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Some Recent Important Advances in the
Diagnosis and Treatment

OF

Urinary Diseases in Women,

BY

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SOME RECENT IMPORTANT ADVANCES IN THE DIAGNOSIS AND TREATMENT OF URI- NARY DISEASES IN WOMEN.

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I need only briefly mention before this body of men, so closely in touch with all that is most recent in medicine and surgery, a discovery which I made over two years ago, and first described in *The Bulletin of the Johns Hopkins Hospital*, November, 1893, and with more detail in the *American Journal of Obstetrics*, in January, 1894, and still more fully in the first volume of the *Twentieth Century Practice of Medicine*, in February, 1895.

By means of this discovery diseases of the bladder in women were rescued from the obscurity which had previously enveloped them, and by one stroke made accessible to simple means of diagnosis,

ing also the little ureteral slits communicating with the ureters and the kidneys above.

Upon this last fact, the ability to see and get at the ureteral orifices, which seems so trifling in its bare statement, I wish to dwell to-night, speaking to you of some of the more important consequences which I have been able to develop from it.

In order that you may fully realize just where we stand in taking up this part of the subject, I will ask you to keep in mind some facts in connection with the ordinary methods of diagnosis and treatment of surgical affections of the kidneys in women.

In the first place, recall the obscure posi-




Fig. I. Ends of renal and ureteral Catheters Nos. 1 $\frac{3}{4}$ and 2

and the way made easy for simple and certain methods of treatment, to replace difficult and haphazard procedures.

The principles of this method, you will recall, are briefly the following:

1. An atmospheric distension of the bladder secured by posture.

2. The inspection of the inner walls of the distended bladder through a simple straight tube, by means of a light reflected by a head-mirror.

By turning this tube or speculum in various directions all parts of the bladder walls are successively brought into view, includ-

*Address delivered before the Academy of Medicine, Pittsburg, December 2, 1895.

tion of the kidneys, concealed in the loins, protected by the ribs, and beyond the reach of touch. Remember that the function of the kidneys is one of such vital importance that each individual is provided with two of them, so that one may supplement the other in case of injury.

The ordinary way of making a diagnosis of disease affecting them is, as you know, (a) by a consideration of the symptoms, notably obscure; (b) by an attempt at palpation through the entire thickness of the abdominal walls; and (c) by examination of the urines secreted from the two sides and thoroughly mixed in the bladder before they are collected.

Note further the uncertainty which attends every diagnosis, as to which side is affected, and then if a site of the disease is determined, the doubt as to the exact condition of the other kidney. Note also, if the question is raised in the course of an operation, as to the advisability of sacrificing a kidney, how vital the query, "What is the state of the other kidney?" "Is it sound?" "Is the other good enough to do the work of both if one is taken away?"

It is my good fortune to have found sim-

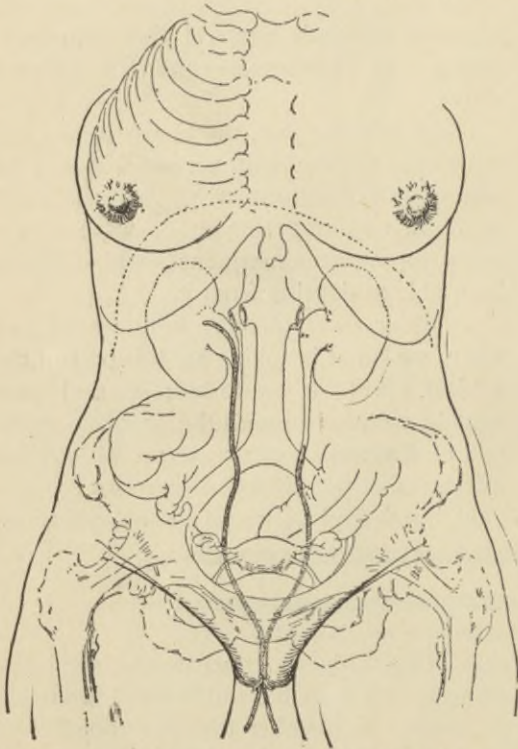


Fig. II. Renal catheter in place on right side, ureteral catheter in place in left.

ple answers to all these difficult and heretofore unanswerable questions.

I have repeatedly made diagnoses which but a short time ago seemed beyond the range of possibility, and I have even been able to give entire relief to some patients without operation, and by very simple plans of treatment, when under any other plan they must inevitably have undergone a severe surgical operation.

The list of diseases where diagnostic in-

formation is wanted is short; it comprises the various infections due to the presence of micro-organisms in the pelvis of the kidney, e. g.: tubercle bacillus, colon bacillus, staphylococcus pyogenes, streptococcus pyogenes, and gonococcus; neoplasms, cancer and sarcoma, hydronephrosis, and renal calculus.

The new methods of making a diagnosis are chiefly of two kinds, by using short ureteral or long renal catheters, and by means of hard rubber bougies. I have had two series of catheters made, varying a quarter of a millimeter in diameter, from 2 to 3 mm, respectively 30 and 50 cm. long. They are of woven silk, coated many times with varnish and polished smooth. The lumen of the catheter and an oval eye 2 cm. back of the conical end, allow fluid to pass freely in or out.

The bougies are used as sounds to detect and overcome resistance, and to diagnose a blockade in the ureter, such as a stone or a stricture.

The catheters are sterilized by boiling in pure water for two minutes, and are kept for use in glass tubes plugged at the ends with cotton.

A wire stylet stiffens the catheter during its introduction and prevents it from coiling up in the bladder.

The ureteral catheter is introduced by exposing the ureteral orifice through the speculum, and then, as the assistant holds the outer end of the catheter over the shoulder of the examiner, the latter introduces the conical end within the ureteral orifice and simply pushes the catheter steadily on up the ureter, gradually pulling it off from its stylet, the end of which is firmly held by the assistant.

The catheter is introduced up the other ureter by taking the speculum out and reintroducing it alongside the first catheter. The opposite ureteral orifice is then exposed and catheterized in the same way as the first.

The ends of each of these catheters are now introduced into separate test tubes

plugged with sterilized cotton where the separated urines from right and left kidneys are collected.

A chemical, microscopic and bacteriolog-

under the microscope that I might know what kind of a peritonitis I had to deal with; it contained abundant pus corpuscles, and in the cells were numerous colonies of gon-

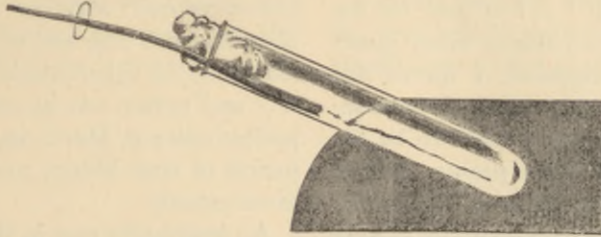


Fig. III. Urine draining through ureteral catheter into tube held in block.

ical examination of these urines collected in the course of from a few minutes to several hours or more, will reveal any differences existing between the two kidneys.

DIAGNOSIS IN PYURIA.

As an example of the utility of these new diagnostic methods I will cite some of my cases of pyuria, covering briefly the whole range of the subject to show you how well the field has been cleared up. You are all aware from your practical experience that when pus is found in the urine it is difficult to know certainly just where it comes from. To support this assertion I need only refer you to the vague and unsatisfactory treatment of pyuria in your text-books. I recall also, out of a large personal experience, the long series of women who have come to me with a pyuria of years standing, who have been constantly under treatment, without the slightest advance towards a diagnosis.

Here are some illustrations: In a patient with small quantities of pus in her urine, at intervals, I found nothing abnormal in the urinary tract until I squeezed the under surface of the urethra against the pubic arch, when a large drop of yellow pus exuded from the right Skene's gland, and the difficulty was cleared up.

Only last week I operated on a woman who was ill with an acute peritonitis. On opening the abdomen I first took up with sponges from among the intestines a lot of milky serum. This was put immediately

ococci. As I lifted the Fallopian tube out of its bed of adhesions thick pus oozed from the fimbriated extremity; this also contained innumerable colonies of gonococci. The grade of inflammation was so intense and adhesions so extensive, that tubes, ovaries and uterus all had to be removed. Coverslips taken from the interior of the amputated uterus also showed pus cells containing gonococci. I took coverslips from the vaginal cervix, and from the vagina; I emptied Bartholin's glands on the vulva and took coverslips, and finally I squeezed a little milky fluid out of the urethra, and found in every specimen abundant pus cells and everywhere the same colonies of gonococci; the whole pelvis of the patient was saturated with a gonorrhoeal infection from urethral orifice up into peritoneal cavity.

A third case was one of sub-urethral abscess, of years' standing, associated with intense pain in urinating. The endoscope introduced into the bladder and gradually withdrawn from the urethra, showed a fine opening on the floor of the urethra, through which pus at once welled up and filled the lumen of the speculum.

A case occurring last Wednesday, Nov. 27th, was one of peculiar interest. An old woman constantly discharged large amounts of pus in the urine, and there was nothing in her history or a digital examination throwing any light upon its source; a cystoscopic examination showed tit-like protu-

berances at the base of the bladder, surrounded by a localized high-grade inflammation. Up in the vaginal vault I found a little opening in the midst of some nodular scar tissue, which I at first took for the cervix, but in order to exhaust every possible avenue of investigation, I forced the tip of my finger into this orifice; it encountered a hard body, which proved to be the handle of a cup and stem pessary put in many years ago; this had been lost in the vagina and had become pocketed by closure of the vagina below it, and the handle ulcerated through the vaginal walls, and the cup part through the base of the bladder. The suppuration from the ulcerated area discharged by both bladder and vagina. After the removal of the pessary a sound passed into the bladder readily entered the vagina also.

Another patient had a pyuria of years' standing and of uncertain origin; I found

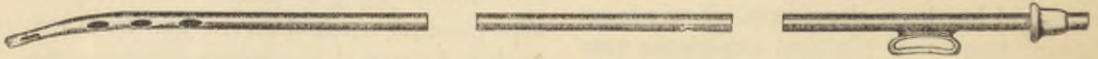


Fig. IV. Metal ureteral catheter, for stricture of ureter low down.

by a cystoscopic examination an inflamed patch on the right side of the bladder posteriorly, and located a fistulous orifice in the midst of some cedematous granulations. I passed in a searcher and saw the pus and air escape from it. I then found an old contracted, hitherto unsuspected tubercular abscess discharging through the base of the right broad ligament into the bladder.

A young woman of about twenty-five years of age came to me with a pyuria of nine years standing. In the course of the investigation I passed a catheter into the right ureter and left it there, and a little clear, acid, dark brown urine was discharged into the beaker drop by drop. On the left side it was difficult to introduce the catheter far up the ureter owing to some resistance within the ureter itself, and after waiting about ten minutes there was no discharge of fluid. I then took hold of the catheter, and with some difficulty and delicate manipulation succeeded in coaxing it

a little further in when it suddenly cleared an obstruction and the urine began to escape rapidly in a continuous stream, filling the beaker in a few minutes, with a pale lemon-colored alkaline urine, containing abundant pus cells and tubercle bacilli. The diagnosis of tuberculosis of the right kidney and ureter was at once made, and the patient relieved, March 30, 1893, by the extirpation of both kidney and ureter—Nephro-ureterectomy.

An instructive case in the diagnosis of pyuria is that of Mrs. S., who came to me two years ago with a marked pyuria, which the most careful investigation had failed to clear up. I found, on examination with a cystoscope, that the region about the left ureteral orifice was puffy, red, and cedematous, and so covered with papillæ that I was only able to find the opening after repeated prolonged searches, and even after finding it I could not get a catheter well into the ureter. One

day, however, I was more fortunate, and it slipped in with a peculiar twisting movement, which I was a long time in imitating again, until I finally learned the corkscrew twist of a tight stricture of the vesical end of the ureter, when I had no more trouble. No sooner was the stricture passed than a large amount of pale yellow urine escaped, with an abundant pus sediment, 160 cc. in all, showing that the ureter above the stricture was extremely dilated. A bacteriological investigation showed that the gonococcus was the cause of the infection and the stricture. In this way the diagnosis was cleared up.

Mrs. B. came to me from Washington with high fever, prostrated by a long continued intense pain in the right side, where a tumor could be felt between the rib margins and the iliac crest, very sensitive to touch. I put her in the knee-breast position and introduced a speculum, sought out the ureteral orifice and passed a renal

catheter up into the pelvis of the kidney. After waiting some minutes and seeing no flow from the catheter, I sent her to bed in the ward, leaving the catheter in place. Dr. Clark in making his rounds afterwards and finding that nothing had escaped from the kidney, connected the end of the catheter

expecting to die shortly; she not only recovered entirely from an extensive pyelonephrosis, but regained her health and left the hospital having gained 15 lbs. in weight.

I could multiply these cases, but enough has been said to show the facility with which pyuria, one of the most difficult subjects in

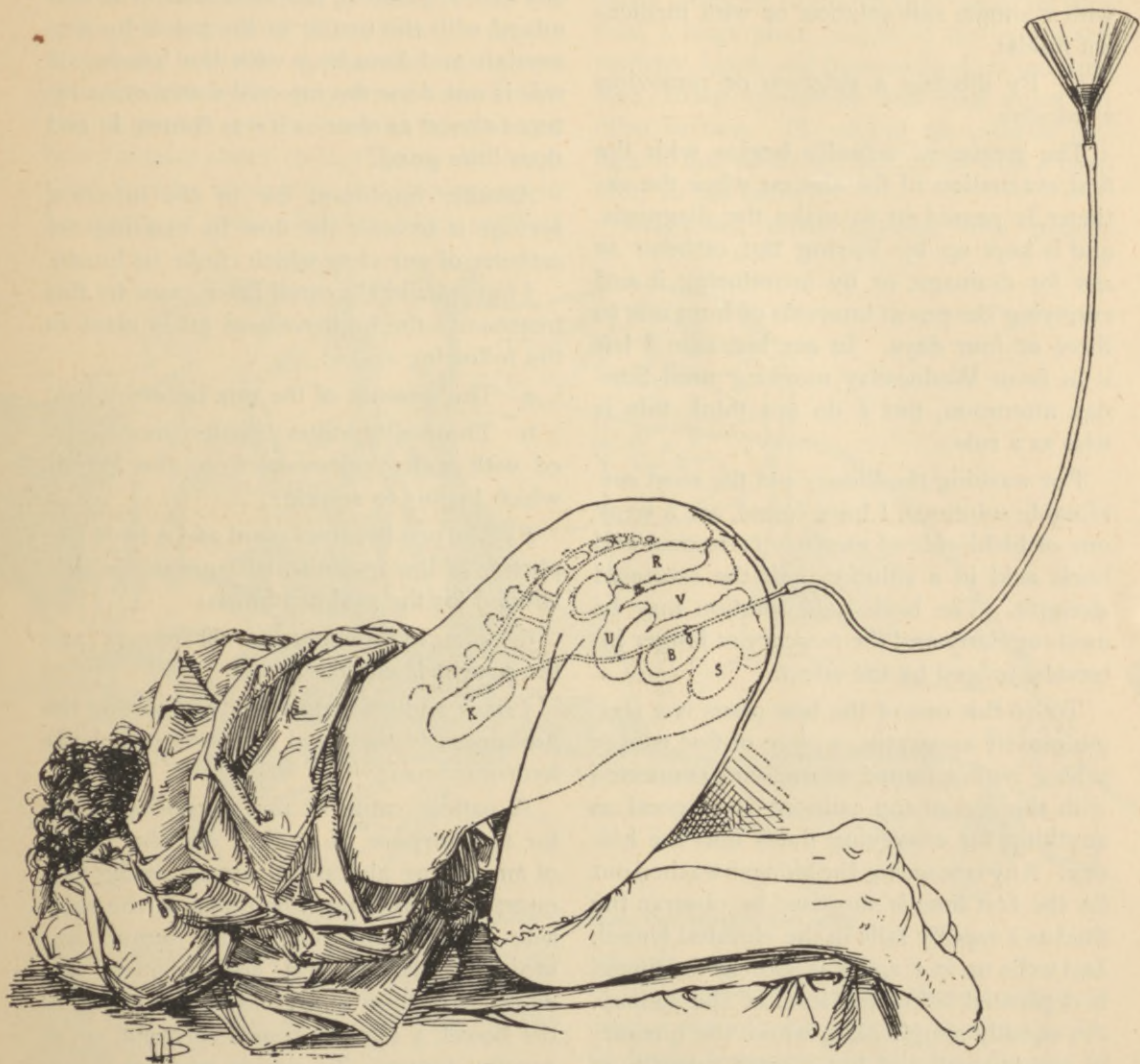


Fig. V. Washing out pelvis of kidney; fluid running in.

with the aspirator bottle and put on suction and was rewarded by the escape of 280 cc. (over half a pint) of thick yellow pus, and the diagnosis was made—Pyonephrosis.

The same thing occurred in the case of another woman brought in on a stretcher,

medicine, has been cleared up.

TREATMENT OF URETERAL AND RENAL PYURIA.

Any active treatment of ureteral or renal pyuria has up to now always been surgical, but the ease with which we can now invade this whole tract with our instruments

of precision also opens up fruitful avenues for treatment, curing many cases without operation.

There are three ways of treating the pyuria by our new methods:

1. By evacuating the pus;
2. By washing out the abscess cavity with a simple salt solution or with medicated fluids;
3. By dilating a stricture or removing a calculus.

The treatment actually begins with the first evacuation of the abscess when the catheter is passed in to make the diagnosis, and is kept up by leaving the catheter *in situ* for drainage, or by introducing it and emptying the pus at intervals of from one to three or four days. In my last case I left it in from Wednesday morning until Sunday afternoon, but I do not think this is wise as a rule.

For washing the kidney out the most serviceable solutions, I have found, are a weak one of bichloride of mercury (1-10,000) and boric acid in a solution half the saturated strength. The boric acid solution may be used regularly and the mercury at longer intervals, judged by the effect.

To do this one of the best plans is a simple gravity apparatus, a piece of fine rubber tubing with a funnel at one end connected with the end of the catheter is as good as anything for conveying fluids into the kidney. Any one seeing the kidneys washed out for the first time is surprised to observe the fluid as it rapidly falls in the elevated funnel, and wells up in it again as soon as the funnel is depressed below the level of the kidney. An equally simple plan, where the quantity of pus is small and but a small quantity of fluid is to be injected into the renal pelvis, is to throw it into the catheter with a small syringe, not more than an ounce (30 cc) or two in capacity, connected with the catheter by means of a short bit of fine rubber tube. I make it a point after evacuating large accumulations from the kidney, never to inject more than 2-3 or 3-4 of the amount

taken out. Once when the rule was inadvertently broken the patient suffered from an intense renal colic.

When the pus is too thick to flow, the syringe serves an excellent purpose by throwing in a watery fluid and thinning the pus which then escapes readily. If the kidney can be handled, the water should be well mixed with the matter in the pelvis by succussion and kneading with the hands. If this is not done the injected water often returns almost as clear as it was thrown in and does little good.

Another important use of the injection syringe is to start the flow by clearing the catheter of any clots which choke its lumen.

I have definitely cured three cases by this treatment—the improvement takes place in the following order:

- a The amount of the pus becomes less;
- b The pus becomes thinner, more mixed with watery elements from the kidney which begins to secrete;
- c The pus becomes scant and a hydronephrosis of low grade (small amount) is substituted for the pyelonephrosis;
- d The hydronephrosis* disappears and the patient is cured.

I have had one opportunity of testing the usefulness of the renal catheters in a large hydronephrosis.

A patient came to my consulting room for the purpose of finding out the nature of an obscure abdominal tumor, as big as a quart measure lying low down in the right side of the abdomen. The tumor was moveable, elastic and not sensitive, and might have been a large kidney, a tumor of the bowel, a retroperitoneal sarcoma, or an ovarian tumor. To decide whether it was a kidney or not I put her in the knee-breast posture, exposed the right ureteral orifice, and passed in a long renal catheter. There was a little escape of fluid which increased on squeezing the tumor between two hands, as suggested by my associate, Dr. Ramsay, until the whole thing collapsed completely, demonstrat-

ing the fact that the case was one of hydronephrosis of high grade.

A woman with a large tumor in the right side of the abdomen was obliged to stop her work in a reformatory institution near Baltimore on account of rapidly failing health. The mass was evidently renal but a deceptive sense of fluctuation made the diagnosis between a vascular malignant growth and a hydro or pyonephrosis doubtful. I passed a renal catheter up and got down at once about 10 cc. of urine and some black specks, shown by the microscope to be pieces of stone, but the large resilient

examination showed them to be masses of uric acid.

Operation and removal of a calculus 11x16 mm. in diameter from pelvis of right kidney.

Case II. Mrs. W., Pyonephrosis; small black pieces of stone brought away by suction, a large piece caught in the eye of the catheter, black and mammilated on one surface, sharp crystalline and buff color on other surface. The end of the catheter disfigured and scratched by contact with a hard body in the kidney.

Diagnosis, renal calculus with pyone-

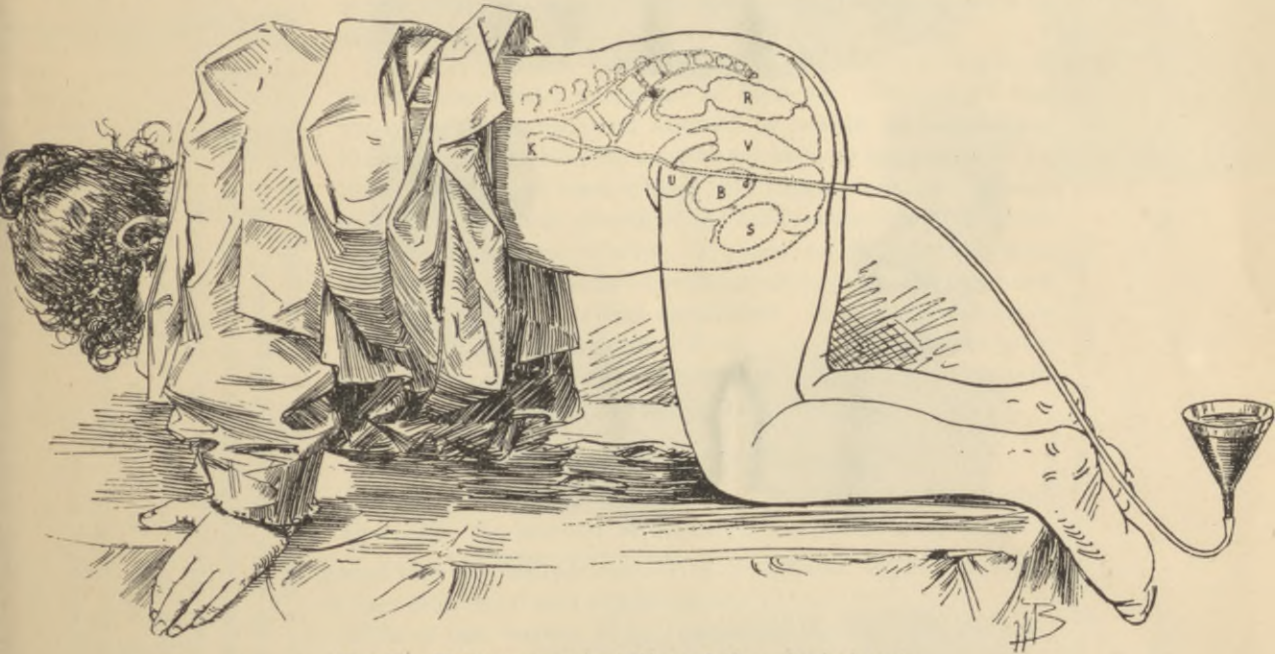


Fig. VI. Washing out pelvis of kidney; fluid running back again.

mass remained the same. The diagnosis was carcinoma or sarcoma of the kidney, with calculus and hydronephrosis of low grade.

Finally in the diagnosis of a renal calculus the catheters have been of the greatest service. In evidence of this I will briefly cite two cases just published in detail in the *Medical News*, Nov. 30, 1895.

Case I. Miss S., pyelitis; colon bacillus infection. Several black specks withdrawn from pelvis of kidney by suction through renal catheter. Microscopic and chemical

phrosis.

In conclusion I would present to the profession the following data to serve as guides in future investigations of renal diseases in women:

1. In all cases of pyuria from urethral orifice to the renal pelvis the location of the infected surface can be easily determined.

2. The presence of a calculus in the pelvis of the kidney may be determined by the renal catheter or bougie.

(a) Either by bringing down bits of the stone, or

(b) By the scratches on or change in form of the end of the catheter or bougie.

3. Strictures in the ureter may be precisely located.

4. Hydronephrosis can be diagnosed and differentiated from soft malignant growths.

5. Strictures of the ureter may be treated by dilating catheters or bougies.

6. Infection of the ureter and renal pelvis can, by emptying and washing out with

medicated solutions, be cured without surgery.

7. We have at our command a precise way of estimating the functional value of each kidney, judged by the amount of urine discharged and its constituents, a fact of the highest importance in forming a prognosis and deciding upon operation; it is therefore incumbent upon the surgeon in all cases to give the patient the benefit of this analysis before operating.

Bulletin 846-VII-5960. PROCEEDINGS
THE JOHNS HOPKINS HOSPITAL MEDICAL SOCIETY.

The Treatment of Pyo-ureteritis and Pyonephrosis by Ureteral and Renal Catheters.—DR. H. A. KELLY.

I want to give this evening a brief resumé of some important work going on in the gynæcological department during the past year, namely, *the treatment of pyo-ureteritis and pyonephrosis by the renal catheter*. In the first place, a word or two as to diagnosis; by means of my cystoscopic apparatus, shown to this society in October, 1893, and the renal catheters first used in April, 1893, I have been able, in all cases with great facility and sometimes in a few minutes, to trace to its source the pus found in the urine of women.

Judging by the number of cases I have met with, pyuria in women appears to be common, and as a rule its source is utterly unknown to the practitioner in charge.

I have found pus in all parts of the urinary tract, from the external urethral orifice up to the kidney. In one case there

was an abscess in one of Skene's tubules at the orifice; in two other cases a suburethral abscess discharged into the urethra and filled the vesical speculum with pus as it was drawn out.

In another instance a contracted pelvic abscess opened into the bladder through the right broad ligament; by my cystoscope I could see the opening and run in a sound, and by pressure cause pus to ooze out.

In other cases I have been able to locate the affection in the urinary tract *above the bladder* by getting separated urines from both sides, and examining it bacteriologically and microscopically; a careful examination of the urea will determine the working coefficient of each kidney, a valuable point in the judgment as to the safety of operating.

I want to dwell now more particularly on the treatment of ureteral and renal pyuria by the renal catheter. There are two ways of treating accumulations of pus in the kidney by the renal catheter: *a)* by evacuation; *b)* by washing out.

a) The treatment actually begins with the first evacuation

when the pus is drawn off by the catheter, and may be continued either by leaving the catheter in the kidney for several hours (as in one of the first cases, where it was left in from 12.30 p. m. till late in the same evening), or for several days (from Wednesday morning until Sunday evening, in a case now in the house). By leaving the catheter in for a length of time I have been able to evacuate and drain an abscess, and then by introducing the catheter at intervals of one to five days I can keep it well drained. In several patients I have introduced it as often as once daily, in one woman over 120 times in all.

b) *Washing out the kidney.* In each case the kidney has been washed out after evacuating the pus, by a syringe connected to the catheter. I first used simple gravity for this purpose, by connecting the catheter with a funnel by means of a rubber tube. As the funnel was held high or lower, the fluid ran in or out (*v. JOHNS HOPKINS HOSPITAL BULLETIN*, February, 1895).

I have used solutions of 1-150,000 bichloride of mercury and gradually increasing to 1-2500 and in one case even to 1-1000.

In some instances I have used boric acid, and in one nitrate of silver. I find that the occasional use of the bichloride solution with the regular use of boric acid solutions gives good results.

Sometimes it only seems necessary to let the pus out to start an improvement. A case in point was that of Miss D., sent to me by Dr. Norment of Baltimore. She had an abscess in the pelvis of the kidney, and another just below the pelvis in the ureter. The lower pocket contained 45 cc. of pus. I evacuated these in my office, and she improved so much that she returned to work and abandoned further treatment.

The washing out may be repeated at intervals of 1 to 4 days, according to the condition of the patient and the way she stands it. This little procedure does not call for anæsthesia. The quantity injected is usually not more than two-thirds that of the fluid withdrawn. In one instance, in using the force-bottle of the aspirator, a quantity was accidentally forced in larger than that which came out, and the patient at once had a severe renal colic. Three women had ureteral chills and fever in the course of the treatment, with nausea and general malaise; there were two or three chills, and a sharp rise in temperature, highest on the second day, gradually subsiding and disappearing by the fourth or fifth day; the initial chill was more marked than the subsequent ones. The temperature went as high as 104 in one case and 103 in another, but no harm resulted, and treatment was continued.

The progress towards recovery is often as follows: After from five to ten catheterizations, the thick creamy pus begins to become watery and of low specific gravity, containing a small amount of urea (0.3 to 0.7 per cent.). Finally the pus disappears, leaving a hydronephrosis of lesser volume than the original pyonephrosis, and later the hydronephrosis too disappears and the condition becomes normal.

I will now briefly cite a few of my cases:

Case 1. Mrs. B had been in the Hospital about a year before for a suspensory operation. At that time she complained of frequent micturition. The urine was examined and the bladder inspected and found normal. She returned a year later, suffering extreme pain in the right loin, with high temperature, and wretchedly depressed. I put her in the

knee-breast position, passed a catheter up the ureter into the kidney, but nothing came, as the pus was too thick to flow. I left the catheter in and sent her to the ward, where Doctor Clark attached the aspirator and drew out 280 cc. of thick, greenish pus, of fetid odor. Her kidney was then regularly washed out with bichloride and boric acid solutions, and the urine became clear. One time by mistake a 1-1000 solution was used; she suffered a good deal of pain, but made more improvement than after any previous treatment. She was finally discharged perfectly well after about 12 washings, with clear urine and without pain.

Case 2. Mrs. S. was brought here on a stretcher about four months ago, apparently in the last stages of illness and not far from death. I introduced the renal catheter, made suction on the end, and drew down a large amount of pus, and then washed her kidney out. The bladder specimen, examined at the time of admission, was reddish in color; thick white precipitate; acid; contained a trace of albumen.

Microscopic examination showed the entire field filled with pus cells. No tubercle bacilli found. Urea, one-half normal. Specimen of urine from right ureter, pale lemon-color, with lower layer of gray thick sediment and an upper layer of sediment. Quantity too small for chemical examination. Field filled with pus cells. One hyaline cast. Amount of urea, one-fourth the amount of the mixed urine. Urine from left ureter: slight amount of albumen present; few leucocytes; few epithelial cells. Urea three times as much as from the diseased side. She has been washed out regularly, and the kidney, on entrance larger than a child's head, is now quite small; there is no more pus in the urine and she is well. She has gained 15 pounds.

Case 3, Mrs. S., a gonorrhœal stricture low down in the ureter, has been reported in the BULLETIN (February, 1895) and will, therefore, not be reported in detail. Washed out over 120 times, with the result that from containing 150 cc. of pus, the kidney and ureter now contain 90-100 cc. of clear urine. I could not relieve the stricture entirely, and she still has a hydro-ureter.

Case 4, Miss S., was washed out over 100 times. Instead of getting better she got gradually worse. One day on applying suction to the end of the catheter I brought out a couple of black granules which proved to be masses of uric acid. I concluded upon this find that the inefficiency of the washing was due to a mechanical cause, a stone in the kidney, so I cut down and removed a small stone as big as the end of my thumb.

Case 5 was sent to me from Chicago for diagnosis (*v. Med. News*, Nov. 30, 1895). I was able to settle it by drawing out pus and urine through the catheter by suction, together with a number of little black specks and some granular debris; but the smaller specks were apparently of calculus. On withdrawing the catheter, a little calculus, black and mammillated on one side and buff-colored and jagged on the other, was found in its eye. The microscope showed that this was broken off from a larger stone. The end of the catheter also, instead of being smooth and round, was hammered down and angular and the side scraped off. This patient has not been operated on, but there can be no doubt about the correctness of the diagnosis.

