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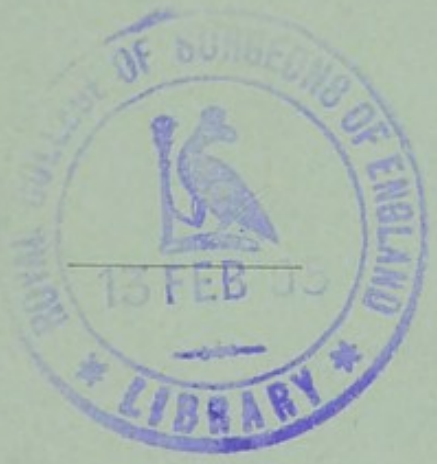

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On October 14, 1902, a young man, aged twenty-one years, was transferred from the medical side to my ward in the Montreal General Hospital, complaining of pain in the end of the penis and frequency of micturition.

He had diphtheria when six years of age, followed by temporary paralysis of the vocal cords. He said that before the onset of the present illness he frequently suffered from severe pain in the lower abdominal region in the middle line. The pain came on about an hour after breakfast, and disappeared as soon as the bowels moved. This was a daily occurrence, but he thought little of it, and did not consult a physician. His habits were good, did not use alcohol in any form, smoked but little, and had no venereal history.

The present illness came on quite suddenly about August 8, 1902. He was in the best of health at the time. Three symptoms appeared almost simultaneously. These were: (1) pain at the end of the penis, about the corona, on the dorsum, just before micturition, and generally very severe, necessitating the administration of morphine; (2) frequency of micturition (he passed urine every twenty minutes or half-hour); when lying on his back the intervals were longer, and (3) loss of expulsive power—the urine just escaped and dropped down at his feet. The act of micturition was not accompanied by pain. He noticed nothing unusual about the urine; did not notice any blood.

He could give no reason for the occurrence of these symptoms.

He had no accident, had not suffered from violence in any form; had not been exposed to the weather more than any man who drove an express delivery wagon, and, as before remarked, had no venereal history.

On August 22, eight days after the onset of the symptoms, he consulted his family physician—a careful, accomplished, and painstaking man—who passed a steel sound. This did not cause much pain, and a few drops of blood followed.

Family history negative; father, mother, three brothers and two sisters alive and well. One brother died of diphtheria when a baby.

He was a fairly well-nourished young man of medium height, and weighed 123 pounds, 12 pounds less than when he first became ill. He complained almost constantly of severe pain at the end of the penis. If morphine were withheld his cries were so loud and frequent that all the other patients were disturbed. The urine was turbid and contained large quantities of thick, tenacious, mucopurulent matter. On standing, this material became very thick and viscid. The reaction was alkaline; the specific gravity could not be determined because of the thick mucopus. There were a few phosphates and triple phosphates and an abundance of pus cells, but no casts. For a fortnight I kept a couple of enthusiastic students at work examining the bacterial flora, their results being always checked by the hospital pathologist, Dr. McCrae.

Streptococci were always present in numbers, as well as small and large diplococci. The tubercle bacillus was never found.

He was losing weight. His temperature varied between 97° and 102° F. Under the influence of general anæsthesia I passed searchers into the bladder, with a negative result. The examination was followed by slight hemorrhage. Prolonged lavage failed to secure sufficient clearness of bladder contents to permit of the use of the cystoscope.

The physicians reported that there was no evidence of any intrathoracic disturbance. Outside the bladder nothing could be found to account for the temperature and emaciation.

I regarded the case as probably one of tuberculous cystitis, and decided to make a suprapubic incision, with the double object of

exploration for diagnostic purposes, and, if tuberculous ulceration were found, the establishment of permanent drainage for the relief of the pain, tenesmus, and septic absorption.

Bladder lavage, using solutions of boric acid, permanganate of potash, carbolic acid, silver nitrate and Thiersch's solution, had failed to afford any relief, and morphine was required to secure rest and sleep.

On November 25th, with the patient in the Trendelenburg position, I made the usual incision in the median line. I had only separated the muscles when the boric solution, which I had placed, so I supposed, in the bladder, began to flow out. The edges of the incision were retracted and the solution removed by swabs. By means of a strong reflected light I found that I had only opened the pro-peritoneal space or cavum Retzii. The bladder —small and contracted to about the size of a hen's egg—lay at the bottom of the space, with a large opening in its anterior wall the size of a twenty-five-cent piece. The edges of the opening were thick, rounded, and somewhat irregular in outline; the mucous membrane was everted. I could bring the internal orifice of the urethra, the openings of the ureters, and every part of the inner surface of the bladder into view, but no ulceration or other change could be detected. The space in front of the bladder measured five inches laterally and four inches anteroposteriorly. After careful cleansing a large-sized rubber tube was inserted through the suprapubic wound and down to the opening in the bladder wall.

The space lessened considerably in size for a time, but the temperature did not improve, and emaciation continued.

On January 20, 1903, I made a perineal puncture, and through this inserted a catheter into the bladder, with the view of securing dependent drainage. This has not proved to be altogether satisfactory, for while the greater part of the urine escapes by the perineum, there is also some overflow through the suprapubic wound, and the cavum Retzii is kept bathed with it.

About the middle of February he complained of pain in the left loin, and on March 13th I opened a perirenal abscess. The kidney was palpable, not much enlarged, firmly embedded in

adhesions, and the patient's condition was so bad that I did not deem it wise to explore further.

Unfortunately for the patient and for my argument, he died on April 24th. The autopsy showed acute miliary tuberculosis of both lungs, caseous tuberculosis of the bronchial glands, miliary tuberculosis of the left adrenal, spleen, kidneys, left ureter, and bladder.

My second case was a healthy school-boy, aged twelve years, with a good family history. He noticed blood in his urine on December 20, 1902. The hæmaturia persisted, and one week later he began to suffer pain at the end of the penis before and after micturition. The pain would pass off in about half an hour. At this time there was no marked frequency in urination. On January 17, 1903, he consulted his family physician for the pain, and it was found necessary to administer morphine.

I saw the boy in consultation on January 23d, and removed him to the Montreal General Hospital. The urine was turbid, acid, and contained blood, pus, and vesical epithelium. Two moderate-sized hyaline casts were found. There were also found diplococci and staphylococci.

On the following day, under ether anæsthesia, I introduced the cystoscope, and found on the anterior wall, about two inches behind the urethral orifice, a patch of ulceration as large as a ten-cent piece. A part of the circumference was abrupt, well defined, the remainder of the circumference gradually passing into healthy tissue. The base was dark, but not actually bleeding. Clear urine issued from the ureters. The bladder was then injected with a 1 per cent. solution of silver nitrate, and after an interval of two minutes this was withdrawn and the bladder injected with normal salt solution. This treatment of the bladder was repeated daily for seventeen days, when all symptoms had subsided.

During his stay in the hospital his temperature varied from 97° to 99° F., and his pulse from 72 to 96. He has remained perfectly well up to the present time.

In 1876 Bartlett[1] reported the death of a man, aged fifty-three years, from peritonitis secondary to intraperitoneal rupture of the bladder. At the autopsy there was found, exactly in the middle

line, on its posterior aspect, one inch from its apex and corresponding to the perforation, an ulcer which bore an exact resemblance to a chronic gastric ulcer: distinct loss of substance, as if a piece had been punched out, funnel-shaped, smooth edges; at one side was some puckering.

In 1885 Reeves[2] reported the death of a young woman from peritonitis secondary to perforation of the bladder. The perforation was through the base of a single ulcer. The perforation would seem to have been temporarily closed by omentum which separated during the removal of a urethral polypus.

In the same year Oliver[3] discusses the occurrence of a simple single ulcer of the urinary bladder similar to that occurring in the stomach and duodenum, but does not report cases.

In 1892 Wyeth[4] reported a case of intraperitoneal perforation of the bladder in a man, aged forty-three years. The perforation occurred through the base of an ulcer about the size of a half-dollar. The adjacent part of the bladder wall was dark colored. This patient passed a large amount of bloody urine four days before his death.

In 1896 Fenwick[5] reported six cases of "simple, solitary ulcer of the urinary bladder" in a clinical lecture published in the *British Medical Journal* of May 9, 1896. He has observed this ulcer in both sexes. The majority of his patients were young men aged about twenty years. He has observed contact ulcers on the opposite wall, especially in the female organ.

In 1892 Johnston[6] reported a case of death from peritonitis following a rupture of the bladder through the base of an apparently simple ulcer three inches in diameter.

In 1900 Chaufford[7] reported an intraperitoneal rupture, elliptical in shape and the size of a two-franc piece, occurring at the upper posterior part of the bladder, and noted its resemblance to a gastric ulcer.

Just a year ago Christopherson[8] reported a most interesting case of a man, aged forty-nine years, with symptoms of what he thought to be probably a tuberculous ulcer. These symptoms began about two years before, during an attack of rheumatism. They

were: frequency of micturition, pain during and after urination, suprapubic and at the end of the penis. He had suffered from lead colic. No tubercle could be found in any part of the urogenital tract or elsewhere, nor was the tubercle bacillus to be found in the urine. Had only passed sufficient blood to color the urine on one occasion. Through a suprapubic incision the cavity of the bladder was found to be small and the walls hypertrophied, but otherwise healthy, except for a small ragged irregular ulcer with granular surface and thin edges, and about 1.9 cm. in diameter, between the two ureters and on the posterior part of the trigone. When it was touched over with swabs of wool wet with carbolic acid (1 : 20) the surface bled readily. There were no signs of caseation or tubercles anywhere, and the ulcer looked more like an anal ulcer than anything else. The ulcer was not found indurated or perforating, and was quite unlike a gastric ulcer. There were no signs of malignant disease. The bladder was drained suprapubically and washed out with a solution of borax and iodine for twenty-eight days. In about two months he gained two stone in weight, and left the hospital apparently cured.

On January 7th of the present year Daly and Harrison[9] reported a case of spontaneous rupture of the bladder occurring in an Irish harvester, aged thirty-six years. The man was seized with pain while carrying a pail of water with which to wash himself. At the operation an intraperitoneal rent was discovered of sufficient size to admit the tip of the index finger. This was sutured with two layers of Lembert sutures, the mucous membrane not being included. The rent was situated midway between the fundus of the bladder and the bottom of Douglas' pouch, and was vertical and central. Notwithstanding some deplorable complications, the man made a good recovery.

Rawson[10] reports the death of a woman, aged thirty-five years, taken suddenly ill, and dying in thirty-six hours. At the autopsy a small ulcerated opening was found at the summit of the bladder. The mucous membrane of the bladder for the breadth of half an inch around the opening was highly injected with blood, and was of a much darker color than the rest of the mucous lining. Purulent

matter was adherent about the edges of the ulcer. The woman had been confined with a live child about a month previously by a midwife, and from what I could make out she had had a favorable labor, and attended to her usual work after the first week. She had never referred any pain to the region of the bladder, but had been heard to complain, both before and after labor, of an inability to empty her bladder completely.

Thurston[12] reports a case of chronic perforating ulcer of the bladder occurring in a married woman, aged fifty-two years. The symptoms had been present for over four years before the perforation of the fundus or the bladder occurred. The hole had been closed by adherent omentum.

We are all familiar with tuberculous ulceration of the bladder and with the breaking down of tissue secondary to neoplasms, and Proksch[11] has told us something of syphilitic ulceration, and it occurs rarely in cases of long-standing prostatic cystitis. Does there occur an ulceration of the bladder wall independently of trauma (including pressure), tubercle, syphilis, and new-growth? I am not prepared to answer that question in a monosyllable. The evidence that I have collected favors, in my opinion, an answer in the affirmative.

An ante-mortem diagnosis before the advent of the cystoscope was impossible, and the true condition was only determined after the occurrence of perforation, and then generally in the autopsy-room.

I have selected these seventeen cases from a larger number in which the reports were sometimes too incomplete to permit of classification. In some instances perforation has occurred after a fall or the receipt of some form of violence. It yet remains to be determined just how much force is needed to rupture a full or distended bladder, not weakened at any one point by ulceration or sacculation. In this list all such doubtful cases are excluded.

I think that we must look to one or more of three conditions for the cause of single ulcer of the bladder—infection, thrombosis, and syphilis. It has been thought by some that probably most perforating ulcers were due to a breaking-down gumma in the bladder

wall. In very few of the case-reports is the suspicion of syphilis raised, and the autopsy findings have not disclosed a condition that has suggested the presence of breaking-down gumma. In both of my cases cocci of various forms were present. The first may have been tuberculous in nature from the beginning, but at the time of first operation there was no appearance of tubercles. But it would appear that there must be some other etiological factor present in addition to the infection.

Simple infection of a normal bladder does not, as a rule, end in perforation. Mention is frequently made of the similarity between perforating ulcer of the bladder and that of the stomach and duodenum, and it is quite possible that in each case a similar pathology obtains.

The condition is referred to by Rokitansky under the name of chronic perforating ulcer of the bladder. Lawson Tait refers to four cases, in two of which Sir J. T. Simpson established a vesico-vaginal fistula to obtain physiological rest and relief to the patient from pain. The evidence of the exact nature of the bladder lesion in these cases is not made clear in the report.

The symptoms in the majority of cases were pain, frequency of micturition, and the presence of small quantities of blood in the urine.

The pain is very severe, and is often referred to some point in the penis in the male and about the neck of the bladder in the female. The intensity of the suffering is often very great. In both of my cases the penis was held in the hand and guarded from dreaded violence. These boys would cry out with the pain of the penis. Fenwick states that some of his patients would cut the pocket out of their trousers that they might carry the penis, and so better protect it. The suffering interferes with micturition, and requires morphine for its relief. In some cases there seems to have been very little pain indeed.

The frequency in micturition varies in different cases. My first case urinated very frequently. I think that I have found a definite relation to obtain between the locus of the ulcer and the pain and frequency of micturition. If the ulcer is about the trigone and

ureteral orifices, or, in fact, if it is in the neighborhood of the neck of the bladder, the pain and frequency are great. On the other hand, in those cases where the ulcer has been situated about the fundus there has often been a remarkable absence of symptoms until the occurrence of hemorrhage or perforation. The symptomatology in this respect bears a close resemblance to that of gastric ulcer.

The diagnosis can be made with a considerable degree of certainty when the onset is sudden and the symptoms mentioned are well defined. The cystoscope is of the greatest value here, and should always be used if possible.

The prognosis in cases seen early is good. They yield readily to treatment, and in some instances have probably healed without any treatment at all.

The local application of solutions of nitrate of silver seem to have been most generally useful. In my second case I used a solution of 1 : 10,000. It caused some smarting at first, which passed away soon after the solution was replaced by a saline solution. I used the injection daily, and the pain became progressively less as the patient improved. Sir James Simpson is reported to have treated two cases successfully by the establishment of a vesicovaginal fistula. Christopherson made a suprapubic incision, touched the ulcer over with swabs of wool wet with carbolic acid (1 : 20). The bladder was drained suprapubically and washed out with a solution of borax and iodine for twenty-eight days. In two months he gained two stone in weight. He left the hospital apparently cured. Boric acid, salol, urotropin, and helmitol are indicated.

It is unfortunate that an ulcer situated on the fundus is so often without striking symptoms. A hemorrhage may give the first intimation of its presence. If perforation occurs into the peritoneal cavity, it may be closed. I believe that as good results may be obtained here by early diagnosis and prompt interference as in the case of perforating ulcer in the stomach—perchance, even better results, because there may be a less virulent infection.

In conclusion I would submit that, in view of the clinical evi-

dence now accumulated of the existence of a single non-tuberculous ulcer of the urinary bladder, and the post-mortem reports of six perforations of the bladder through the bases of single non-tuberculous ulcers, the condition should be more generally recognized and find a place in our text-books.

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