which has been advocated up to the present time must be emphasized, and I believe that this is the general consensus of opinion among surgeons. This is simply due to the intricate histological structure of the skin. Then, again, the nails with their sulci and spaces around them are practically impossible to render sterile. All scratches and abrasions which are hardly visible to the naked eye are prolific sources of germ infection and all such foci which contain the most virulent material are with difficulty disinfected.

The object of mechanical cleaning is to partially remove the bacteria from those places where they have become deposited and also to render the latter more accessible to the action of antiseptics. Cutting and trimming the finger nails, followed by their cleansing, is the basis of all disinfection methods. Cultures made from the subungual space after disinfection will usually give rise to the growth of innumerable colonies of more or less virulent bacteria, and since the space beneath the nails is usually the most difficult part of the hands to disinfect, too much stress cannot be laid upon the careful attention to this point. For this reason I strongly believe in having the hands carefully manicured at least once a week by a competent operator. It is better to first soften the parts by scrubbing with hot water and soap and a sterile brush, and then proceed with the cleansing and cutting process of the nails and subungual spaces. It has always appeared to me that an ivory nail cleaner is by far the best and I cannot too strongly condemn the use of sharp iron ones, because they tend more to roughen the nail and subungual spaces and I also believe that orange wood sticks have the same disadvantage, although to a lesser degree.

After the preparation of the nails the real mechanical cleansing is begun, which is usually carried out with brush, soap and hot water. It should include the hands and forearms, particular attention being given to the palm and between the fingers and, like the entire act of disinfection, it must be carried out with the greatest conscientiousness and attention. The temperature of the water recommended has varied greatly, but I believe that it should be as hot as the hand can comfortably bear. By the use of hot water the epidermis swells up and softens so that the brush will remove its upper layers along with the bacteria therein contained.

Regarding the soap, one should use ordinary soda soap or green soap. According to Furbringer the latter has the advantage of causing the upper dead layers of epidermis to swell up more than with any other soap, on account of the large amount of free alkali contained in it, while at the same time it absorbs the fatty secretions of the skin. Others object to soft soap, because, when sand or a brush is used, it is supposed to interfere with their action on account of its sticky consistency. If, however, one takes into consideration that it is rapidly dissolved, this objection would appear to be groundless.

(To be continued.)

Clinical Department.

TWO CASES OF KIDNEY INFECTION ILLUSTRATING THE VALUE OF CYSTOSCOPIC EXAMINATION AND URETER CATHETERIZATION. TREATMENT OF THE CASES BY VACCINES.

BY JOHN H. CUNNINGHAM, JR., M.D.,

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THE object of this communication is to mention two cases of unusual interest from the Genito-Urinary Department of the Boston City Hospital. In both of these cases an erroneous diagnosis of cystitis had been made, due to the fact that the symptoms were entirely vesical, although in reality the lesions were renal. The diagnosis in both of these cases was made by means of the cystoscope, and could not have been made in any other way. The establishment of the diagnosis by this means made it possible to recover the organism producing the lesion, from which a vaccine was prepared from the urine collected aseptically from the infected organ.

Following is a brief account of the cases:

CASE NO. I. A PURULENT URINE PERSISTING FOR SEVEN MONTHS AFTER AN OPERATION FOR URETHRAL STRICTURE.

G. R. Fifty-two. Swede. Was operated upon Dec. 10, 1907, for a deep urethral stricture, the result of a gonorrhea many years previous. The operation consisted of an internal and external urethrotomy.

Five weeks following the operation the patient came to the Genito-Urinary Out-Patient Department. The urine was purulent in character. Sounds 28-29 passed easily to the bladder. The patient was irrigated almost daily for nearly five months, the amount of pus in the urine diminishing little if any.

On July 1, 1908, the patient stated that he was passing his water four times a day and twice at night and had been doing so for the past three months. The stream is of good caliber, starts easily and there is no dribbling. A soft rubber catheter No. 28 Fr. passed easily to bladder. No residual urine. Bladder capacity, 14 oz. There are no renal symptoms and no tumor tenderness in the renal region. General condition good. No stone could be detected by a stone searcher. External genitals normal. Prostate normal.

Urine examination. — Purulent, 1024; $\frac{1}{4}\%$ of 1% albumen. Sediment great in amount, consisting entirely of pus, normal and abnormal blood.

In view of the fact that the urethra is patent throughout and that the urine remains as cloudy as at the time of operation, a cystoscopic examination was undertaken to ascertain if possible what might be keeping up the inflammatory process.

Cystoscopic examination. — July 2, 1908. Bladder entered with soft rubber catheter No. 21 Fr. No residual urine. In order to obtain a sufficiently clear media for the examination, it was necessary to irrigate the bladder for forty minutes. Bladder capacity, 14 oz. Bladder distended with 8 oz. of sterile water. The deep urethra and bladder was anesthetized with 2 oz. of a 2% solution of cocaine. The cystoscope passed into the bladder without meeting obstruction. Bladder wall rather more injected than normal. Rugae pronounced. Trigone distinct, deeply injected. Vesical surface of prostate normal. Issuing from

the left ureteral orifice was a plug of pus which resembled thin cream cheese. This oozed slowly from the ureteral opening. The left ureter functionated at intervals of fifty-five seconds, and the urine was always cloudy and occasionally contained bits of the same thick white substance as on the right. The ureteral mouths were normal in size, the lips slightly thickened and reddened. The ureteral catheters were passed into both ureters for a distance of six inches, meeting no obstruction. The urine collected from both sides was equal in amount and extremely cloudy, practically the same color as the voided urine. Following the removal of the ureter catheters and cystoscope, the patient voided the distended median, which was slightly cloudy.

Examination of the separate urines. The sediment in both urines was considerable and equal in amount and possessed the same characteristics. It consisted chiefly of pus. There were also degenerated cells, normal and abnormal red corpuscles, but no crystals or casts.

Bacteriological examination. — (Dr. Geo. P. Sanborn.) Smears show organisms resembling the bacillus coli communis. Cultures of each urine show pure cultures of this organism.

As a result of the cystoscopic examination it was decided that the patient had but a very slight chronic cystitis, and that the origin of the pus in the urine was from both kidneys which were infected with the bacillus coli communis. Irrigations of the bladder were, therefore, omitted, and the patient was placed under the care of Dr. G. P. Sanborn, who had made vaccines from the cultures obtained from the urine.

Dr. Sanborn's remarks on this case are as follows: After three weeks' treatment with colon vaccine the urine became less cloudy and continued to do so until he left off treatment Oct. 1, 1908. His general condition gradually improved so that he was able, after three months, to go about as a traveling salesman without the exhaustion which had been an unpleasant symptom previous to July 1. During this time weight increased gradually (20 lb.). Frequency of micturition was considerably reduced.

During October and part of November, 1908, the patient's business kept him out of town. He thought he felt well enough to dispense with treatment. On his return the middle of November his urine was nearly as cloudy as at first, but his general condition remained good. He has been inoculated three times since his return. The total gain in weight up to date has been 30 lb. The urine, while it is less cloudy than at the start, has not returned to the condition it was when he left off treatment. The improvement in the frequency of micturition has maintained, being now three times at night and every three hours during the day.

The further indications would seem to be a gradual increase in the dosage of colon vaccine, not with the expectation of completely clearing the urine of bacilli, but with the hope of further immunizing against them; secondly, further investigation with the idea of possible tubercle in the kidney.

CASE NO. II. A PURULENT URINE PERSISTING FOR SEVERAL MONTHS, DIAGNOSED CLINICALLY AS CYSTITIS.

J. R. Fifty-five, male. American. Bank cashier. Admitted to the Boston City Hospital, Nov. 2, 1908, on Dr. Paul Thorndike's service.

Past history: denies venereal; grippe twenty years ago.

Present illness. In December, 1907, had a cold which lasted one week, about which time he noticed that he passed more water than ever before, although for

the past ten years he had been rising three or four times each night. On one occasion six months ago he had a similar attack of polyurea, rising as many as twenty times at night. This lasted about three days. Has never had any pain referable to the urinary system; or blood in the urine.

Pathological examination. — General condition good. Examination negative in every respect except that the urine is cloudy.

Urine. — Twenty-four-hour amount, 110 ccm., pale, turbid. Specific gravity, 1016; acid. Albumen, slightest possible trace. No bile or sugar. Sediment, considerable in amount, consisting of many pus and medium round cells, bacteria and triple phosphate crystals; an occasional normal blood corpuscle. Some squamous epithelium.

Cystoscopic examination. — On Nov. 6, the patient was sent to the out-patient department by Dr. Paul Thorndike, through whose kindness the case is mentioned. The voided urine was very cloudy. The bladder was entered with a soft rubber catheter No. 14 Fr. No residual urine. Bladder capacity, 9 oz. Bladder easily washed clean. Cocaine anesthesia. Six ounces of sterile water used as distending median. The cystoscope passed easily to the bladder. The bladder wall and trigone were normal in every respect. The right ureteral orifice was normal in appearance, and the ejaculations of urine occurred at intervals of about thirty-five seconds. The ejaculated urine was very cloudy. The left ureteral orifice, normal in appearance, ejaculated a clear fluid at the rate of about forty seconds. Both ureters were catheterized, and from the right side was collected a very cloudy urine; in fact, the same degree of cloudiness as in the voided urine. The urine collected from the left side was normal in appearance. Following the cystoscopic examination the patient voided the distending median, which was clear. The collected urines were given to Dr. Sanborn for examination.

Dr. Sanborn's remarks are as follows: The appearance of the specimens of urine from the bladder and right kidney, when shaken, was that of milk. When settled, there was a layer of sediment from $\frac{1}{2}$ to 1 in. thick. The supernatant urine remained very cloudy, and this was proven to be due to the large numbers of colon bacilli present.

The report of the Pathological Department on the examination of these urines is as follows:

Specimen from right ureter. — Very cloudy. Smear and culture show presence of bacillus coli in abundance and few staphylococci. Much pus, mostly polymorphonuclear leucocytes, and some red blood corpuscles.

Specimen from left ureter. — Slightly cloudy. Culture, bacillus coli and some staphylococci. Oxalate crystals. Occasional pus cells.

The urine from the right kidney had all the characteristics, in appearance, of that passed from the bladder, was milky and largely pus. That from the left ureter was straw colored, very slightly cloudy and had little sediment.

Tubercle bacilli were searched for by two workers, but none were found.

"X-ray" examination Nov. 5. No renal or ureteral calculi were seen.

In consideration of the good general condition of the patient; of the fact that apart from occasional dull aching pain in the small of the back there were no serious subjective symptoms; that there was no evidence of stone, of enlargement or serious disintegration of either kidney, there seemed to be no urgent indication for the removal of the right kidney. From the presence of bacillus coli in such numbers in the urine from the right kidney it seemed reasonable to

assume that infection by this organism was a partial, if not a predominating, factor in the production of the condition found, and it was decided to make the attempt to immunize the patient to the colon bacillus by the use of a vaccine prepared with the organism obtained from the urine.

At this time, Nov. 7, 1908, the patient was discharged from the hospital, and the treatment by vaccines begun.

Inasmuch as the presence of colon in the urine may not necessarily mean that it is pathogenic in a given case, definite evidence of specific infection was sought. The serum of normal individuals is known to agglutinate colon bacillus from their own intestinal tracts in dilutions of 1 to 50, but no higher. This patient's serum tested against his own colon bacillus produced complete agglutination in all dilutions up to 1 to 128 in five minutes at room temperature. It was borne in mind, however, that colon infections are very commonly only secondary to a basal tuberculous disease, and to rule this possibility out a guinea pig was inoculated with pus from the right kidney, both intraperitoneally and in the groin.

Vaccine having been prepared in the usual manner, inoculations were begun Nov. 9 and have been continued two or three times a week ever since. After the fourth inoculation, the urine, which had at first, as stated, the appearance of milk, assumed a distinctly straw color. After standing, the sediment in an 8-oz. bottle, which at first was from $\frac{3}{4}$ to 1 in. deep, diminished so that it was scarcely $\frac{1}{4}$ in. The supernatant urine was still cloudy, however, from bacteria present. The frequency of micturition, which had been six times nightly, was reduced to three times.

During December, 1908, the second month of treatment, the dosage of vaccine was increased gradually. By the fifteenth of December the urine was noted, after sedimentation, to be of a normal straw color. It was cloudy when first passed, but after settling the supernatant urine was almost clear. At times the sediment was barely sufficient to cover the bottom of an 8-oz. bottle; at times there was a $\frac{1}{4}$ -in. layer. At the end of December smear showed but few colon bacilli in the pus, and but few in the clear urine after sedimentation. The urine was then almost free from colon bacilli after two months' treatment. The frequency of micturition did not show continued improvement, and reverted to the original five to six times a night, and during the day, every two hours or so.

The general condition did not show the marked improvement that one would expect. The subjective symptoms were seemingly improved a little. Moderate exercise produced some exhaustion as at the start. During December there was a loss of 5 lb. in weight. The failure of the patient to show the improvement which one would expect to accompany the changed condition of the urine again brought to mind the possibility of tubercle. On Jan. 7, 1909, Von Pirquet's tubercle-cutaneous test was performed with a distinctly positive result.

Though there is little doubt that a positive test is an indication of tuberculosis present or past, the question of interpretation in a given case is apt to be very difficult. In consideration of the absence of any suggestion of tuberculosis in the physical examination; of the long-drawn-out history of frequent micturition (ten years); of the presence of colon infection in the kidney so common an associate with tubercle; the absence of marked improvement; in fact, the loss of weight when the condition of colon infection had actually become better; the possibility of renal tuberculosis came prominently into mind as the best ex-

planation of the positive cutaneous test in its relation to the facts already elicited. It was, therefore, decided to use tuberculin R. as a therapeutic measure.

Beginning Jan. 7, 1909, tuberculin was given subcutaneously once each week. At the time of this writing, five inoculations have been given. The dosage has been minute, and no constitutional symptoms have been produced. During this period, over four weeks, the patient has gained 6 lb. Whereas he has never admitted that there was much improvement in his subjective symptoms previously, he now states that he feels stronger and has a better appetite than in November and December; that, whereas during these months the frequency of micturition was every two hours or so during the day, he now finds that he can hold his urine three or more without discomfort. In connection with these statements of his, it should be stated that he did not know that tuberculin was being given. The improvement that he notes would not, therefore, seem to be imaginary.

On Jan. 29, 1909, the guinea pig inoculated, as stated, Nov. 12, 1908, died. Autopsy showed a generalized miliary tuberculosis involving peritoneum, pleura, spleen, lungs, etc., and smears showed tubercle bacilli in large numbers.

The interest of this case from the standpoint of specific treatment lies at present, perhaps, not as much in its being an example of the efficacy of bacterial vaccines, as it does in furnishing evidence of the accuracy of a bacteriologic diagnosis which is fundamentally necessary; of the measures that one must execute to arrive at such a diagnosis, to the end of arriving at a safe and rational basis for every attempt at immunization with specific bacterial vaccines. The importance of cystoscopic investigation of the bladder, of ureteral catheterization, of "x-ray" examinations, of animal inoculations, when necessary, for a basis for clean-cut diagnosis, for accurate prognosis and for specific treatment, seems clearly demonstrated by the sequence of events in this case.

As to prognosis, it seems that it should be guardedly favorable. The treatment with colon vaccine and tuberculin will be carefully continued and the case will be recorded with others of the same type at a later date.

Conclusions. — In Case I there is some excuse for not having attempted to arrive at a more intelligent understanding of the condition of the upper urinary tract, inasmuch as this patient had had a very tight stricture for a long period of time with accompanying cystitis. After the division of the stricture treatment was directed toward improving the cystitis. Experience has proven that it is the usual thing for a cystitis to improve following the relief of the obstruction. On the other hand, the fact that the infection may extend from the bladder up the ureters of the kidney is often forgotten. In this case we delayed cystoscopic examination much longer than was wise. When cystitis is present as a result of obstruction in the ureter from stricture, its improvement following operation and as a result of bladder irrigation is progressively better and often rapid. The fact that improvement did not take place at all, after many weeks of

local treatment following the operation, should have led us to suspect a kidney infection and to an earlier cystoscopic examination.

The cystoscopic examination changed the aspect of the case entirely. The urine obtained from both kidneys by means of the ureter catheters showed a pure culture of the bacillus coli communis, from which urine collected aseptically Dr. Sanborn was able to make his cultures and vaccines. The improvement following the employment of the vaccines was manifested in two ways. First, the general condition was markedly improved, the patient gaining thirty pounds and feeling very much better in general health. Locally, although the bladder irrigations were discontinued, the urine became less cloudy up to the time he ceased treatment by vaccines (Oct. 1). On this day, Oct. 1, 1908, the urine was much less cloudy than at any time since the patient had been under observation. After the pus, which was small in amount, had settled, the supernatant urine remained slightly cloudy, which cloudiness was due to the colon bacillus.

He was away a period of six weeks without treatment, during which time the urine again became more cloudy and his general condition failed somewhat. He resumed treatment the last of November and it has been carried on for the past eight weeks. The urine has not returned to the condition that held at the time treatment was stopped. It has, however, improved in the amount of pus present and in the cloudiness. The general condition has again improved.

An interesting and important question presents itself: as it is seen that the patient's general condition and the urine improved while the vaccines were being administered, and the improvement gained was temporarily lost when the vaccines were discontinued, the question is, Will the vaccine ultimately destroy the infection and cure the patient, or will it be necessary to continue the use of vaccines constantly to maintain the improvement?

In Case No. 2 the diagnosis of cystitis of unknown origin was the most probable one in view of the symptoms and the urine examination. The patient, having received no benefit from treatment of the bladder, and inasmuch as the etiological factor producing the cystitis could not be detected, the cystoscopic examination was undertaken to determine what the underlying cause of the bladder inflammation might be.

It has been emphasized by those most familiar with the subject of genito-urinary surgery that cystitis must always have an underlying cause, which in nearly every instance can be discovered. This, however, can bear repetition.

Another most important point in connection with this case, as also in the other, is that the bladder symptoms were referable not to this organ, but to the kidney, although the symptoms in no way suggested kidney disease. It has been pointed out many times by authorities that the presence of a cloudy urine with bladder symptoms, especially frequent urination, may be in

reality a disease of the kidney. This point is illustrated by these cases.

Another most important point is that the tubercle bacillus will often escape detection in the examination of smears, while the same urine inoculated into the guinea pig will give positive signs of tuberculosis.

It is to be pointed out, also, that the tubercular infection of the kidney is usually a mixed infection, in this instance the infection being tubercular, together with the presence of the bacillus coli communis. It is probable that the pyuria in this case was due to the double infection, and the improvement noted as following the treatment with the vaccine obtained from the cultures of the bacillus coli communis was due to a lessening of the part played by this organism.

It is a question of judgment whether this patient should be treated by a removal of the infected organ or by hygienic measures and the vaccines. Be this as it may, the cystoscopic examination has proved of value in making the diagnosis positive.

TWO CASES OF PERFORATED DUODENAL ULCER.*

BY JOSEPH R. WISEMAN, A.B., M.D.,
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CASE I. E. M., aged thirty-five, laborer in a carriage factory, married, has three children. His mother died of tuberculosis, otherwise the family history is negative. The patient smokes and drinks in moderation, denies venereal disease and has always been well and strong.

For the past two weeks he has complained of epigastric pain which has caused considerable discomfort. It usually comes on about 11 o'clock in the morning and lasts most of the day. In character the pain is sharp and persistent and seems to have but little relation to the ingestion of food. There has been no vomiting, no blood noticed in the stools and no other adverse symptoms.

At four P.M., June 1, 1908, he was suddenly seized with terrific epigastric pain. The suffering was so intense that he could do nothing but walk the floor or sit doubled up with his hands pressed into the upper abdomen. I saw the patient about an hour after the onset of symptoms. He presented such a clear picture of agonizing pain that its relief was evidently of the first importance, and without attempting a definite diagnosis I at once gave him morphia, $\frac{1}{4}$ gr., hypodermically. This barely quieted him and he could not remain still long enough to permit a satisfactory examination. All that could be determined was that there was a very rigid abdomen with tenderness across the upper region. Believing that we were dealing with some serious, deep-seated trouble, we at once telephoned for the ambulance and had him taken to St. Joseph's Hospital.

Upon admission the patient was examined by Dr. Jacobson. The face was anxious and drawn, the tongue moderately coated, heart and lungs apparently normal. The abdomen presented a boardlike rigidity upon which practically no impression could be made by the examining hand. Across the upper zone of the abdomen, especially in the epigastrium, was a

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