

go on to over-distention, and, finally, overflow. This stretching of the hypertrophied but weak fibres of the detrusor takes away more or less of their power of contraction, and the bladder is apt to be left in a condition of atony.

After a retention, if it has not lasted too long, the bladder may go on expelling the excess of urine above the residuum, just as it did before, but now the amount of residual urine is greater, and the power of the bladder less. The congested membrane around the vesical neck and in the prostatic urethra is kept irritated by the partly-decomposed urine, and it takes but a slight cause, a chilling or an excess at table, to

bring on another retention. After each attack the bladder is left in a more helpless condition.

Besides distention of the bladder with hypertrophy of its walls, sacculi may be developed and grow greatly with each succeeding retention. The efforts which the hypertrophied fibres of the detrusor are obliged to make, to expel the urine, cause the mucous membrane to be pressed out between their meshes into little pouches, and if retention come on, these parts, being weaker than the rest of the bladder, suffer most, and may become enlarged into supernumerary bladders composed of mucous membrane, connective tissue, and peritonæum, but covered by no muscular coat (Fig. 61).

Sometimes, though rarely, one of these sacculi may be found larger than the bladder itself—usually they are only shallow depressions between the raised bundles of muscular fibres, occasionally little sacs with constricted necks. These sacs have no muscular tissue, and consequently no power of emptying themselves; hence the urine tends to stagnate in them, and to undergo decomposition, depositing crystals of triple phosphate with more or less amorphous phosphate, etc., all of which become glued together by mucus, and thus form a nucleus for stone, which, increasing in size, may finally fill up the sacculus even with its narrow neck (encysted calculus). These changes are all the more certain, if some kidney-stone lodge in a sacculus, instead of passing off. Any foreign body remaining in the bladder becomes incrustated by urinary salts and becomes a nucleus for stone, as is well seen when a catheter is tied in for a length of time.

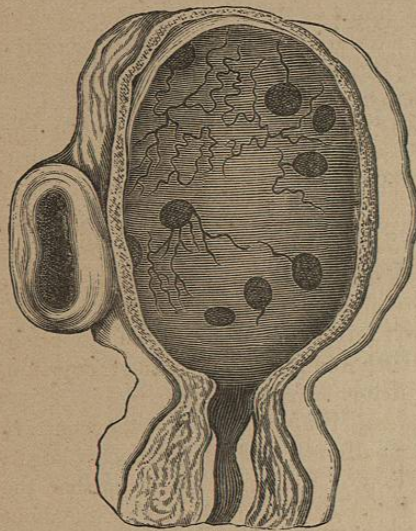


FIG. 61.—(Crosse.)

This process of stone formation, which goes on so readily in a sacculus, also takes place in the bladder when its floor is depressed behind a third lobe, in what is known as the "bas fond," or lower bottom. Here, too, the urine stagnates and deposits its salts, as crystals and amorphous dust, to be glued together upon a nucleus (kidney-stone), or, as is more usual, to become themselves consolidated by the cement of mucoid pus. In all cases of enlarged prostate, where there has been any considerable amount of residuum, stone is liable to form. *Stone is the logical sequence of obstruction to urinary outflow.*

A stone, or several, may exist under these circumstances without giving rise to any symptom. They are usually smooth, and do not scratch or irritate the floor of the bladder greatly, nor do they add much to the already existing pain. The fibres of the weakened detrusor cannot, during micturition, force a stone thus formed against the sensitive tissues at the neck of the bladder and produce the striking symptoms which characterize vesical calculus, when found in a healthy subject.

Enlarged prostate, by obstructing the free outflow of urine and damming up the bladder, tends to distend the cavity of the latter, gradually to dilate and congest the ureters and pelves of the kidneys, and ultimately to excite and maintain a mild inflammation of the cortical and medullary structure of the kidneys—which exists, as a rule, in all old cases. This kidney complication is easily aggravated by any increase in the bladder congestion; and any inflammation of the latter organ is apt to run rapidly up the ureters and further congest the kidneys, bringing on symptoms of mild uræmia, with more or less fever, hot, dry skin, loss of appetite, and a particularly dry mouth and tongue.

In these cases there is no suppression of urine, but on the contrary a marked polyuria, as a rule, occasionally attended by a trace of sugar, and usually showing an occasional cast, a little more albumen than the pus and blood in the specimen will account for, and a sp. gr. of about 1006 to 1016.

Swelled testicle sometimes accompanies one of these exacerbations of inflammation, but more usually follows the introduction of an instrument. The pressure of the enlarged prostate occasions also congestion of the hemorrhoidal vessels, while the violent straining not infrequently brings on some prolapse of the rectum. The distress attending this group of morbid changes is often so excessive that the patient's life becomes a burden to him.

The urine is that of catarrh of the bladder, and this catarrh, the inevitable accompaniment of prostatic enlargement at some period of its existence, is usually limited to the vicinity of the neck. Its tendency is to involve more and more of the mucous lining of the body of the organ, from the action of such causes as cold, over-acid urine, retention, etc. The urine is alkaline, or, even if faintly acid, it has an ammoniacal odor, and often a fetid, sickening smell, which occasionally disappears. When

the urine is acid, it is so because it comes down strongly acid from the kidneys, and all of its acidity has not been neutralized by mingling with the alkaline residuum. Whatever urine has been alkalized, deposits crystalline and amorphous phosphates, so that, even in those cases where the urine is still acid, it is murky, cloudy, filled with little strings and clots and clouds of pus, and with gouts of ropy muco-pus (pus agglutinated, and made translucent by ammonia). A few blood-corpuscles will nearly always be found, and more or less amorphous urate or phosphate (perhaps both), with (pretty certainly) crystals of triple phosphate entrapped in the "stringy mucus," and, possibly at the same time, crystals of uric acid, oxalate of lime, or others.

The above detail represents the course of changes as they occur in a majority of instances of enlarged prostate; but there may be variations. Thus the whole prostate may be enormously enlarged without any median posterior hypertrophy, and consequently without any appreciable diminution in the calibre of the urethra or obstruction to the outflow of urine. In these cases there is no residuum. The patient can empty his bladder entirely; but the obstruction to the return of venous blood from the bladder-walls, produced by pressure of the enlarged prostate, keeps up a congestion about the floor and neck of the organ none the less. Hence the symptom, known as irritability (constantly-recurring desire to urinate), is pretty sure to be present, sometimes to an intolerable degree. The bladder hypertrophies, but, instead of dilating, as is the rule, it may contract, and, as there is little or no residuum, sacculi do not form and atony does not come on. This condition of things, unfortunately, may occur even where there is some median hypertrophy and a small, constant residuum, and may even be found occasionally after the bladder has been overstretched by retention.

This is always to be regretted. A bladder that is thoroughly atonied, so that it can only slowly force out the urine through a catheter, is far preferable. Such a bladder is patient and uncomplaining, giving its possessor but little uneasiness. It is slow to take on inflammation, while the other form (where full contractile power remains, and irritability is present) is usually a torment to its owner as well as to the surgeon. The bladder contains little or no residuum, the urine continues acid and only slightly murky in appearance; but the calls to urinate are incessant, night and day, and the bladder cannot be made to contain more than an ounce or two of urine without feeling as if it were splitting. Thompson speaks of an old gentleman whose prostate formed an "enormous tumor" when examined by the rectum, yet repeated explorations failed to find a drop of residual urine. The patient was tormented by an incessant desire to pass water, and experienced great difficulty in the act.

Besides the two conditions already alluded to—namely, dilatation with great tolerance, and contraction with irritability—in the one case

the patient urinating rarely, unless there are atony, a large residuum, and overflow; in the other, great frequency of urination being always present—besides these two, there is one other condition, possible but rare, namely, true incontinence. Occasionally, the unsymmetrical development of the prostatic lobes leads to a slightly patulous condition of the internal orifice of the urethra, and causes true incontinence, the patient being unable to prevent a slight, constant dribbling away of the urine. In nine cases out of ten such dribbling is the result of overflow; but still the possibility of true incontinence must be borne in mind. A distinction between the two is easy. Empty the bladder by means of a catheter: if dribbling recur at once, we have incontinence; if only after some hours, overflow.

Course of Symptoms.—During all the time that these pathological changes have been going on, a period of many months, perhaps years, ever since there began to be a little hyperæmia around its neck, the bladder has been getting gradually irritable. The patient does not readily notice it, and will never be able to fix a precise date for the commencement of his troubles. An old man does not sleep soundly or pay the strictest attention to the performance of his habitual functions, and he so gradually acquires the habit of getting up a little earlier than usual in the morning to empty his bladder, that he pays no attention to it. Soon he finds that he wakes up once at night, perhaps twice, with a feeling of fullness in his bladder. He passes water, and goes to sleep again. He is also troubled a little more frequently than usual in the daytime, but he looks upon it as a condition natural to advancing life. He has learned that the little ills of the flesh, if let alone, usually regulate themselves. He has passed water without trouble for fifty or sixty years, and he thinks that he ought still to be able to manage it without applying to his surgeon. He shrinks from acknowledging a weakness, which he must admit to be, if nothing more, a symptom of advancing age, and so he goes on lulled to security, making water at intervals which gradually but steadily become shorter, getting up perhaps every hour at night, and constantly annoyed by a faint, obscure sense of weight and heaviness about the lower part of his belly, with, perhaps, a fullness in the rectum, and a dull pain behind the pubes. The bladder, now, is never empty; but the patient does not know it. Only an excess above a certain residuum can be passed off. The old man notices also, perhaps, that he has to wait a little while before the urine begins to flow, that the stream is small, and is not projected away from him with any force, and that, perhaps, a part of the urine dribbles down perpendicularly from the meatus, while the rest flows as a continuous stream. Possibly he cannot make the "coup de piston," the final spasmodic clearing of the urethra, and finds that a few drops dribble away upon his clothes after each urinary act. He does not experience quite as much ease and relief as usual, after micturition; but this has come on so

gradually, that he disregards it. He finds, however, when he is jolted through the streets in a carriage or car, that his calls to urinate are even more frequent than usual.

At this juncture he dines out, and drinks a glass or two of wine more than usual, or he neglects a call to urinate, or gets a wetting, or his feet and legs get chilled (the latter a very common cause of trouble), and suddenly he finds that he cannot pass water at all. After vainly trying at intervals for a number of hours, if he does not seek surgical relief, at last the urine will begin to dribble away from him. The bladder has been distended to its utmost, the mouth of the urethra has been dragged open slightly, and the excess of urine trickles involuntarily away. This is overflow and not incontinence. Meantime the patient has been suffering the torments known only to those who have had retention, and he hails the overflow with delight, believing that his sufferings are about to cease. The hope is vain. The congestion of the bladder neck, brought on by the use of liquor, or by the chilling, and which, added to the already large prostate, has swollen it sufficiently to shut up the urethra entirely, subsides shortly. Gravity, and the contractions of the abdominal muscles, and of the diaphragm, are together able to dispose of a certain excess of urine, which the overstretched bladder, now in a condition of atony, is unable to void. The patient, perhaps, recovers from his overflow, but his residuum is greatly in excess of what it was before his attack of retention, his calls to urinate are more frequent, he is disturbed more often at night. All his former feelings of uneasiness and pain about the hypogastrium and perinæum are increased; digestion is impaired; the appetite fails; and, worn out by loss of sleep, inability to eat, and constant uneasiness amounting to actual pain, the sufferer runs down, aging rapidly, and becoming fretful and irritable, losing all interest in business, and nearly all pleasure in life.

A second and third retention come on, and aggravate the situation. Perhaps a stone is forming, as is always apt to be the case. The bladder may ulcerate, and peri-cystitis ensue, and death finally close the scene, the most common mode of death being by uræmia, induced by a little extra congestion of the secreting portion of the kidneys.

The foregoing clinical history is that of a type case. It may be variously modified, according to the pathological condition of the bladder and prostate; there may never be any retention; on the contrary, there may be constant true incontinence, or the bladder may take on acute inflammation, after an over-distention, with retention, and carry off the patient with acute febrile symptoms. Pyelitis or peri-nephritis may come in as complications, and quickly close the scene, or certainly precipitate the catastrophe.

CHAPTER X.

DISEASES OF THE PROSTATE.

*Hypertrophy (continued).—*Diagnosis; Description of Instruments and Manceuvres employed in their Use.—Examination of Patient.—Methods of retaining Catheters in the Bladder.—Methods of deciding upon the Character and Extent of Prostatic Deformity as affecting the Course of the Urethra.—Treatment.—Treatment of Complications.—Internal Remedies in Prostatic Disease.—Natural Mode of Death due to Hypertrophied Prostate.

Diagnosis.—When a patient of over fifty comes to seek relief for frequent micturition, suspicion falls at once upon the prostate. It is rare that stricture causes trouble for the first time so late in life; moreover, with enlarged prostate, the inconvenience will, as a rule, have been first noticed at night—the reverse of what is observed in stricture. As the first step in the examination, the patient should be placed upon his back, with the knees elevated and abdomen relaxed, and a digital examination made through the rectum. By this means alone general prostatic hypertrophy can always be demonstrated. In place of the soft, chestnut-like body, hardly recognizable except by the skilled touch, the finger will encounter a rounded, dense mass, smooth and symmetrical, or variously distorted and nodulated. The median fissure between the lobes may be more than usually perceptible, or may be wholly obliterated; while the finger passed up on either side, between the prostate and the walls of the pelvis, recognizes a deepening of the sulcus, and any undue prominence in size of one or the other lobe. Forcing the finger well up the rectum, it may be impossible to hook the last phalanx above the posterior margin of the enlarged prostate, while the seminal vesicles can usually be made out on either side, partly embedded in the general hypertrophy.

Perhaps rectal examination may reveal none of these positive evidences of enlargement, median hypertrophy existing none the less. In such a case the finger readily detects the bladder, if it be distended, beyond the prostate; the latter apparently not at all or but little larger than normal. Pressure through the rectum upon an enlarged prostate does not cause pain, unless there be some inflammation about the neck of the bladder. It often, however, provokes a desire to urinate.

The next step in the examination is to make out the condition of the bladder by palpating and percussing the hypogastrium. Usually this method does not throw any light upon the condition of the prostate, unless it is exceedingly large, when pressure upon it through the rectum may be recognized by the hand upon the hypogastrium. The same