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A SUCCESSFUL CASE OF NEPHRECTOMY FOR PYELO-NEPHRITIS WITH CALCULI.¹

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THE patient, a married lady of American parentage, was born and has always lived in New England. She is now forty-six years of age. A careful investigation respecting hereditary tendencies, clinical history, locality of residence,² manner of living, or occupation,³ furnishes no data previous to 1883 which can be regarded as etiologically connected with the disease for which I first saw her in August, 1891, at the request of Dr. E. J. Cutter, of Leominster, Mass. Till 1883 perfectly well; all functions normal; menstruation regular; menses three days, almost always painless, interperiod approximately four weeks. One normal confinement twenty-one years ago. No miscarriages.

In 1883 an attack causing confinement to bed for four weeks. Reported diagnosis, "Inflammation of the bladder with prolapsed uterus." The attack was characterized by difficult painful micturition. Retention of urine with chills. Suppression of urine. Pain in right side. Urine, thick, turbid. No vomiting.

In 1885 another attack, attended with some icterus. Hepatic enlargement. No gastric symptoms. Intestinal action habitually sluggish. The urine was much diminished in amount, turbid, with a heavy sediment. There were distinct chills, followed by fever. Was relieved by weak diuretics (uva ursi, buchu, gin), and was better for a short time. Then frequent relapses which subsided under similar treatment.

In 1889 a uterus retroverted to the first degree with hypertrophy required treatment. The local examination and manipulation thus necessitated failed to demonstrate any indication of trouble elsewhere in the abdomen.

Since 1889 the general condition has been impaired ("felt poorly"). A constant sense of fatigue. Pain in the lower extremities.

In the summer of 1890 menstruation recurred every two weeks.

¹ Read before the Surgical Section of the Suffolk District Medical Society, May 4, 1892.

² Twenty years in Massachusetts, previously in Vermont.

³ Tailoress, and housewife for the past twelve years.

In January, 1891, attention was first attracted to the right side. Patient was unable to lie on that side, but did not complain of pain or tenderness.

In February food caused distress. "Catch" over right hip reported. Urine, diminished in amount, thick, turbid.

During the spring the subjective symptoms became gradually more marked. Considerable pain, referred to right hypochondrium and "through the back." A dragging sensation in the dorsal region. Pain described as more posterior than anterior, and extending up rather than downwards.

In May became still worse, with anorexia, loss of flesh and strength, etc., so as to require medical attendance during this month. When relieved, first noticed a "bunch" in the right hypochondrium, which could then scarcely be felt but which steadily became more distinct.

FIG. 1. June 25th.

About June a careful examination disclosed a somewhat movable tumor in the right hypochondriac and lumbar regions. (See Fig. 1.) Contour generally ovoid or globular, but not easily defined; surface lobulated, but smooth; at some points, elastic, if not fluctuating; at others firm. Percussion flat. Tumor separated by a narrow tympanitic zone from the liver dulness. Towards the median line and below, the adjacent surface was tympanitic; but externally the outline was not well defined, merging into the lumbar dulness. Bimanual examination failed to show any connection with the pelvic organs. The urine was diminished in amount; alkaline; specific gravity 1012; albumen absent; sediment heavy and flocculent, consisting of mucus, indifferent cells and am. mag. phosphate crystals. No renal elements detected, except perhaps a few renal cells. Generally characteristic of a chronic catarrhal process, probably vesical.

During June and July the tumor increased continuously in size, growing downwards and laterally. Considerable loss of flesh, great weakness, restless, unable to sit or stand without discomfort. Pain in side, sometimes in groin or over right nates. Easier when right

hip flexed. Slight œdema of right leg. Micturition at times increased in frequency. No relief was obtained from careful, skilful medical treatment. The patient's condition was steadily becoming more serious, and surgical treatment was advised.

I first saw her about August 3d. Her subjective symptoms were as above described, but more marked. The tumor was now visible, even when covered by the clothing. She was a fairly well developed person, somewhat above medium height. Considerably emaciated; cheeks thin; facial expression anxious. Temperature, pulse and respiration normal.

Examination of the chest negative.

FIG. 2. August 6th.

The abdomen was somewhat distended on the right side but otherwise normal in appearance. The enlargement extended from just below the right costal arch to the level of the right anterior superior iliac spine, and laterally from about the centre of the right rectus abdominis muscle to the external border of the right erector spinae. The surface was rounded, of slightly irregular contour, as in Fig. 2. Skin normal. Position of tumor not altered by respiration. The abdominal wall moderately thick.

Palpation disclosed a large, irregularly ovoid and slightly movable tumor. Its outlines were not well defined, except that it extended from under the liver to the brim of the pelvis, and from a little to the right of the median line laterally outwards so as to distend the right loin (Fig. 2). Its surface was irregular, lobulated, but otherwise smooth. At some points it was dense and firm; at others tense, elastic or fluctuating. No vibration on concussion. Distinct tenderness with more than moderate pressure.

Percussion.—Note over tumor, flat. A narrow zone of different resonance between hepatic dullness and its upper border. Abdomen to left of growth and below, tympanitic. The "flat" area extended round the right side to the spine, including the whole area between the tenth rib and the iliac crest.

Auscultation negative. Outlines of resonance not altered by change of position and site of tumor, only

by its sagging slightly to the left during left lateral decubitus.

Vaginal Examination.—Uterus somewhat retroverted and enlarged. Otherwise no indication of the presence of the tumor, at least, without ether. There was a slight œdema of the lower extremities. A careful examination of the lymphatic vessels and glands—pelvic, axillary, supraclavicular, inguinal or elsewhere—gave negative results.

The urine was pale, turbid, alkaline; specific gravity 1014; albumen absent (at least by HNO₃ or heat test); a large amount of white sediment containing much pus, many cells of bladder epithelium, numerous crystals of am. mag. phosphate, and considerable unrecognizable organic detritus.

Concisely, then, the case was that of a patient, age forty-five, who for eight years had had recurrent attacks resembling a chronic catarrhal inflammation, with exacerbations of the vesical tract, and no indication that the kidney had been affected, or at least more than temporarily so. Within the past few months the general constitutional disturbance indicating the existence of some serious pathological process. More recently the appearance and rapid growth of a tumor apparently affecting the right kidney. The character of this growth was doubtful. It was partly solid, partly cystic. It must be inflammatory or neoplastic. The temperature, pulse and general condition favored the latter hypothesis rather than the former. The urine showed no elements which would indicate a renal origin. There had been "no hematuria." Cystic tumors of the kidney which could produce the present physical conditions are only the result of suppurative processes or malignant disease (generally cancer, sarcoma or adenoma). There seemed no means of making a more accurate diagnosis without an actual inspection of the growth. In either case the only treatment which offered any hope of relief was operative. Hence I decided that an exploratory incision was justifiable; also, if found possible after a careful examination, to endeavor to permanently relieve the patient by some radical operation. That such an incision should be abdominal, not lumbar, seemed necessitated by the size of the growth, and the probable subsequent operation, that is, nephrectomy. I do not think either a satisfactory exploration or operation would have been possible by the lumbar method.

On August 7th (11 A. M.) this plan was executed. During the preceding few days the patient was carefully prepared by hygienic, dietetic, antiseptic and other treatment, the object of which was to empty the alimentary canal, accustom the patient to change of diet and environment, to insure a proper action of the skin and renal functions, and secure as far as possible an aseptic surface for operation.⁴

Operation.—Incision in right semilunar line, 20 cm. long, over the most prominent portion of tumor, through the abdominal wall. Abdomen opened without difficulty, and the tense elastic surface of the tumor found in contact with the parietes. After separating the adjacent adhesions with the fingers, the growth was grasped with cyst forceps and incised.

⁴ Instruments—towels, sheets, etc.—were sterilized by moist heat. Sutures, twisted white silk, prepared by the Brunner method. Sponges, the Elliot worsted, sterilized with steam and sublimate solution. Hands aseptic by Furbering method. Dressings sterilized by dry heat. External irrigation, hot sublimate solution (one-tenth per cent.). Intra-abdominal irrigation, hot saline solution (six-tenths per cent.), with boiled filtered water. Anæsthetic ether preceded stimulating enemata.

About 3,000 c. c. of a yellowish-white, gruel-like, somewhat sparkling fluid gushed forth, leaving a large cavity whose walls were here and there adherent to the parietal peritoneum and adjacent organs. Exploration with the hand inside, and as far as possible outside, the cyst, discovered a solid, firm, irregular mass, somewhat fixed, situated to the right of the spine. Its lower end could not be defined with any accuracy, but apparently extended over the pelvic brim and towards the centre of the cavity. The upper border was under the liver. Although by exclusion the growth was the kidney, the recognition of it as such from its contour or appearance was impossible. It could not be definitely determined that it was not connected with some pelvic organ. Hence the best course seemed to be to attempt its removal, and such an attempt was begun. The adhesions were first attacked and gradually separated by clamping, ligating, tearing, sponging, etc., till at length the insertion of the cyst wall to the solid portion of the tumor was reached. At this point the mass was first definitely recognized by the arrangement of the renal fat at the junction of the pelvis with the body of the organ. By degrees the solid portion of the growth was freed from its attachments. The vena cava inferior was exposed for several inches. The ureter was found, isolated, doubly ligated, divided, and the end disinfecting. The renal vessels were next clamped, ligated separately and *en masse* with heavy silk, and cut off. The tumor, thus freed from its last attachment, was removed from the abdomen. The latter cavity was now rapidly irrigated. All bleeding points were controlled as far as possible, but still leaving considerable bleeding from the extensively abraded surfaces. The abdominal wound was next closed with seven heavy silk sutures, at intervals of one inch, which penetrated the entire abdominal wall and peritoneum. No drainage. The skin was apposed where necessary by fine silk, superficial sutures. Dressing, bleached gauze, wet with sublimate solution. Sterilized (baked) absorbent cotton pads. Sheet wadding and swathe.

The duration of the operation, was one hour and twenty minutes.

Shock marked. Stimulation by hypodermic injection was necessary at times during the operation and immediately after. Marked pallor, sunken cheeks, dilated pupils, shallow respiration, very weak, rapid, occasionally intermittent, radial pulse, and cold extremities, indicated its severity.

The patient recovered consciousness rapidly, but reacted slowly; and only after eight to ten hours of careful and energetic treatment did pulse, respiration, surface temperature and general appearance indicate that danger from immediate collapse was successfully passed. There was considerable pain referred to the seat of operation which finally required morphia (gm. 0.016) to relieve. The abdomen was tender over the same area. All motion was quite painful. Vomiting occurred at times.

Eight hours after the operation 450 c. c. of urine were removed from the bladder by catheterization. It was turbid and slightly alkaline; specific gravity, 1.025; albumen absent; sediment abundant, white and flocculent, consisting chiefly of phosphates, round and squamous bladder-cells and a few columnar cells. Six hours later (fourteen hours after operation) 300 c. c. were similarly removed; still turbid, rather dark, acid, albumen one-eighth per cent., sediment still considera-

ble. Twenty-three hours after operation micturition became voluntary.⁶

During the last twelve hours the abdomen became somewhat distended and tympanitic. Pain less, tenderness unchanged, temperature and pulse normal, respiration easy, except on forced inspiration.

Treatment.—Absolute rest, nutriment and medicine by rectum. Catharsis by magnesia sulphate. Flatus relieved by soft rubber rectal tube and enemata.

Second day.—General condition improved; stronger, can move a little without assistance. Temperature, pulse and respiration practically normal. Vomiting ceased during the forenoon. Abdomen less distended and tympanitic, but still marked tenderness at site of operation. Urine 900 to 1,050 c. c. Considerable flatus during the night and small faecal defecation at 2 p. m. A dark-colored vaginal discharge noticed. Feeding by mouth begun.

Third day.—Steadily improving. Respiration, even forced, without discomfort. Abdomen soft, still somewhat tympanitic, not distended, less tender. Patient can move a little without pain. Amount of urine 1,410 c. c. Saline cathartic diminished.

Fourth day.—Better. Temperature, pulse and respiration normal. Some flatus. Abdomen flat, less tender, no induration. Urine 1,440 c. c. No vaginal discharge. Some smarting at site of abdominal incision. Diet liquid. Nutritive enemata omitted. External dressing removed and renewed after moistening internal layers with sublimate solution.

Fifth day.—Steady improvement; moves easier; abdomen tender only in right loin; no dulness. Urine 1,320 c. c.

Sixth day.—Doing well. Slight tenderness about wound; abdomen apparently normal. Wound dressed. Found united, with some redness about deep sutures, apparently from tension. Superficial sutures removed. Urine 1,080 c. c.; color normal, clear; acid; specific gravity 1.032; albumen absent; sediment slight, calcic oxalate crystals numerous, round bladder-cells, vaginal epithelium, and a few leucocytes. No vaginal discharge. Diet increased to solid farinaceous and small amount of nitrogenous food. Lithia water.

Seventh day.—Still slight discomfort from wound. Redressed and five deep sutures removed. Supported by strapping. Sterilized dressing. Urine 1,380 c. c. Now normal in appearance, without visible sediment.

Eighth day.—Cheerful and happy; wants to be dressed and sit up. Much stronger. No abdominal tenderness; abdomen flat, soft. Urine 1,350 c. c., clear; normal yellow; normal odor; slightly acid; specific gravity 1.029; albumen absent; sediment slight. Wound redressed, and all remaining sutures removed; union complete. Redness about suture punctures nearly gone; no discomfort; slight vaginal discharge this forenoon. Food increased.

Recovery from this time was uninterrupted. The chart shows no general disturbance. The urine before the operation, as stated, was alkaline, with an excessive sediment characteristic of suppurative. In the first twenty-four hours after operation the amount was 900 to 1,050 c. c. In the next it increased to 1,410 c. c.; and in the next (that is, the third day) to 1,440 c. c. The urine became acid during the first twenty-four hours after operation. Its character also rapidly

⁶ Amount small (15 c. c.) at 11 A. M.; 2, 2.30 P. M.; acid, rather dark, still turbid; albumen one-eighth per cent.; sediment less, but still considerable; bladder and vaginal epithelium in large numbers; considerable pus; also earthy phosphate in large amount.

changed as regards its other constituents, so that on the seventh day it was normal.

Its average composition during the next three weeks was as follows: Amount 1,290 c. c. (maximum 1,380 c. c., minimum 1,140 c. c.). Color normal or pale; odor normal; reaction acid; specific gravity 1,018 (maximum 1,029, minimum 1,010); sediment slight (few bladder or vaginal cells) or absent; albumen absent.

TEMPERATURE CHART.

Date.	Day.	Temperature.		Pulse.		Remarks.
		A. M.	P. M.	A. M.	P. M.	
Aug. 6..	..	..	97.5°	..	70	
7..	1	98.4°	99.0	70	90	Operation.
8..	2	98.6	99.0	75	80	
9..	3	98.6	99.4	70	80	
10..	4	98.6	99.8	70	80	
11..	5	98.6	98.6	70	82	
12..	6	98.6	98.8	70	80	
13..	7	98.6	99.0	70	82	Dressing opened.
14..	8	98.0	99.5	75	81	Five sutures removed.
15..	9	98.6	99.4	74	74	All sutures removed.
16..	10	98.6	99.2	82	78	
17..	11	98.6	99.5	90	74	
18..	12	98.8	99.6	90	80	Sat up.
19..	13	98.6	99.2	100	90	
20..	14	98.6	99.6	80	90	Sat up; about room nine hours.
21..	15	98.6	99.4	80	92	

Since then occasional examinations show an average analysis as follows: Amount in twenty-four hours 1,305 c. c. (maximum 1,580 c. c., minimum 960 c. c.) pale, clear; slightly acid or neutral; specific gravity 1,009 (maximum 1,010, minimum 1,008). Sediment (except once specimen obtained during menstruation) slight or absent. Never any histological elements found which would indicate any lesion of the remaining kidney. Albumen absent (once slight trace).

Last analysis was made May 17, 1892, eight months after operation.

The general condition rapidly improved and strength increased.

Sat up first on the twelfth day and could have done so earlier had it not been considered desirable to protect the recently united wound from tension as much as possible. On the fourteenth day was up and about the room for nine hours. The remaining kidney was apparently performing without effort its double task. On this day it excreted 1,350 c. c. of urine, color and odor normal, acid, 1,021; albumen absent; sediment slight, mostly vaginal, with a few bladder-cells. The wound of operation was supported by strapping and swathe.

From this time till the twenty-first day the patient was simply under observation except as regards the protection of the wound to insure firm union and a careful regulation of diet. The urine was made as un-irritating as possible by extreme dilution and modification with liquids and Lithia water. After the sixth day no calcic oxalate crystals were seen.⁶

⁶ The presence of these calcic oxalate crystals is rather surprising.

On the twenty-first day the patient went home, a journey of several hours by carriage and rail, without assistance or very much fatigue. Apparently well.

The subsequent history is uneventful. She is now, eight months after operation, well, ruddy, eyes bright, skin firm, no pain, sleeps well. Can lie, sit or stand in any position. The operation cicatrix is 12.5 cm. long. Its greatest diameter (at one or two points, otherwise linear) is 0.75 cm. It is firm, freely movable, and shows no signs of yielding. There has been no treatment except that an excess of nitrogenous food has been avoided and the urine has been kept diluted with Lithia and later with Poland water. She is now well, but with reference to future attacks nothing definite can be assured. They may, if the diathesis still exists, recur, and a calculus formation affect the remaining kidney, but there is no indication that such an event will happen and it may, perhaps, be permanently avoided by careful prophylactic treatment.

The specimen (alcoholic) is here for inspection. It is an irregular, globular-shaped mass ten inches in diameter and consists of a sac, the remains of the dilated kidney, attached to a solid mass.⁷ The sac wall was irregular in thickness but is now apparently uniform. It was chocolate colored, eight millimetres thick, and firm. Histologically it consisted of fibrous tissue, some remains of tubes lined with cubical epithelium and some areas of round cell infiltration. The solid portion on section showed fibrous and fat tissue, also, microscopically, some round cell infiltration. Impacted in the fibrous tissue were calculi, dark brown, hard, surface irregular. They consisted⁸ of almost pure calcic phosphate with a trace of ammonio-magnesian phosphate. The pelvis, or other remains of kidney structure were not seen.

The fluid contained in the cyst is described as thick, opaque, grayish.⁹ It contained a large amount of granular debris and small fat drops. Many small granular and fatty cells. Many plates of cholesterin. A few altered blood globules. Fluid partly dissolved and cleared up with ether, showing that it contained much fat.

The following points have been of especial interest:

(1) Was a more accurate diagnosis possible? I do not see how it could have been more definitely made although I should now be more prepared to find a suppurative than a neoplastic process when similar physical appearances existed. And this case demonstrates that the former process can exist without causing urinary changes except those common to disease in other portions of the urinary tract. Also, hematuria is not a necessary symptom to demonstrate the existence of a renal calculus as has been frequently stated.

(2) The choice of operation. This is not an easy task. First, as regards nephrotomy or nephrectomy. Second, as regards the route, lumbar or abdominal, that is, transperitoneal. General statistics, tables of mortalities or general rules are of little value in cases similar to the one reported, and the operator must decide on the procedure preferable according to the especial conditions presented. According to many rules,

They are reported as present only on the sixth day; but their rapid disappearance and the character of the urine both before and after these dates would seem to indicate that the observation was incorrect, and that some other substance had been mistaken for them; possibly uric acid crystals.

⁷ From report of Dr. H. F. Sears, Pathologist, Boston City Hospital and Harvard Medical School.

⁸ Analysis by Prof. E. S. Wood, Harvard Medical School.

⁹ From report of Dr. E. M. Greene, Pathologist, Carney Hospital and Boston Dispensary.

my operation was contra-indicated, for nephrectomy is not generally considered to be the operation for renal calculus. In my case the result has justified my selection. It was made on account of the uncertain diagnosis, the size of the tumor and the necessity for room for work. The kidney was so disorganized as to be functionally worthless, and if nephrotomy had been done the evidence is in favor of a renal fistula as a result. My patient is not only relieved but is well, and recovered rapidly.

As regards the route, I think there was here no choice, for if in such a case nephrectomy is the selected operation it must be abdominal. I do not see how the operation would have been possible by the ordinary lumbar method on account of the size of the tumor and its adhesions.

By the König lumbo-abdominal operation or similar modifications, such an extensive division of the muscles would be necessary that the operation would become practically a transperitoneal one before its conclusion. Again, the abdominal route has the following advantages:

A better opportunity for diagnosis.

A better appreciation of the exact conditions under which the operation must be done.

An opportunity to examine the remaining kidney.

More space for operation.

An easier access to the pedicle.

(3) The dangers of the operation seem to be: (1) shock; (2) hemorrhage; (3) uræmia; (4) peritonitis; (5) septicæmia; (6) Renal fistula.

(4) I have wondered at the comparatively slight constitutional disturbance and uneventful rapid recovery from so extensive an operation. The condition resembles that seen after continued exertion or great fatigue. Also at the rapidity with which the urine became normal, and the readiness with which the remaining kidney performed its increased task.

(5) The case demonstrates that it is possible to obtain a recovery by nephrectomy without drainage, and it is preferable to drainage, if followed by its frequent unsatisfactory sequel of fistula and its attendant discomforts. This, even when the peritoneal cavity has been tainted with fluid from a kidney extensively disorganized by a suppurative pyelo-nephritis.

NOTE.—Patient last seen on July 1, 1892. Was in perfect health as far as could be ascertained.

Clinical Department.

A CASE OF BROKEN NECK, WITH AUTOPSY.¹

BY EDWARD O. OTIS, M.D.

H. L. W., JR., a student, seventeen years old, was attempting to do the "cut-down" in the gymnasium of the institution where he was at school, when he fell upon the underlying mattress. This accident happened about five o'clock in the afternoon of January 20th. The "cut-down," as it is called in gymnasium parlance, is a simple feat. The performer stands beneath the parallel flying rings, holding them in his hands. He swings his feet up so as to throw them inside his hands, and letting go without breaking the continuity of the swing, lands upon his feet. It is a pretty and not a difficult trick.

¹ Read at the Surgical Section of the Suffolk District Medical Society, May 4, 1892.

Young W. when about the middle of this manoeuvre, fell a distance of about five feet, upon a thick mattress lying beneath. He fell at the point of time when his head was down and the superincumbent body was moving forward with the momentum of the swing. The resultant of the two motions was that he struck upon his head—the occipital part—and upon his knees and elbows. The weight of the body, then, bent over the cervical spine on the one hand, while the head resting on the mat, held it fixed, on the other. The boy weighed about a hundred and twenty-five or thirty pounds, and had a long, slender neck. The weight of the body, not the force of the fall, did the mischief.

As one can readily see, no more perfect way of breaking one's neck could be devised; and yet in a considerable gymnasium experience I have never seen or heard of this or any accident happening in the performance of this common trick, although it possesses this awful possibility. There is no evidence to show that the fall was accompanied with any great amount of pain. Paralysis was immediate, the patient finding it impossible to extricate himself from the peculiar position in which he had fallen. He was seen by his attending physician, Dr. Nute, of Exeter, N. H., who had him very carefully transported to his room, near by, on a stretcher.

I saw him, together with Dr. G. W. Gay, of this city, the next forenoon, seventeen hours after the accident. There was complete paralysis below a line drawn two or three inches above the nipples. He could flex the forearm upon the arm, but could not extend it, or make any other movement of arm or hand. Respiration was diaphragmatic. There was paralysis of bladder and intestines. He could rotate the head, but any antero-posterior movement gave him pain. There was a tender spot, painful on pressure, between the fourth and sixth vertebrae. There was no sensation in the paralyzed portion of the body. He could swallow perfectly well, but could not clear his throat. An attempt was made by extension, counter-extension and manipulation to reduce whatever displacement might exist from dislocation or fracture. This gave him much pain and was apparently without result. Operative interference was not advised.

I saw him again the next forenoon, January 22d, and thenceforward constantly until the end, and made another attempt with his attending physician to reduce whatever displacement there might be. Extension and counter-extension with rotation was tried, and twice we heard something snap, which was also noticed by the patient, but no results followed. We then applied permanent extension from the occiput and chin, with a weight of from seven to twelve pounds, and counter-extension by elevating the head of the bed. This seemed to give him relief and when it was discontinued from time to time he often asked to have it re-applied. He was given simple liquid nourishment, catheterized regularly, and the tympanites was relieved by a rectal tube kept *in situ*. An ice-bag was placed at the back of his neck. The temperature was about a degree above normal, the pulse 62°, and the respiration 24. His mind was remarkably clear and he was perfectly self-possessed, although he realized the gravity of his condition. His fortitude for one so young was remarkable; he expressed himself as having no fear, and showed the greatest care and consideration for all about him. Not the slightest