

They represent the scientific and the humanitarian spirit of the age and of the community. A community which is given to graft and selfishness and pure utilitarianism must expect to see its hospitals show the same characteristics. A hospital which is refused autopsies and scientific instruments cannot give continued good service. It must fall behind the standard of more enlightened communities.

But if our hospitals are not perfect they are, from the standpoint of the patient, the best in the world. Not that every hospital on this side of the broad Atlantic is better than every one of the same class in the old world, but that the sympathy, the feeling for the unfortunate, the spirit of self-sacrifice on the part of those who administer them is nowhere surpassed.

A perfect hospital cannot exist in this mortal world. It would require omniscience on the part of those who plan and erect them to foresee the changes that must come; omniscience on the part of those who administer them, and also forbearance and willingness to bear one another's burdens on the part of patients.

A CASE OF INTRA-VESICAL CYST OF THE URETER: DILATATION OF URETER WITH VERY SLIGHT DILATATION OF THE RENAL PELVIS AND CONTAINING TWENTY-EIGHT MOVABLE CALCULI; BACTERIURIA; ALKALINURIA; PHOSPHATURIA.*

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Cystic dilatation of the ureter has been occasionally reported, but the condition is a rare one. The following quotation is from Von Bergman's Surgery, vol. v, p. 227:

"In some cases, both in men and in women, an extra ureter, or a single ureter, may pass through the muscular wall of the bladder with a normal or dilated lumen and end in the mucous membrane either blindly or with a very fine opening. This may be due to epithelial adhesions. The portion of the ureter situated in the bladder wall often undergoes cystic dilatation under such circumstances. Such a cyst may be the size of a nut or very much larger. It may press upon the normal opening of the normal ureter of the same side and obstruct it, or, if it is large enough, it can also obstruct that of the opposite side. In this manner various degrees of unilateral or bilateral uronephrosis may result, as well as interference with the proper emptying of the bladder. This may lead to the development of calculi, cystitis, pyelitis, pyelonephritis, and death from uremia.

"If the cyst is large enough to reach the orifice of the urethra, or if it is situated in the urethra, it may greatly interfere with the passage of urine. The patient will then suffer not only from vesical tenesmus and irritation of the bladder, but also from a constant dripping of urine, or interruption of the stream, or complete retention. It is a curious fact that these symptoms have usually

reached a higher degree in the female than in the male, and in consequence the females who have been affected have died in infancy or girlhood, while many of the males have lived to adult life."

In the case here reported there was but one opening seen at any time. I have seen one other case in the adult female, which was successfully operated on by Dr. F. B. Harrington.

The case I am about to report is of great interest not only on account of the remarkable pathology and almost completely successful treatment, but also as an illustration of the value of a combination of several modern methods of diagnosis. Although a record case in point of number of ureteral stones there were none of the classical symptoms of stone in the ureter.

The logical development of the diagnosis follows:

Chief symptom — a turbid urine. The microscope showed that this was due to finely divided pus and bacteria. The three-glass test showed that the pus came from the bladder or kidneys. The diagnostic cystoscope showed that there were no stones or other lesion in the bladder itself except a cyst at the site of the left ureteral orifice. The x-ray not only showed that calculi were present in the left ureteral region, but it also showed that at different times these calculi lay in different relative positions. Thus the dilatation of the ureter was determined. The photocystoscope (thanks to Dr. O'Neil) recorded the appearance of the intravesical cyst.

By an operation combining the technic of suprapubic cystotomy and pyelonephrotomy, the stones and cyst were removed. Again, a year after operation the x-ray shows that no new stones have formed and the cystoscope shows that the cyst has not returned and that the ureteral opening is practically normal, both in appearance and function. Finally, I have recently with the catheterizing cystoscope catheterized the left ureter and determined that it is now but slightly dilated and also obtained information which shows that in spite of all that we have done there are still new fields to conquer, for we find a very mild degree of bacteriuria, phosphaturia and alkalinuria still present! Although the exhibition of urotropin holds these in check, I am afraid we must resort to the *fin-de-siècle* vaccine treatment to cure the bacteriuria.

I first saw this patient in September, 1904. He was a slight, rather poorly-nourished young man of Hebrew extraction and born in Moscow, Russia. He was twenty-four years old, and had lived in this country since the age of ten. During his childhood he was fairly well, though never rugged. He had scarlet fever in childhood. At one time, at about five years of age, he is said to have passed "worms." Until sixteen years of age he had nocturnal enuresis and even up to the time I saw him there was a tendency to incontinence, so that he had more than ordinary difficulty in controlling a full bladder. In 1900 he began to notice frequency and scalding. In 1902 he had a specific urethritis of very mild degree and was treated for it by injections for about three weeks, when the discharge ceased. Shortly before I saw him sounds were passed a few times on the supposition that his symptoms might be due to stricture. At no time had

* Read at the meeting of the Suffolk District Medical Society in conjunction with the Boston Medical Library, Feb. 5, 1908.

there been symptoms of acute cystitis, although the pre-existing frequency was perhaps aggravated by the sounds.

When first seen by me in September, 1904, he complained of only three things: frequency, scalding and sudden interruptions of the stream, with tenesmus. These symptoms had come on gradually and were first definitely noticed in 1900, although the patient thinks they existed even before this.

All the symptoms were mild in degree and could be tolerated well enough, except for their persistency. His physician considered them partly neurotic. His urine was but slightly turbid and opalescent. I regret that I have no positive record of the analysis, but I remember that the sediment consisted of finely divided pus and bacteria. I supposed the condition to be due to a mild chronic cystitis due to instrumentation, and prescribed urotropin.

The symptoms were somewhat improved by the drug and were tolerated for two years more without material change. He received no other treatment. In July, 1906, he again consulted me for the same symptoms. There was no change in any respect, — the urine was slightly turbid with pus and bacteria; there was slight frequency, scalding and tenesmus. Occasionally the checking of the stream resembled the checking caused by a free stone. There was no blood. There was no albumin. There had been no attacks in the slightest degree resembling ureteral colic or renal stone. There was no sign or symptom pointing to the kidneys, but the three-glass test showed the third as turbid as the first. Rectal examination was negative.

Since the presence of pus in the urine was persistent, it seemed to me that cystoscopy was indicated (and by the way, I consider this a pretty safe rule when the urethra is ruled out by the three-glass test). After cocaineizing the urethra I introduced a Kollman cystoscope without difficulty. The bladder mucosa was normal, except for the slightest possible evidence of chronic cystitis.

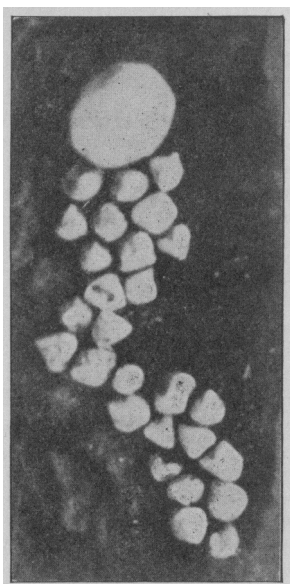


FIG. 1. Photograph of stones after removal. Natural size.

The right ureteral orifice was normal in appearance and function. In the region of the left ureteral orifice was a clearly-defined translucent cyst of remarkable beauty. It was apparently pedunculated and about the size of a cherry. (At the time I could not locate the left ureteral orifice, but at the operation it was seen to functionate on the mesial surface of the cyst.) On the

following day some very beautiful x-rays taken by Mr. Dodd showed a cluster of stones on the left side of the pelvis and a few more in the region of the kidney. As may be seen in the illustration (Fig. 1), one of these stones appeared quite large in contrast to the others which were all of nearly equal size. Curiously enough, in one of the pictures the large stone appeared at the bottom of the group and in the other at the top of the group. (Fig. 2.) This fact justified the diagnosis that

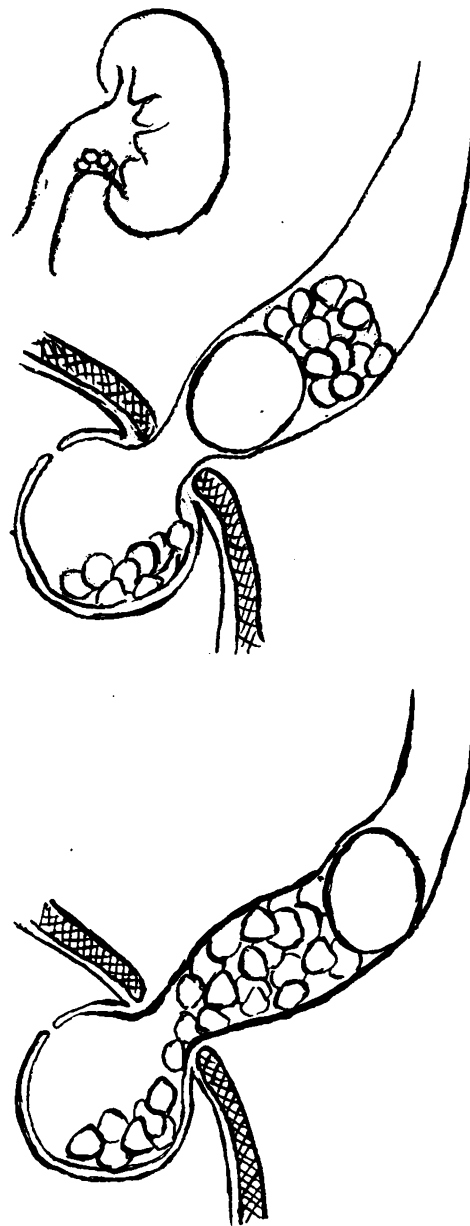


FIG. 2. Diagrams showing the reason why in some radiographs the small stones appeared below the large one and vice versa. Small ones could pass to kidney.

I was dealing with a greatly dilated ureter, the lower end of which formed a cystic projection into the bladder and which above the vesical wall was large enough to allow the numerous calculi, which it contained to easily change their relative positions.

Operation was performed at 38 Commonwealth Avenue, on Aug. 1, 1906. Before the patient was anesthetized, a cystoscope was again introduced and Drs. Chute, Davis and O'Neil were kind enough to

see the case with me and agreed in the diagnosis. To Dr. O Neil's skill I am indebted for this cystoscopic photograph of the cyst. (Fig. 3.)

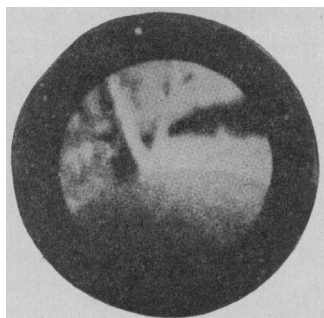


Fig. 3. Cysto-photograph by Dr. O'Neil. Upper portion of cyst occupies lower third of field. Trabeculae are shown in upper two thirds.

There was some difference of opinion as to the best method of removing the stones. I finally decided on suprapubic cystotomy combined with pyelonephrotomy. Suprapubic cystotomy was done in the usual manner and the intravesical cystic end of the ureter exposed. The ureteral jet was seen to spring from its inner surface. The orifice was minute, but a probe was passed into it without great trouble. The cyst was practically pedunculated, although the pedicle was as large as an ordinary pencil and of no length. The cyst itself apparently consisted simply of normal mucous membrane and was very thin-walled. It was clipped away with scissors to near the bladder wall, where its neck passed through the muscular layers. This neck was about the caliber of a lead pencil, but was readily dilated to admit the little finger. No stones were found in the intravesical portion but I was obliged to reach up with curved gallstone forceps in order to extract the 27 stones shown in the illustration. I have no doubt that this high position of the stones was due to the Trendelenberg position of the patient and that when he was upright the small stones could easily have dropped down into the intravesical portion. The large one, however, could not have got through the muscular wall without assistance. This might account for the fact that one of the x-rays shows the large one above the little ones, while another shows it amongst them. (I have recently operated on a case of gallstones in which I found practically the same condition. Possibly the presence of one large round stone, together with many small faceted ones in such cases, may indicate the existence of a constriction through which the small ones may at times escape the grinding of the big one.) With the hope that the redundant portion would shrivel and form a new ureteral orifice, no attempt was made to suture the remains of the cyst wall. The suprapubic opening was closed by purse-string suture around a drainage tube.

Since the x-ray showed evidence of several small calculi in the pelvis of the kidney, the patient was then turned on his side and I exposed the kidney in the usual manner through an incision in the loin. The kidney was pushed forward and the ureter and renal pelvis were exposed. The ureter was greatly dilated, but the pelvis of the kidney very slightly increased in size. It was just large enough for me to insert the end of my finger into it after incising the ureter. To my surprise no stones could be found at all, although I had a most satisfactory chance to feel for them with one finger in the pelvis and the other outside. I concluded that they must have passed on down the dilated ureter with the flood when the cyst was opened, and have been

among those removed at the lower end. This must have been the case since later x-rays showed no evidence of stones in this region. It was interesting to me to note that the renal pelvis was not dilated in proportion to the ureter itself. *This would indicate that stricture of the lower end of the ureter does not necessarily cause hydronephrosis.*¹

The opening in the ureter was not sutured, but the muscles and skin of the loin were closed, except for a small drain leading to the incision in the ureter.

The convalescence was in every respect normal, even unusually rapid, for the patient left the hospital with the wounds healed at the end of three weeks. A few days after the operation he passed, per urethra, another small calculus, which I must have missed at the operation. Three weeks later he returned to his law office and has been at work since. However, he has not been *perfectly* well. A very faint turbidity of the urine, which the microscope shows to be due to bacteria, still exists. There is practically no pus, but almost always a light and sometimes (especially in the morning urine) a heavy sediment of phosphates which clears up with acid. The reaction is persistently alkaline or neutral. X-rays taken on Dec. 27, 1907, show that no new stones have formed. Symptomatically there is still at times slight scalding and frequency, but not enough to give trouble, if small doses of urotropin are taken. When this drug is omitted, however, frequency, turbidity and scalding increase somewhat. At times he has passed per urethra small white granular masses of phosphatic material. It occurred to me that he might collect this material by carrying about with him an ordinary tea strainer and passing the stream through it when he went to the urinal. Specimens of phosphate gravel were obtained in this way. (Possibly this method of obtaining them may be in general use — at any rate, it is clean, convenient and effective.) I suppose that these little particles of phosphatic material might come under the term "gravel," but in my experience they are very characteristic of the disorder from which this patient is suffering, which may be called phosphaturia, bacteriuria or alkalinuria and which is a fairly distinct clinical entity. Surgical phosphaturia would be a good name for it. I have three other patients who present almost the identical signs. Whether the metabolic condition produces the excess of alkaline phosphates or whether the presence of bacteria produces alkaline changes in the urine soon after its secretion is the important question. I am of the opinion that the bacteria are responsible and that the change is accomplished in the urine in the renal pelvis practically as fast as it is secreted.

The following report of a cystoscopic examination, which I made on this case on Jan. 12 of this year gives a fair idea of the condition to which I allude:

The urine withdrawn from the bladder by catheter was neutral in reaction. The bladder mucous membrane was normal throughout, except that on the base behind the interureteric bar were about a dozen white granules of phosphatic deposit of minute size. These were not movable, but were lightly attached to the mucous membrane, so that they were not dislodged by washing. The mucous membrane to which they were adherent appeared normal. Both ureteric orifices appeared normal in function and emitted clear jets at intervals of ten to fifteen seconds. The right was nor-

¹ Another case of stricture of the ureter which I operated on in the fall of 1906 showed the same point. There was an intra-renal stricture at the bladder end. Laparotomy showed an enormously dilated ureter, which resembled a coil of small intestine, but the pelvis of the kidney was only slightly enlarged.

mal in appearance; the left was normal in appearance, except for a redundant fold of mucous membrane, which partially covered it. A sterile ureteral catheter was readily passed into the left ureter and a specimen for examination collected in a sterile test tube. The flow of urine was at first steady and rapid, but when the catheter was passed in several inches it became intermittent as in a normal ureter. This urine was faintly alkaline, contrasting with the bladder urine, which was if anything faintly acid. Therefore, presumably the urine from the right or normal kidney was acid. The right ureter was not catheterized for fear of infection.

The following is an excellent detailed report of the bacteriological examination by Dr. Roger Lee:

Three specimens, two received in sterile tubes, which are precisely alike. The third is a non-sterile specimen, voided by the patient. The sterile specimens were both obtained by catheterization of the left ureter.

Sterile specimens. — Macroscopically only a few fine shreds. Albumin, very slightest possible trace. Reaction is very faintly alkaline. Microscopically, there are a very few triple phosphate crystals, a very rare pus cell, blood cell and a few renal and caudate (from the pelvis of the kidney) cells, a very little mucus. No tubercle bacilli, a very few colon-like bacilli.

Bladder specimen. — Neutral; specific gravity, 1.014; albumin, very slightest possible trace. Macroscopically, on standing, a flocculent gray white precipitate of $\frac{1}{4}$ in. in the bottom of the glass. On heating, and the addition of acetic acid, this precipitate largely disappears, and is assumed to be phosphates. Microscopically, there is a large amount of amorphous phosphates and triple phosphates, considerable mucus in fine shreds, rather numerous pus cells, not clumped; a few blood cells; a few bladder (squamous and large round) cells, and an occasional renal cell. No casts, no fat, no tubercle bacilli; but very many colon-like bacilli.

Cultures were made from all three specimens on blood serum and hydrocele agar. From the bladder specimen, very many colonies of colon-like bacilli; no cocci. From the sterile specimens there were fairly numerous colonies of colon-like bacilli. No cocci; no gonococci. Further cultures were made, which showed that this organism, while belonging to the colon group on account of its morphology, gas production in glucose agar and motility, however, is not a typical member of that group, as it does not produce indol, nor does it coagulate milk, and moreover, *it does not make milk acid.*

A guinea pig was inoculated with a portion of the sterile specimens.

It will be seen from the above that this patient's condition at present lacks very little of being normal. I think that many cases after removal of phosphatic calculi would be considered well if their symptoms and physical signs were no worse than this, but the fact still remains that there is a tendency toward phosphatic deposit and that bacteria, though few in number, can be demonstrated in the urine from the left kidney.

The condition is not severe enough to demand operative procedures like drainage of the kidney pelvis in the loin or even frequent lavage of the pelvis of the kidney through the ureteral catheter. The probability of absolute cure from such treatment is not good enough to justify the chance of further impairment.

Dr. Lee is going to help me to investigate this case and the three other similar cases I alluded to from which I have also obtained bacteria from the renal pelvis by ureteral catheter. Bacilli of the colon group are present in them all. In all the cases the inflammatory symptoms are almost *nil* and all have alkalinuria, bacteriuria and phosphaturia. I believe that we shall find that these bacteria are really merely saprophytes living on the urine as fast as it is secreted and producing the alkaline chemical changes which in turn lead to the formation of calculi or at least chronic cystitis.

The calculi in this case were examined by Dr. Boos. They are composed of calcium oxalate and calcium phosphate. The "gravel" has the same composition.

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CLINICAL MEETING OF THE BOARD HELD MAY 8, 1908.

- I. A CASE OF EXTENSIVE TRAUMATIC STRICTURE OF THE URETHRA. REPAIR BY OPERATION.
- II. PERSISTENT HEMATURIA DUE TO VARICOSE VEINS OF PAPILLA OF KIDNEY.
- III. A CASE SHOWING CERTAIN OBJECTIONS TO EXPLORATORY HYSTEROTOMY.

BY HUGH CABOT, M.D.

CASE I. P. R., age twenty. Admitted April 9, 1907. One hour before admission struck by a railroad train. Examination shows fracture of the pelvis, with rupture of the urethra. Soft catheter fails to enter bladder. Gum elastic catheter drew 18 oz. of clear urine. Next day catheter could not be passed.

Perineal section done by Dr. Brewster. Anterior urethra found torn across by a fracture of the ascending ramus of the pubes. Sharp fragment of bone in wound. Posterior end of urethra could not be found. Bladder could be felt as a bulging tumor in the wound, and was punctured with knife. Tube inserted. A month later passing urine freely by urethra, without leakage. Soft bougie passed up to 27 French.

Entered hospital Oct. 7, 1907, for retention of urine. Bladder distended up to 2 in. below umbilicus. This was aspirated with a needle and 18 oz. drawn. The next day an instrument passed into the urethra stopped just behind the peno-scrotal angle, apparently striking against the front of the pubes. On account of the probable difficulty in identifying the posterior portion of the urethra, it was decided to open the bladder above the pubes, and explore from above. This showed that the prostatic urethra ended blindly behind the depressed fragment of the pubic bone, and that the opening made at the previous operation was below and behind the posterior border of the prostate. Bladder drained with tubes.

Oct. 16. Attempt was made to repair the urethra through the perineum. The urethra was exposed through a curved incision, similar to that used in perineal prostatectomy. Rectum found bulging forward and adherent to the lower margin and behind the pubic arch, with only a narrow passage upon the right side,