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SUPPRESSION AND RETENTION OF URINE.*

BY

R. H. JOCELYN SWAN, M.S. LOND., F.R.C.S.,

SURGEON TO THE CANCER HOSPITAL; CONSULTING SURGEON TO ST. PAUL'S HOSPITAL FOR GENITO-URINARY DISEASES.

It is necessary in the first place to define exactly what we mean when we speak of suppression and of retention of urine—suppression or anuria are synonymous terms used when there is a failure, temporary or otherwise, of the kidneys to secrete any urine, whereas retention of urine implies the inability of the patient to void urine which has been normally secreted by the kidneys. Both conditions come under the term of "Surgical Emergencies," and it is my intention to spend a short time on the consideration of the various causes which may give rise to these emergencies and later to briefly discuss the treatment necessary.

SUPPRESSION OF URINE.

Suppression of urine or anuria is a serious condition and demands early recognition so that appropriate treatment can be commenced, for the gravity of the case increases as time goes on and until renal function is again established. It most frequently occurs in patients in whom the kidneys are already diseased, even though slightly, though it may arise when there has been no clinical evidence of impairment of function. It may be accompanied by pyrexia, headache, vomiting, dyspnoea, or by the muscular twitching seen in the uræmia of the advanced stages of medical renal diseases, but one of the remarkable features of anuria, especially in the obstructive form of which I shall speak in a few moments, is that it may go on for several days without any of the above-mentioned symptoms; in one case under my

care anuria remained complete for 17 days before death occurred without the onset of headache or vomiting until the twelfth day, and the mental condition remained clear almost until the end.

Causes of Anuria.

Anuria may occur from a *variety of causes*, which for convenience may be divided into (a) obstructive and (b) non-obstructive. In the former group obstruction may be due to calculous disease, to vesical growths involving both ureteric orifices, to the spread of uterine carcinoma into the broad ligaments causing pressure on the lower ends of the ureters, or to large pelvic or abdominal tumours. In the absence of disease causing obstruction in the urinary passages, anuria may be due to the reflex inhibition of urinary secretion following traumatism to any part of the urinary apparatus, even to the passage of a catheter along the urethra; it may accompany infection of the kidneys, either from hæmatogenous causes or from ascending infection from the bladder. It may be due to increasing renal disease, such as tuberculous disease, polycystic disease or suppurative pyelonephritis, and in the case of impairment of the renal function by old-standing back pressure anuria is particularly liable to follow the sudden emptying of an over-distended bladder by catheterisation. Again, suppression of urine may follow an operation, due either to the low blood pressure of shock or to the effect of the anæsthetic on the renal function. It may be present in any form of severe collapse and occasionally as a manifestation in hysteria. It is probable that in many cases more than one cause may coexist, perhaps most frequently when an operation has been undertaken on a patient in whom the renal function is already impaired either by infection or by back pressure.

Let us study the causes of anuria a little more in detail. The obstructive form naturally implies a simultaneous blockage of both ureters, causing first increased intrarenal tension quickly followed by failure of secretion. This is not wholly true, for in calculous disease one kidney may be partially

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destroyed or calculi may have been present in the ureter for a considerable time, when the other ureter becomes suddenly blocked by a calculus passing into the upper ureter from the renal pelvis. Again the sudden blockage of both sides at the same time must be very rare, but the impaction on one side in cases in which the other kidney is diseased or in which previous disease has already rendered it functionless, is not so uncommon. Cases have been recorded in which the sudden impaction of a calculus in one ureter has led to anuria when the kidney of the other side has been normal and has been assumed to be of a reflex nature. Such an anuria is most probably of short duration, the secretion becoming re-established when the first effect of the impaction has gone off; most authorities deny that suppression does occur with one healthy kidney, but that if such kidneys as were supposed to be normal were examined microscopically some form of nephritis would have been found. Thus in calculous anuria the following conditions may be present.

1. The ureters of both kidneys are simultaneously blocked by calculi.

2. The ureter of one kidney is blocked by a calculus, the other being absent, previously removed or destroyed by disease.

3. The ureter of one side is blocked by calculus, the function of the second kidney been suppressed reflexly by it. The second kidney is practically always already of diseased form.

Obstructive and Non-obstructive Suppression.

In calculous anuria there is usually a history of an acute attack of renal colic accompanied by a frequent desire to micturate, but that the quantity of urine becomes lessened until none is passed. In these cases the kidney of the affected side may be tender on pressure, may be palpable, and the abdominal muscles of that side may be resistant. When the suppression is established there follows a period in which no symptoms may be present, and this forms one of the striking features of cases of obstructive suppression, as opposed to the non-obstructive form. The anuria may be complete or may be interrupted by periods in which large quantities of very pale urine of low specific gravity may be passed, only to be followed again by suppression. Even with complete anuria there is a period in which no further symptoms arise, known as the *tolerant stage*, which is followed by *stage of intoxication* in which uræmic symptoms develop. The tolerant stage may last from any time up to ten days, the patient remaining mentally active and be to all appearances in good health; when a hydronephrosis is present, the tolerant stage may be still further prolonged. After a variable period, usually about the seventh day, the patient becomes drowsy, complains of headache, and nausea and vomiting frequently occur; the ankles may become slightly oedematous, constipation becomes marked, and muscular twitching may occur, though in many cases these are entirely

absent. The respirations become embarrassed, often of Cheyne-Stokes sequence, and the patient dies in coma of respiratory or of cardiac failure.

I have described the sequence of events in calculous suppression somewhat fully, because it is in the tolerant stage that too little significance may be given to the story of failure of renal secretion, whereas if any good is to be done for the patient, the sooner operation is undertaken the better chance there is that the renal function may be re-established. The occurrence of suppression in these cases is a serious event, but is by no means necessarily fatal. In a few cases recovery takes place by the passage of the calculus into the bladder, but when the diagnosis is confirmed by radiography, &c., no time should be lost in operating either to remove the calculus or to provide drainage to the recently blocked kidney.

The other common causes of obstructive suppression are from the implication of the ureters in progressive carcinomatous growths in the base of the bladder or in the broad ligaments from carcinoma of the uterine cervix or more rarely from carcinoma of the prostate. In these cases anuria occurs as a terminal event in the illness, of which the characteristic symptoms will have been for some time in evidence. In these cases infection of the kidneys may have already occurred, but the onset of nausea, refusal of food, headache, and subnormal temperature with coldness of the extremities may proceed anuria, and after a variable period death takes place without any true uræmic symptoms. In both cancer of the uterus and of the bladder hydronephrosis is very liable to occur from the gradual pressure on the ureters, but in the numerous cases of cancer in both these organs that I have seen in the Cancer Hospital I cannot remember one dying of suppression of urine before the usual symptoms of the disease have been evident, although cases have been recorded of this nature.

Suppression of urine in the *non-obstructive* variety presents a very different clinical picture. It may occur from a variety of causes, the antecedent symptoms of which will usually have been so apparent that little difficulty will be found in the diagnosis of the condition. The anuria may be a purely transient trouble, passing off with re-establishment of the secretion in a few hours; this may follow any severe shock and may be seen after an operation, especially in those patients in whom there is some degree of nephritis. I have seen anuria follow severe abdominal operations in patients in whom the ordinary clinical tests have shown nothing abnormal in the urine, but it is more likely to follow operations on the kidney or upon the lower urinary passages. Whether this anuria is due to a reflex inhibition of secretion or to the effect of the anæsthetic I am not prepared to say. These cases are usually of a temporary nature, but will cause a good deal of anxiety until urine is again passed. There is no doubt that disease of one kidney is often accompanied by a reflex depressing

effect on the function of the other, but that the removal of the diseased organ is followed by an increased activity in the remaining one. Should the second kidney have been inadequate to carry on the full function before operation, the removal of the more diseased organ may be followed by anuria. Again, in cases in which operation has been performed on the lower passages in whom the renal function is impaired anuria may result; in these cases there is usually a period of polyuria accompanied by loss of appetite, headache, &c., followed by anuria from which death occurs.

In another class of case anuria occurs with symptoms which are much more alarming. There may be an initial stage of a succession of rigors, headache, and giddiness, quickly followed by convulsions and coma, resembling the terminal stages of the uræmia from chronic nephritis. These cases are very acute and are usually accompanied by some infective process; they are seen in cases of infective pyelitis or pyelonephritis, either from a hæmatogenous infection or from infection ascending from the bladder. The mere passage of a catheter along the urethra may be followed by a rigor and by suppression of urine, even where no disease is present in the urethra and in which no traumatism has been caused, and it is probable that there has been some infection in these cases; more frequently the urethra has been the seat of a stricture or in which the difficulty in passing the instrument has been followed by hæmorrhage. The kidneys are sometimes the seat of chronic nephritis or of septic pyelonephritis, though in some cases nothing has been found post mortem. In one case in which an operation for internal urethrotomy was followed by great pyrexia, convulsions, and anuria, the kidneys appeared on exposure to be normal and after death no disease was found microscopically.

Thus it will be seen that suppression of urine may occur with marked symptoms of physical disturbance, pyrexia, vomiting, and convulsions, rapidly passing on to coma and death in a short time or, on the other hand, the anuria of the obstructive form may be unaccompanied by any other symptom for several days, the so-called tolerant stage, before other symptoms appear; even then these may be of slight degree compared to the marked disturbance in the non-obstructive form, and death may occur without there being any pyrexia or convulsions, the patient becoming gradually more and more comatose.

Diagnosis.

When anuria is present, the first point that will arise will be the diagnosis of the condition causing it. The anuria that follows the progressive destruction of the kidneys, whether from chronic nephritis, chronic pyelonephritis, tuberculosis, polycystic disease, &c., will usually cause no trouble by the other symptoms which have been present during the illness, whilst that following upon operations or upon catheterisation is recognised by the immediate history. In cases of suppression of urine

due to the obstruction of the ureters by carcinoma of the bladder, uterus, or prostate, there will be in nearly all cases the ordinary symptoms of the initial disease, but if these are absent, a routine vaginal or rectal examination will easily reveal the nature of the trouble. In the obstructive form of anuria due to calculus the occurrence of former attacks of renal colic followed by the sudden onset of pain in one side and accompanied by anuria immediately suggests that the obstruction is due to calculous disease. In many cases there will be a previous history of attacks of renal colic and possibly the history of the passage of a calculus, but it must be remembered that one kidney may have become silently disorganised by calculous disease without causing any symptoms and that the obstruction has occurred to the only functional one. In one case under my care, one kidney had already been removed for calculous disease and my patient was fortunate enough to pass her calculus after two days of complete suppression. It can be taken as a general rule that when anuria occurs from the blockage of the pelvis of one kidney or its ureter, the functional capacity of the other has already been impaired by some form of disease and that the sudden blockage of the previously functional organ has caused a reflex inhibition to the decreased secretory capacity of the damaged kidney. Thus, in 28 cases collected by Morris in which calculous anuria occurred, there was no trace of a second kidney in 6 cases, marked atrophy in 8, almost entirely disorganised by calculus in 11, destroyed by hydatid disease in one and enlarged in two.

Additional evidence of a calculus causing anuria may be obtained by rectal or vaginal examination, by radiography, or by cystoscopy. By rectal or vaginal examination a calculus may occasionally be palpated if it is impacted in the lower terminal ureter, which appears to occur in roughly one-third of the cases. Radiography may give more valuable and precise information and may show a small calculus in the renal pelvis or anywhere in the line of the ureter; a collection of shadows in one renal area would suggest that this organ is one of old-standing disease and functionally damaged. Cystoscopy may show a congested or oedematous orifice of a ureter if the calculus is placed in the lower ureter or more rarely the tip of the calculus may be seen projecting from an orifice. Catheterisation of the affected ureter may so alter the position of the calculus that the obstruction to urine may be relieved.

Treatment.

The treatment of an anuric patient will depend in a large measure on the condition causing the anuria. In cases of old-standing bilateral renal disease and in those of renal obstruction due to advanced carcinomatous growths in the bladder, prostate, or uterus, little can be done, and it is doubtful if any such operation as bilateral nephrostomy is justifiable, as ultimate death would follow and in the meantime the misery of a double urinary fistula has to be borne. In cases in

which the suppression follows operation on the lower urinary tract or accompanies acute infections of the kidneys, treatment should be prompt and energetic. Hot fomentations should be applied to the loins, hot packs given, and diuretics freely administered; diuretin, caffeine, acetate of ammonia, and hot drinks are all useful. Infusion of saline or of glucose solution into the subcutaneous tissues or, better, into the vein, should be given and if these measures do not re-establish the flow of urine, no time should be lost in performing bilateral nephrostomy. Where the anuria is due to the blockage of a calculus, the stage of tolerance for the first few days allows of some steps to be taken to localise the obstructing calculus, but there is no doubt that every day delayed beyond the third distinctly minimises the chance of a successful result, although cases are recorded of recovery even when the operation has been delayed until uræmic symptoms have been present. In these cases an attempt should be made to remove the calculus if this does not entail too serious a proceeding in the patient's condition, in which case a nephrostomy should be done and the removal of the stone postponed until the suppression has been relieved.

RETENTION OF URINE.

By the term retention of urine is implied the gradual accumulation of urine in the bladder with inability to void it per urethram. It is necessary to distinguish it from anuria on the one hand and also to distinguish those forms of retention due to some obstruction in the urethra from those due to nervous causes in which the urethra is fully patent.

Retention of urine occurring suddenly gives rise to severe pain and strangury, but in old-standing cases in which the obstruction has been gradual, the bladder may become enormously distended before pain is severe. If the condition remains unrelieved, urine may continually dribble from the urethra, when a condition resembling incontinence of urine is produced; it is important to distinguish this *false incontinence from overflow* from the true incontinence of urine due to injury or paralysis of the vesical sphincter. In *true incontinence* the bladder remains empty and the urine dribbles away as soon as it enters the bladder; there is no obstruction in the urethra. In the false incontinence from the overflow of a distended bladder the latter may be felt as a rounded, smooth swelling above the pubes, firm on pressure and dull on percussion.

In a general sense it may be said that retention in a young man is most likely to be due to gonorrhœa; in adult life, it is more likely to be due to stricture; whilst in elderly men, prostatic enlargement is the most frequent cause. In women it is most frequently due to hysteria or the pressure and drag on the urethra of a retroverted gravid uterus or some pelvic tumour.

The causes of retention of urine may be classified as follows.

Retention with obstruction or acute inflammation:—

- (a) Prostate—simple enlargement.
malignant disease.
acute prostatitis.
prostatic abscess.
- (b) Urethra—stricture.
acute urethritis.
impaction of stone, &c.
pressure from tumours.
rupture.

Retention without obstruction in the urethra:—

- (a) From spasm or inhibition—
after anal operations, &c.
hysteria.
- (b) From nerve diseases, tabes, myelitis, &c.

The diagnosis of retention of urine is made by the passage of a large-sized catheter through the urethra. In cases due to atony of the bladder, to spasms after operations, to hysteria, and to the presence of a pelvic tumour in the female, the catheter will enter the bladder easily, but will be arrested if obstruction be present. In stricture and with the enlarged prostate there is usually a history of gradual increasing difficulty and of increased frequency of micturition, whilst the palpation of the prostate per rectum will determine the condition of the gland.

Treatment.

I propose to consider briefly the treatment required in those cases of retention of urine most generally met with in practice.

With *acute urethritis* complicated by retention there will be a history of purulent discharge from the meatus, but with the onset of an acute prostatitis the urethral discharge may be temporarily diminished or even absent. Every endeavour should be made to relieve the retention before the passage of a catheter. The patient should be given a suppository of morphia or belladonna, and after a quarter of an hour placed in a hot bath and encouraged to pass his urine into it. Failing this, an enema of hot water or a glycerine suppository is occasionally successful. If these measures fail and the pain is becoming worse, a catheter must be passed. The inflamed urethra is intensely sensitive, so that a local anæsthetic may be necessary. The urethra should first be washed out with a hot solution of potassium permanganate (1 in 6000) or of oxycyanide of mercury (1 in 4000) and the canal then anæsthetised by a solution of novocain (2 per cent.) introduced by means of a pipette. A soft rubber catheter is then passed very gently and the retention relieved. Owing to the fear of conveying infection into the posterior urethra or to the bladder in these cases it has been taught that suprapubic puncture should be done in preference to catheterisation, but it must be remembered that retention does not occur in urethral infections unless the posterior urethra or the prostate is already infected.

After operations, especially after those for hæmorrhoids, fistula, hernia, &c., early resort should be made to the catheter in order to avoid the acute pain with the overdistended bladder.

Needless to say, in every catheterisation complete regard to asepsis must be employed.

Blockage of the urethra by calculus, pedunculated vesical growths, calculus, foreign bodies or blood-clot should be relieved similarly by the passage of a catheter. A calculus or foreign body may cause a good deal of spasm in the urethra, but this can be overcome by the use of novocain. In cases in which the retention is due to the filling of the bladder by blood-clot, attempts should be made to break up the clot and extract it by means of a lithrotomy evacuator, but in these cases it is often better to proceed immediately to a suprapubic cystostomy, turn out the clot, and drain the bladder; the cause of the excessive hæmorrhage can then be treated at a future date.

With *enlarged prostate* retention of urine may occur from the increasing obstruction of the gland or from the increased congestion of the enlarging gland from excess of alcohol, exposure to cold, etc. In every case of retention in which there has been gradually increasing obstruction in the lower urinary passages, it must be ever borne in mind that there is very frequently interference with the full renal function from the gradually increasing intrarenal pressure, and it cannot be too strongly emphasised that in every such case the bladder must be emptied very slowly, as otherwise the sudden relief to the intrarenal pressure may cause such congestion of the renal tubules that complete and fatal anuria follows. Believe me, it is not by any means unusual to see a case in which a doctor has been called to see a case of retention and in which he tells us with some pride that he drew off 40, 50, or 80 ounces of urine, but that since then no more urine has been passed and there is none in the bladder.

Attempts should first be made to obtain voluntary micturition by means of a hot bath, belladonna suppositories, or hot enemata. Should these fail, a catheter must be passed with rigid asepsis and with great gentleness. It is best to try with a large Coudé catheter, size 18 or 20 French scale, first; smaller or pointed catheters are prone to be caught in folds in the prostatic urethra. If difficulty is found with the Coudé catheter a long, fully-curved prostatic metal catheter should be tried, or an English gum-elastic instrument used, the curve being increased whilst the catheter is in the urethra by withdrawing the stilette for two inches. Should catheterisation be found impossible, suprapubic puncture by means of a small trocar and cannula may be necessary. Where the catheter has been passed into the bladder, only a small quantity of urine should be withdrawn, say 10 or 15 ounces, when the catheter should be tied in and directions given that 4 to 5 ounces be drawn off every hour until the bladder is empty. The catheter should be kept in for several days and then withdrawn, and the patient encouraged to pass his urine naturally, but it may be necessary to replace the catheter and decision made as to the necessity for operation.

Stricture of the urethra may cause retention and may cause great difficulty in passing an instrument into the bladder. In the majority of cases the stricture is not very dense and the exciting cause of the retention is excess of alcohol or exposure to cold. In these cases a fairly large olivary-pointed catheter should be first tried and the position of the stricture ascertained. If this fails to pass through the stricture smaller sizes should be successively tried until one is passed through into the bladder. This should then be tied in and the urine allowed to trickle away slowly. Subsequently, larger sizes should be passed and the stricture gradually dilated. In other cases great difficulty may be experienced in passing any catheter and resource may have to be made to filiform bougies. A straight one should first be tried, failing which the point should be slightly bent and a further attempt made. It is often useful to inject warm oil into the urethra and to pass several filiform bougies into the canal down to the face of the stricture when one may be manipulated through. This should be then tied in and after a little time the urine will trickle alongside it. After a day or so the stricture will allow of dilatation by one of the usual methods. When complete failure has been the result of attempted passage of a bougie, an anæsthetic should be given, when a filiform may frequently be passed; in other cases a suprapubic puncture may be done or a Wheelhouse's external urethrotomy performed.

HÆMOPTYSIS.

BY

L. S. T. BURRELL, M.D. CAMB., F.R.C.P. LOND.,

PHYSICIAN TO THE BROMPTON HOSPITAL FOR CONSUMPTION
AND DISEASES OF THE CHEST; PHYSICIAN TO THE
ROYAL FREE HOSPITAL.

WHEN a patient coughs up blood it is often taken for granted that he is consumptive. This is not wise, for hæmoptysis may result from a variety of causes. Pulmonary tuberculosis is, however, such an important cause that in this paper I propose to discuss the subject under two headings: (1) hæmoptysis of non-tuberculous origin; (2) of tuberculous origin.

HÆMOPTYSIS OF NON-TUBERCULOUS ORIGIN.

1. *Heart affections* and especially mitral stenosis may give rise to hæmoptysis which is often large and of frequent recurrence. In any case of hæmoptysis it is very important to examine the heart. Indeed, in all routine examinations of the chest it is a good rule first of all to find the position of the apex beat, and then to examine the heart before coming to the lungs. This practice will save many a mistake. It is surprising how often there is found in a tuberculous institution a case with so obvious a murmur that it could not have been overlooked had the heart been examined. In