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CONSTANT IRRIGATION IN CHRONIC CYSTITIS.¹

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It is well known that in cystitis, sooner or later, the products of inflammation are liable to decompose in the bladder, and that, as a consequence, the urine becomes ammoniacal and, in turn, by its irritating properties, increases the inflammation.

The most important question in connection with treatment is, How shall this vicious circle be broken? In some cases, where the cause is no longer acting, success in this direction is followed by recovery; and in others, dependent upon causes which cannot be removed, great relief is obtained.

The difficulty of meeting the question is sufficiently shown by the means adopted for keeping the bladder empty, such as dilatation of the urethra and vaginal cystotomy in women, and perineal cystotomy in men. It is certainly desirable that the same end should be reached by simpler means, which would secure the complete removal of the products of inflammation, as well as the urine itself, before either had time to undergo decomposition. The latter takes place so rapidly that intermittent irrigation, so long in use, often proves ineffectual. It therefore seemed desirable to try the effect of a constant current of warm water through the bladder. The following two cases show the results obtained. Though not so complete as could be wished, the examination of the urine still showing some of the products of inflammation of the bladder, and though the trouble may return, the patients were made so comfortable as to justify the publication of the cases, in order that a knowledge of the results might secure a more extensive trial by others, and establish the value of the proceeding much sooner than it could otherwise be done.

CASE I. On October 6, 1876, a woman, twenty-four years old, who had been employed as a cook, entered the Massachusetts General Hospital. Although she had been married more than six years she had never been pregnant, but had been well except for the dysuria on account of which she entered. This began six years before, being pre-

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ceded by nearly constant dull pain in the back, also at times in both iliac regions and in the hips, always worst at night.

About two months after the pain began micturition became frequent and painful, and so continued. She was always obliged to pass urine from two to four times in the night, and had a burning pain during micturition. Finally, the burning sensation became nearly constant. It seemed to be in the neck of the bladder, and was worst just after micturition, which was sometimes attended by straining. During the past two or three months she had often passed gravel, the pieces sometimes being as large as a bean. The menses had always been regular, lasted from three to four days, and were not particularly painful, though the trouble with micturition was generally worse at this time. There had been much headache for some years. At times within two months the feet had been so much swollen as to prevent her putting on her boots. Any unusual exercise caused palpitation and dyspnoea.

She had done no work since June, 1876. The appetite was poor, and she had lost flesh for a year and a half. The bowels were regular. Sleep was disturbed by pain and the necessity of rising to pass urine.

She entered the hospital under the care of Dr. G. G. Tarbell, who reported no distention of abdomen, but marked tenderness on pressure or percussion over the region of the bladder. Uterus high in the pelvis; apparently normal, with the exception of slight ulceration about the os; not tender on pressure, though pressure on bladder caused great pain. There was a peculiar purplish appearance of the os and surrounding vaginal wall. Carbolic acid and glycerine were applied to the os, and the bladder was syringed twice daily with a solution of carbolic acid, one part to one hundred and twenty.

At this time the *urine* was turbid and *alkaline*; specific gravity 1019; albumen one per cent.; sediment abundant. An examination with the microscope showed pus, blood, bladder epithelium, and crystals of triple phosphate. A week after, October 15th, it was reported that the introduction of the catheter, as well as the injected fluid, caused much pain, but the latter was followed by a sense of relief which lasted two or three hours. The water injected came away bloody, and contained coagula, which clogged the catheter so much as to require removal frequently. Micturition was still frequent.

It was directed that the bladder should be washed out with flaxseed tea three times a day. The urine at this time was high colored, slightly *alkaline*, specific gravity 1020, albumen two per cent. There was a heavy deposit of pus and blood, and in addition to this the microscope showed degenerated bladder epithelium and crystals of triple phosphate.

October 22d. Micturition was as frequent as before, but there was less tenderness of the bladder on pressure above pubes and by the vagina. There was also much less blood in the water after syringing.

On October 29th the urine drawn before syringing was clear at first, then contained clots, and then was free from blood. The water used in syringing was sometimes tinged with blood, but more frequently was clear.

On November 2d the patient came under my care, and injections with the same solution of carbolic acid were ordered to be given every half hour during the day, the double catheter being allowed to remain. These injections were made by means of a bottle suspended at the head of the bed, perhaps eighteen inches above the level of the pelvis, but the height was regulated so that the pressure did not cause pain.

On November 3d the report was that irrigation had been used from two till nine P. M. The water which escaped was always tinged with blood, and a few small coagula were seen.

On November 4th the catheter had been well borne, though kept in the bladder from 7.30 A. M. till 8.30 P. M. She had been obliged to pass urine but twice during the preceding night. The water which escaped was much clearer than when irrigation was first used. The urine which passed this morning after the night's rest contained comparatively few coagula, and was much clearer.

On November 5th the water which escaped from the bladder had still a reddish tinge, but only a few small clots were seen.

On November 6th the injecting fluid which escaped was quite clear, but the urine which collected during the night was dark colored and contained much sediment. It was turbid and still alkaline; specific gravity 1021; albumen one and one half per cent.; sediment very abundant, largely blood. The microscope still showed pus, blood, bladder epithelium, and crystals of triple phosphate.

On November 8th the urine passed the night before was much clearer, and there was less deposit.

From the 8th to the 17th the urine presented about the same appearance, and the patient was comfortable.

On the 19th the catheter was left out, and there was some increase of pain the morning following.

On the 22d, as there was some irritation and blood had reappeared, the catheter was again left out. She continued, however, to complain of pain in the back and hypogastrium, and the catheter was reintroduced on the following day, with relief. During the week preceding the 24th she had more or less loss of appetite, and nausea, and vomited once or twice.

On the 27th the urine was darker colored and contained a few clots.

On the 29th the appetite was good, and she felt better than for two weeks.

On November 30th constant irrigation day and night was ordered.

On December 3d the carbolic acid was omitted, and water of about

the temperature of the body was substituted. On the night of the 4th the catheter was omitted, in order that the condition of the morning urine might be ascertained. The latter, on the morning of the 5th, had the normal color. The sediment was moderate in amount and less dense.

On the 12th it was turbid, of normal yellow color, *acid*, specific gravity 1020; albumen one fourth per cent. Sediment moderate, but still containing pus and bladder epithelium.

On the 15th the catheter was omitted at two P. M., and was not introduced again until the following morning. She was obliged to rise but once during the night to pass urine. The catheter was again omitted at the same hour on the 17th. An examination of the urine on the morning of the 18th showed that it was still acid; there was only a trace of albumen. The sediment consisted of a light cloud, containing pus and bladder epithelium, less marked than before.

On the 19th, after a similar omission of the catheter, the sediment occupied only about an inch in the glass (about eight ounces), and was simply a light cloud, as before.

On the 22d irrigation was omitted from nine A. M. until 7.30 A. M. on the following day. During this time she was up, and perfectly comfortable. She stated she had not had so comfortable a day for six years. She had been obliged to rise once in the night, but the irritation was less than formerly. The urine was about the same as on the 10th.

On November 23d irrigation was omitted twenty-four hours. She was perfectly comfortable, passed urine but once in the night, of about the same character as before.

After free irrigation with a solution of carbolic acid (one part to one hundred and twenty), on the afternoon of the 24th the catheter was withdrawn.

On the 26th she reported that she had been obliged to pass urine but twice during the day and once at night, but its passage was accompanied by some irritation. The urine of this date showed twice as much sediment, of the same character as before.

On the 29th it was still acid; specific gravity 1018; albumen one fourth per cent. The sediment was half an inch in depth, but was very dense, and pus was quite abundant.

On the 30th she felt as well as before, though the urine still contained the increased amount of pus as the previous examination.

On the 31st, as she had had some pain in the region of the bladder, irrigation was recommenced.

The pain persisted until the morning of the 4th of January, when the urine was acid; specific gravity 1019; albumen one fourth per cent. The sediment was dense and half an inch in depth, and contained much pus.

On January 9th, after omitting the catheter twenty-four hours, the urine appeared the same as on the 4th, but on the 11th the sediment was less than ever before, and appeared in the form of a light cloud half an inch deep. On this day the patient left the hospital, feeling perfectly well.

CASE II. A married woman, thirty-two years old, a native of Ireland, entered the hospital on December 4, 1876. She had had three children, the last two years before. After the birth of this child, and taking cold, she thinks, she began to have frequent and painful micturition, and to pass blood with the urine. No pain at other times. No fever. These symptoms continued, though at the time of entering she passed less blood than before. She was obliged to get up two or three times in the night, and there was constant soreness about the meatus. Though never confined to the bed, she had lost some flesh and strength. Appetite fair. Bowels regular. Complained of sharp, cutting pain, which obliged her to empty the bladder frequently, though the pain was worse during and after the passage of urine. She could at times resist the inclination, and the pain would pass off, but at other times the urine would escape involuntarily. She had also passed a substance resembling mortar, which occasionally would cause temporary obstruction.

The mucous membrane about the meatus was somewhat swollen, but the catheter passed without pain.

Urine yellow and turbid; specific gravity 1025; *alkaline*; albumen one per cent. Sediment abundant, consisting of pus, blood, bladder epithelium, and crystals of triple phosphate.

On December 10th constant irrigation with the double catheter was begun, as in the preceding case, and was continued twelve hours daily for three days. She suffered only from the introduction of the catheter, but the urine escaped at times around it. She had forcing pains when standing erect. On the 12th a small fragment of mortar-like material was found in the catheter.

An examination of the urine on the morning of the 13th, after the catheter had been omitted twelve hours, showed the color to be normal; specific gravity 1024; *alkaline*; albumen one half per cent. Sediment much less than before, containing mucus, pus, blood, and crystals of triple phosphate.

On December 16th the patient was seen by Dr. Minot in consultation, and the bladder was explored, but no calculus was found.

Irrigation was then resumed, and continued without intermission during the twenty-four hours. She bore the catheter well, and there was less escape of urine around it.

On the 22d, after omitting the catheter during the night, the urine was found to be of a normal yellow color, cloudy, and *acid*; specific gravity 1024; a marked trace of albumen. The sediment was much

less dense than before, and contained pus, a few blood corpuscles, and bladder epithelium.

The nurse reported more clots on the previous day than before. The patient was obliged to rise twice in the night to pass urine, but had no pain.

On the 26th, the catheter having been omitted twenty-four hours, it was reported that the urine had been passed but once during the day and once in the night. It was cloudy, *acid*; specific gravity 1023; only a trace of albumen. There was but little sediment which contained a few corpuscles and bladder epithelium.

On the 28th the irrigation was again omitted twenty-four hours; the patient was up and about, and passed urine but three times, its passage causing some irritation.

On January 12th the catheter was withdrawn, and was not introduced again.

On the 14th the dribbling noticed on the 7th, after the temporary removal of the instrument, had ceased, and there was no irritation in the neighborhood of the bladder, but there was some pain in the back, and she was obliged to pass urine three times during the night and twice during the day.

Between December 28th and January 15th the urine was examined several times, the variations being in the amount rather than in the character of the sediment.

On January 15th the urine was cloudy, *acid*; specific gravity 1019; a trace of albumen. Less sediment than ever before, containing a few scattered pus corpuscles.

She was about the ward, and the urine continued about the same until she was discharged, January 23d. On February 6th the patient wrote that she had been comfortable since returning home, with the exception of pain in the "small of the back."

It will be noticed that the urine in both cases was alkaline until the irrigation was constant, that it soon after became acid, and so continued while the patients were under observation. While pus was still formed the blood disappeared, and none was found in either case for some time before the patient left the hospital. The time necessary for the change from alkaline to acid may be much shorter than is shown here, but a number of cases are necessary for a complete demonstration. The partial irrigation at first employed may have been instrumental in bringing about the result, but much of the time spent in this way was probably lost. Through fear of interrupting the continued irrigation too soon it may have been continued unnecessarily long before testing the urine. But when the latter was found to be acid it was too late to ascertain *how soon* it became so. We only know that it was so in six days. Other cases are needed in which the urine can be tested in five, four, three, and two days after the commencement of constant irrigation.

In regard to the apparatus, nothing more is needed than a vessel to hold the water, a double catheter, and sufficient india-rubber tubing to convey the water to and from the bladder. The flow may be regulated either by a stop-cock attached to the reservoir, or by some compression of the tube. The position of the vessel should be such as not to cause pain by excessive pressure, but it is desirable that the bladder should be fully distended at times, in order that the whole surface may be thoroughly cleansed. Patients may learn to do this by simply compressing the efferent tube from time to time. The quantity of water needed is about a barrel in the twenty-four hours.

ERYTHROXYLON COCA.

BY G. ARCHIE STOCKWELL, M. D.

COCA is the dried leaf of the shrub *Erythroxylon coca* or *Erythroxylum Peruvianum*; order, trigynia; class, decandria; habitation, mountainous districts of Peru and Bolivia, two thousand feet and upwards above the level of the sea.

To the native Peruvian and Bolivian coca holds the same relation as the betel-nut to the Malay, the tea-plant to the Celestial, poppy and Indian hemp to the Oriental, and tobacco to the Caucasian. To it he is as much the slave as were Dr. Johnson and Gilbert Stuart to rappee. Beyond the confines of the country to which it is native but little seems to be known of coca; nevertheless it is, without doubt, one of the most remarkable products of the torrid zone. When we consider its peculiar properties, it is astonishing that it has so long remained unnoticed. Were it a product of the jungles of interior Africa, or extremely difficult to obtain, this neglect could be accounted for; on the contrary, hundreds of European and North American vessels annually frequent the harbors of Peru and Bolivia, or the metropolis of the Amazon, where it may be obtained in large quantities, and where it has been as long known as the cinchona; yet the tonic, stimulating, and narcotic properties of this shrub are just beginning to attract the attention of the medical world.

Like the cinchona, the peculiar powers of coca have been introduced to the notice of the Caucasian by the aboriginal inhabitants of the country to which it is indigenous. No historical record informs us when it was introduced to their notice, or who first discovered the hidden properties of its leaves. When the empire of Atahualpa was overthrown by the rapacious Pizarro, coca was as well known to the Peruvians as at the present day, and played an important part in their religion, being used in all public ceremonies as an offering to the sun god.

Although found in a wild state, like most other shrubs it is enhanced