, though when the bladder is sufficiently distended some overflow may take place. In partial retention the patient may partially empty his bladder by a voluntary effort, but if a catheter be passed at the end of micturition a further quantity of urine will be withdrawn. In any obstruction to the evacuation of urine the amount of residual urine affords an indication of the ratio between the power of the bladder muscle and the degree of obstruction. The increase or decrease of residual urine will show the progress of the case.

Retention of urine is a symptom that has engaged the attention of the medical profession for many centuries, during which time many accurate observations have been made, though in early days curious theories were held. Before the time when Francis Bacon, by his synthetic reasoning, delivered science from the bondage of superstition, observers appear to have often started with a theory and attempted to make the facts fit it, rather than to have marshalled their facts and then formulated a theory in accordance with them.

In 1588 there was published in London a translation into English, by John Read, of the works of a Spanish surgeon, Francis Arceas. In this book Read incorporated an anonymous tract on urethral stricture by a West Country surgeon. This is full of accurate observations, combined with theories, the result of former teachings, which held that stricture—or caruncle, as it was called—was a form of new growth. We have become so used to the French word “bougie” that, for the moment, it strikes us as odd that, in these early writings, the word “candle” is used.

Ambroise Paré deals with retention of urine, but makes no distinction between suppression and retention. He describes most graphically, amongst other causes of retention, that of over-distension, for he wrote:

“Thus of late a certain young man riding on horseback before his mistress, and therefore not daring to make water when he had great need to do so, had his urine so suppressed that, returning from his journey home into the city, could by no means possible make water.”

Paré goes on to describe how he drew off two pints with a catheter, and in spite of the opinion of the young man's friends, who believed that he had a stone, Paré said that

there was no stone, and the subsequent history of the patient confirmed this. While Paré gave much useful information, some of his treatment, such as fumigation of the patient with sulphur, appears to us unlikely to have been very successful. I could find no mention of enlargement of the prostate in Paré's writings.

The retention is dealt with by other early writers such as Hart, in his *Anatomy of Urines*, published in 1625; Record, in *The Urinal of Physic* (1547); and Johannes Scultetus of Ulm in Swabia, who published *The Chyrurgeon's Storehouse*, translated by E. B. and published in 1624. Record describes a delightfully homoeopathic treatment for stone, which he said could be cured by the patient obtaining a stone from a human being, crushing it with water and drinking the mixture so obtained. Scultetus quotes at length from Celsus (lib. 7, cap. 26) a description of catheterization which would do for a description of this manœuvre as practised to-day.

Charles Brandon Trye of Gloucester, writing in 1774, draws a distinction between retention and suppression. Among other things he describes enlargement of the prostate; though he knew of no treatment, he wrote that he could promise a cure of this condition. He also described an evacuator for clearing out the bladder. In 1778 Alexander Reid published *An Enquiry into the Merits of Operation used in Obstinate Suppression of Urine*. He was a strong supporter of the puncture of the bladder through the rectum, according to the method described by Flurant of Lyons in 1750, and quotes a high mortality for perineal puncture.

Percival Pott, in 1778, describes spasmodic retention of urine in such conditions as fistula in ano. He protested strongly against use of the catheter in these cases, and recommended purgings, baths, and hot applications to overcome the spasm. Later on, Cock of Guy's, in 1866, revived the use of perineal puncture.

Turning aside from this brief historical review of the subject, let us consider the question, What are the causes of retention of urine? The answers to this question may be grouped conveniently according to the patient's age.

CAUSES OF RETENTION OF URINE.

Males.

A. Newborn.

1. The meatus stuck together by a little dried blood or secretion.
2. Pinhole meatus.
3. Phimosis.
4. Congenital membrane or valve in the posterior urethra.

B. Young Adults.

1. Acute urethritis, prostatitis, or prostatic abscess.
2. Reflex spasm due to inflammation elsewhere—for example, appendicitis, ischio-rectal abscess, etc.
3. Trauma, locally or to reflex arc.
4. Over-distension.
5. Functional or hysterical.
6. Organic nervous disease.
7. Stone.

C. Middle Life.

1. Urethral Stricture.
2. Tabes dorsalis.
3. Causes under B.

D. Old Age.

1. Enlarged prostate.
2. Atony.
3. Causes under B and C.

Females.

1. Urethritis (gonococcal).
2. Retroverted uterus, especially if enlarged by fibroids or pregnancy.
3. Prolapse of urethral mucous-membrane.
4. Caruncle.
5. Hysteria.
6. Nervous disease.
7. Vaginitis (Children).

Hamilton Bailey, in his most useful work *Physical Science in Clinical Surgery*, recalls Jaques's speech in *As You Like It*, and he applies the seven ages to the causes of retention of urine.

What would happen if retention of urine were not relieved? It is a popular belief among the laity that the bladder would burst. This does not happen. If the obstruction to micturition is at the neck of the bladder, overflow will occur when the intravesicular pressure reaches a certain point. If the obstruction is in the urethra extravasation of urine from the posterior urethra takes place

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and fistulae are formed. The rise of pressure in retention of urine causes trabeculation of the bladder, due to degeneration of the muscle; dilatation of the ureters and kidney pelvis with destruction of kidney tissue and function; and, finally, uraemia, anuria, and death.

In the space at my disposal I shall be able merely to allude to some of the causes of retention and to discuss certain points of practical interest in connexion with them.

The treatment of most of the congenital causes is obvious. The congenital membrane or valve is interesting, owing to the fact that, while it obstructs the passage of urine, instruments passed from the external urinary meatus may not be obstructed. Until, therefore, the condition had been described in medical literature, it was often overlooked.

In retention of urine due to inflammation or reflex spasm it is best to avoid the use of a catheter, if possible, and to treat the inflammation. This will diminish the spasm. Other methods of diminishing spasm are a hot bath, hot local applications, morphine and atropine hypodermically, and calcium chloride intravenously.

The history of the patient will often indicate the probable cause, and is very helpful, since the method of examination suitable for one cause may be unsuitable for another; for instance, in stricture instruments of small diameter will be required, whereas in enlargement of the prostate it is easy to pass large instruments, and these are less likely to cause bleeding than small ones. I have never seen a case of adenomatous enlargement of the prostate in a man who has had gonococcal posterior urethritis. A history of gonorrhoea, or "strain," as the ignorant sometimes call it, suggests the probability of a stricture. Other conditions may be suggested by the symptoms. Stone would be indicated if the patient were to complain of pain, especially on movement, and the sudden stopping of free micturition.

In passing instruments, on a patient suffering from stricture, it is important not only to remember the common sites of strictures, but also the common sites of false passages; the position of these is indicated in the accompanying diagram. Thompson states that 67 per cent. of

A and B = common sites of false passages. Percentages indicate the common sites of stricture and their relative frequency.

urethral strictures occur in the region of the bulb of the urethra. Spasm must be eliminated if possible, because its presence makes it impossible to estimate correctly the diminution of the urethral passage by the stricture; it also increases the congestion, and the risk of a false passage. The position of the patient and his co-operation will help. He should be flat on his back with his head on a pillow, but not his shoulders. His knees may be slightly bent on a pillow, though this, as a rule, is not necessary, and may obstruct certain manoeuvres. His hands should lie beside him in a position of rest and relaxation. On no account must he clench them, nor must he grip the couch or bed. His mouth should be open and he should sigh his breath in and out gently. He must not strain or hold his breath. If he cannot, or will not, relax himself, it is not only useless, but dangerous, to pass instruments, and resort should be had to some sort of anaesthesia. This may be local, sacral, spinal, or general.

While local anaesthesia is the simplest, it is not always easy to get good anaesthesia in the case of a tightly closed stricture, owing to the difficulty of introducing the solution

into the more sensitive posterior urethra. It works very well for dilating strictures that will admit a sound of moderate size, and also for cystoscopy. Various solutions have been used. Many surgeons recommend novocain. This is usually quite safe, although I have known alarming symptoms follow its use. In my experience, however, the degree of anaesthesia produced is poor. Cocaine produces a far better anaesthesia in a mucous membrane, and this, I believe, is the experience of rhinologists. It has, however, been considered too dangerous to use cocaine in the urethra. Canny Ryall, whose experience in this work is as great as that of any other surgeon, uses cocaine, and if his technique is followed I believe there is little or no risk. At any rate, I have never seen the slightest evidence of cocaine poisoning. The solution used is a very weak one, and it is necessary to follow the technique exactly.

Sacral anaesthesia is recommended by Macalpine. He uses a novocain solution. The solution is injected into the lower part of the sacral canal below the level of the dura. It gives an excellent anaesthesia of the perineum. On two occasions in my experience this has produced convulsions and coma lasting for a few seconds. I think these symptoms were due to novocain idiosyncrasy, and in future I do not think I shall use more than 20 to 30 c.cm. of the solution recommended by Macalpine.

In spinal anaesthesia I have used various substances, but have found the most satisfactory to be a solution made according to the formula of Despas, which includes 3 per cent. stovaine solution with 5 per cent. of caffeine in normal saline. I use 1.5 c.cm. of this solution for an average-sized man. Spinal anaesthesia is the ideal anaesthesia for dealing with a difficult stricture. Relaxation is complete, and any fall in blood pressure that may occur diminishes the congestion. General anaesthesia may be used, but the relaxation is not so complete and congestion may occur.

The number of various catheters and sounds is immense, and I do not propose to deal with these in detail. Soft rubber catheters and metal catheters can be sterilized by boiling; gum-elastic and silk web instruments are sterilized by immersion in 1 in 1,000 mercury biniodide, or preferably by exposing them to formalin vapour. This can be carried out in hospital in special ovens or sterilizers. For private practice one may use a glass tube of sufficient length to take a bougie or catheter. The end of the glass tube is closed by a rubber stopper in which is inserted a perforated receptacle for carrying a formalin tablet. Dr. H. M. Galt, pathologist to the Royal Sussex County Hospital, has recently tested the efficacy of this instrument for sterilizing catheters, and has found the method very efficient. The catheters must be dry inside as well as outside, to prevent air-locks, and to ensure proper exposure to the vapour.

In dealing with strictures, my own preference is for metal instruments, and with spinal anaesthesia eliminating all straining, I have used the smallest size of metal sounds without any ill result. I prefer a metal sound, as I feel that it can be controlled so much better than a flexible gum-elastic bougie. Metal sounds should be fairly heavy, as a heavy sound passes more safely and is quite easy to control, whereas a light sound may require a little force behind it, and this increases the risk of a false passage.

In catheterizing a patient suffering from retention of urine due to an enlarged prostate Tiemann's catheter is the simplest and best instrument. It is a soft rubber catheter with a solid rubber tip, which is turned up like a ski tip. The turned-up tip rides over the enlarged middle lobe of the prostate, as does a ski over a mound of snow. The catheter is sterilized by boiling. It is useful to cut a small notch in the end of the catheter to correspond with the direction of the tip, so that if any rotation occurs the direction of the tip may be known. This should, of course, point anteriorly when passing over the prostate. This catheter is well known abroad, but does not appear to be so well known in this country. It may be safely used by a male nurse or by the patient himself. A useful method of lubrication of a catheter is by means of a tall jar almost filled with hot water, on which floats a layer of liquid paraffin. The catheter is warmed, and at the same

time picks up a very even layer of oil. I am indebted to Mr. Sidney MacDonald for teaching me this method. Instruments, especially metal ones, should be used hot, as cold ones produce spasm.

If, even under spinal anaesthesia, no instrument can be passed through a stricture—a very rare condition—suprapubic puncture with a fine needle may be performed. This can be done two or three times safely without risk of extravasation. The bladder should be emptied slowly, or only partially. Later it may be found that an impermeable stricture has become a permeable one. In some cases—for example, the case of an enlarged prostate in a patient whose condition contraindicates immediate prostatectomy—retention of urine may be relieved by a suprapubic drainage. This may be done by an open operation, or, more conveniently, a Depezzier self-retaining catheter can be introduced through a cannula. Local infiltration of the abdominal wall with novocain provides adequate anaesthesia for this. The advantages of the open method and the disadvantages of the closed method have been greatly exaggerated. In cases of enlargement of the prostate requiring a preliminary drainage a cystoscopy can be carried out first, and this will give the required information, or the probable state of affairs can be estimated by experience, a careful digital rectal examination, and the examination of the urine.

Operation is performed less often in cases of stricture than formerly. The urethrotomy may be internal or external. In the eighteenth century internal urethrotomy was occasionally performed by puncturing the stricture by a trocar or lancet. In 1827 Stafford described to the Westminster Society an instrument for cutting a stricture from before backwards, with a guide through the stricture to prevent the blade leaving the urethra. In 1836 he described an instrument for dividing the stricture from behind forwards.

For the performance of internal urethrotomy it must be possible to introduce a fine guide through the stricture. This operation is indicated in those cases of stricture which are unsuitable for dilatation; in the resilient stricture; in the stricture that bleeds very readily, no matter what care is taken; and also in peri-urethral abscess.

External urethrotomy, performed as a restorative operation, apart from puncture for the relief of retention, dates from the early part of the nineteenth century, and in this country is associated with the names of Guthrie and Syme, and later Wheelhouse. It is indicated when no instrument at all will pass through the stricture, and in cases of extravasation of urine, perineal abscess, and in fistulae. The disadvantage of Wheelhouse's operation is that great difficulty may be experienced in finding the way through the stricture when the urethra in front of it is opened. I have therefore devised the following operation.

The patient is anaesthetized spinally and placed in the lithotomy position. The bladder is opened suprapubically by a small incision into which a finger can be passed. Along the finger a sound is passed into the internal urinary meatus and along the prostatic urethra. The tips of the sounds are then only separated by the stricture—a perineal incision on to the tops of the sounds divides the stricture. The tips of the sounds are exposed; the anterior one

is rotated to extrude its tip. Each end of a piece of tubing about the size of a No. 12 catheter is tied on to the sounds, a long window being cut close to the end tied on to the posterior sound. The sounds are withdrawn by the way they entered, the tube is drawn in with them so that it traverses the urethra, bladder, and suprapubic wound, and its window lies in the bladder. Each end of the tube is secured by a safety pin, so that, however restless and uraemic the patient is, there is little risk of his extracting the tube. Each day the tube may be moved to and fro by means of the pin at each end; in this way the urethritis associated with an indwelling catheter is diminished. The tube may be left in for seven to ten days. The subsequent treatment and dilatation are the same as for a Wheelhouse operation. I performed this operation first in 1925, and have performed it twice since. The fact that the tube traverses the suprapubic wound does not appear to delay healing in any way, and the feeling of security that it gives is very reassuring.

In concluding this paper it is my very pleasant duty to express my gratitude to Sir D'Arcy Power for permitting me to see one of the two copies of Read's book that exist, and for information on certain points of history; to Mr. H. E. Powell, librarian of the Royal Society of Medicine, for much help; and to the late Dr. W. E. Powell, for preparing the excellent diagrams and the drawings of my method of performing external urethrotomy, which are so clear that description of the operation is really superfluous.

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