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RENAL NEOPLASMS, WITH REPORT OF TWO
CASES OF NEPHRECTOMY.

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WILLIAM MACKIE, A.M., M.D.,
SURGEON, MILWAUKEE HOSPITAL, MILWAUKEE, WIS.



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**RENAL NEOPLASMS, WITH REPORT OF TWO
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BY WILLIAM MACKIE, A.M., M.D.,
SURGEON, MILWAUKEE HOSPITAL, MILWAUKEE, WIS.

NEOPLASMS, as they occur in the kidney, have been classified either histogenetically or histologically. Paul¹ adopts the former method, and divides them into those of congenital and adult origin. Those of congenital origin include sarcomata and dermoid tumors, and those of adult origin, cysts, sarcomata, adenomata, and carcinomata. In proof that sarcoma is of congenital origin he cites the case of a seven months' fetus in which the kidneys weighed twelve ounces, and the medullary portion of each was made up of nodules of a white new-growth, and the cortex was mottled with the same, yet there remained from twenty to thirty times the normal amount of renal tissue. These nodules consisted mostly of round cells, but in many parts they arranged themselves as though attempting some higher evolution. This he prefers to call a round-celled sarcoma. He also refers to another case of an eight months' fetus, described by Osler as one of adeno-sarcoma, and confirmed by himself. Cohnheim classes the sarco-

¹ Read before Wisconsin State Medical Society, May 4, 1893.

mata in children amongst the teratomata, and so does Dohrn.² Histologically, the new growths are divided into benign and malignant, and the following is the classification given by Newman :

A. BENIGN : 1. Fibromata. 2. Lipomata. 3. Hematangiomata. 4. Adenomata. 5. Papillomata.

B. MALIGNANT : 1. Carcinomata. 2. Lympho-adenomata. 3. Sarcomata.

A. BENIGN.—

1. *Fibromata.* These are of comparatively rare occurrence. Out of seventy-four nephrectomies tabulated by Newman, five were for fibromata. These tumors sometimes reach a great size. Thomas removed one originating from the capsule of the kidney weighing ten and a half pounds; and Bruntzel, one weighing twenty-seven and a half pounds. Both patients made a good recovery. These were simple fibromata. Billroth removed a fibro-myoma, weighing forty pounds, with a fatal result. Fibro-cystoma and fibro-lipoma have also been met with.

2. *Lipomata.* These are still more rare than the foregoing. Ebstein records a case in which one kidney consisted wholly of lipomatous tissue. Spencer Wells³ removed two fibro-lipomata, one from either kidney, weighing sixteen and a half pounds and fourteen and a half pounds, respectively. With that originating from the left kidney was removed one calix and papilla. Mr. Eve, in preparing the specimens, gave it as his opinion that their origin was from the circumrenal connective tissue; hence these cannot be regarded as true tumors of the kidney.

3. *Hematangiomas*. These occur as small nodules situated in the cortex and usually do not exceed in size that of a bean, and do not call for operative interference.

4. *Adenomata*. These occur in two forms, the papillary and alveolar: the former originate in the medulla and consist of tubules and acini into which the papillæ project, and are lined with cylindrical epithelium; the latter originate in the cortex, and are formed of dilated tubules lined with epithelium similar to that found in the convoluted tubes. They rarely attain any great size. Czerny operated upon a child of eleven months, with a fatal result; Schönborn successfully in a child of two years; Albert, in a woman of forty-one, and the tumor was as large as a child's head; Weir,⁴ in a man of thirty-five, the kidney weighing twenty-one ounces; and Keyes,⁵ in a gentleman of forty-nine. In the last case almost all traces of normal renal tissue were destroyed and the kidney appeared to be composed of an enormous number of nodules separated by newly-formed connective tissue. In Weir's case the new-growth was separated from true renal tissue by a distinct capsule. Walter Edmunds⁶ reported to the Pathological Society of London a similar case, in which a globular tumor, two and one-half inches in diameter, projected from the anterior surface of the kidney, and extended internally into one of the calices. It consisted of cysts of various sizes, lined by cubical and columnar epithelium, and was enclosed in a distinct capsule. The kidney-tissue was healthy. Edmunds agrees with Shattuck in the belief that such growths are due to inclusion of rem-

nants of the Wolffian body, because of the existence of a distinct limiting capsule.

5. *Papillomata*. These grow from the mucous membrane of the pelvis, are identical in structure with those found in the bladder, and the principal symptom present is hematuria. Jones⁷ records the case of a patient who, while walking, was suddenly seized with faintness and an urgent desire to urinate. The fluid evacuated consisted of almost pure blood. Eighteen months after the first attack the kidney was explored, and a papilloma was found in the pelvis, and was removed. The hematuria recurred in four months, and eight months after the first operation nephrectomy was performed, and a papilloma, the size of a hen's egg, was found occupying the pelvis. Papillomata rarely give rise to any appreciable renal enlargement unless hydronephrosis is produced by a blocking of the ureter. Knowsley Thornton⁸ met with such a case in a woman thirty-two years of age, who for twenty-nine years had suffered from discomfort and pain in the right renal region. On removal by abdominal nephrectomy he found a hydronephrotic kidney containing two pints of cloudy urine, several calculi, and the ureter blocked by a papilloma.

B. MALIGNANT.—Primary malignant growths of the kidney are unilateral and form tumors of considerable size; the secondary are bilateral and do not give rise to any considerable enlargement of the organ.

1. *Carcinomata*. The medullary type is the most common, although all transitions from scirrhous to medullary are met with. It occurs as a nodular

growth or a diffuse infiltration of the whole kidney. In the former, the shape of the kidney may be greatly changed, while in the latter its shape is retained. The origin is generally in the cortex, the parts first affected being the epithelium of the tubules; later the connective tissues become infiltrated. In the diffuse form are to be found many cavities of varying size, filled with broken-down tissue mixed with blood. This condition is likely to be misleading because of an indistinct sense of fluctuation being present. When the pelvis becomes involved, ulceration follows, and parts of the tumor separate and block the ureter. The capsule becomes thickened and very vascular. Adhesions to surrounding organs do not take place until late. When formed, the disease may extend to the overlying colon, into which the new-growth may even ulcerate. Secondary deposits form in distant organs, the retro-peritoneal glands, the liver, and the lungs. Rarely is the lower urinary tract involved in secondary infection. Dickinson explains this on the ground that infection takes place through the lymphatics, in which the flow from the kidneys is away from the pelvic organs.

2. *Lymphadenoma* occurs in the kidney as a part of a general disease; it is a metastasis, the primary growth being in the lymphatic system, and consequently does not come within the sphere of the surgeon.

3. *Sarcomata*. Many of these are doubtless congenital. Of forty cases collected by Newman, thirty-three occurred under the tenth year, and of these thirty-three, twenty-six under the fifth year.

Paul and Osler, as already referred to, have found them in the fetus. All varieties are found in the kidney. Their most frequent site of origin is in the cortex. At first the growth is encapsulated, but with cellular proliferation the capsule gives way, cell-elements find their way into the capillaries, and the disease becomes diffused throughout the entire organ. The richer the new-growth is in cellular elements the more rapid is this dissemination. Finally, the contents of the renal vein become infected and secondary deposits occur in the lungs.

THE SYMPTOMS are often very obscure. Renal symptoms may be wholly absent, the first thing to arrest attention being the discovery of a tumor in the lumbar region; or there may be anoxeria, with recurring attacks of vomiting or diarrhea, or even jaundice. Pain is not characteristic. It is not acute, but rather a feeling of discomfort, or of a dull, aching character, confined to the loin, seldom extending along the course of the ureter as in calculus, and uninfluenced by movement. Hematuria may be the first symptom and of such a degree as to produce syncope, as in a case recorded by Jones. It occurs when the growth has reached and ulcerated into the pelvis, and is hence absent in a great many instances. According to Roberts, it is absent in half the cases of malignant disease. When present it is continuous and independent of exertion, thus distinguishing it from the intermittent form present in renal calculus. It may also be absent for long periods of time.

When hematuria is the only symptom, the question presents itself: From which kidney does

the hemorrhage originate? To decide this absolutely it is necessary to obtain samples of urine from either kidney. This has been accomplished in two ways: direct catheterization of the ureters, or compression of one ureter while the other remains patent. Simon dilated the female urethra, and with the finger in the bladder he guided the catheter to the urethral opening. Pawlik accomplished the same without urethral dilatation by following certain landmarks in the anterior vaginal wall.

Newman introduced an electric lamp into the bladder, and with the aid of the eye introduced a specially devised catheter. Silbermann compressed one ureter with a rubber bulb filled with mercury; Tuchmann, by an instrument resembling a lithotrite, and Polk, by a catheter in the bladder and a finger in the rectum. Other devices have also been used. All have been reported successful, but none has come into general use, probably from the difficulties encountered in their employment.

The most important point, however, is the discovery of a tumor in the renal region. When of considerable size it can be easily made out by palpation, one hand being placed in front and the other in the lumbar region for counter-pressure. The tumor will be felt projecting forward and downward between the margin of the last rib and the crest of the ilium, smooth or irregular in outline, with rounded margins, and retaining more or less of the shape of the kidney; movable or not on deep inspiration, according to the presence or absence of adhesions, downward movement being most marked on the right side from the close relation of

the organ to the liver. When of smaller size, Guyon's "renal ballottement" or Israel's method will be necessary. The former is practised with the patient recumbent. The operator stands on the side to be examined, and with the corresponding hand makes deliberate and gentle pressure at a point one inch below the junction of the tenth rib with its costal cartilage, and with the other hand pushed under the lumbar region, makes a series of gentle but short, regular, and quickly successive blows, by means of which the kidney is projected in a jerking manner toward the anterior abdominal wall. By the method of Israel,⁹ the patient is placed in the lateral position with a pillow under the loin, the head-end of the table being elevated. Examination of the left kidney is made, with the patient on the right side, the operator standing upon the right side and placing the right hand upon the lumbar region, the left resting upon the anterior abdominal wall. During respiratory movements the finger-tips glide over the lower edge of the kidney. In the normally-attached kidney only the lower third, or at most the lower half of the organ can be palpated, and the rounded edge of the kidney can be felt and distinguished from the liver and spleen. These latter organs may be isolated and their edges lifted away from the kidney with the finger-tips. By means of this method Israel¹⁰ diagnosed in a boy, fourteen years of age, the existence of a normal kidney upon the one side and a sarcoma upon the other; in an emaciated woman with persistent hematuria, a calculus in the kidney was found and the diagnosis was confirmed by subsequent operation; and also a case of carci-

noma in a patient twenty-one years of age, in which, with the finger pressed below the anterior junction of the eleventh and twelfth ribs, a flat prominence the size of a dime could be felt. In one month this had increased to the size of half a cherry; the kidney was exposed and exploratory puncture of the tumor proved it to be malignant. Nephrectomy was performed. The kidney was of normal size and microscopic examination confirmed the diagnosis, it being a carcinoma very rich in cells.

The retro-peritoneal location of the tumor is demonstrated by resonance on percussion anteriorly, from the interposition of the colon between the growth and the anterior abdominal wall. If the colon be empty, it will be felt as a rounded cord running over the front of the tumor. To exclude this, rectal insufflation with air should be used. If the colon is anterior, as it becomes distended, the percussion-sound will become resonant. When the tumor is of very large size the colon may be displaced inward; then there will be dulness instead of resonance, and a diagnosis must be reached by exclusion.

DIAGNOSIS. — New-growths have to be distinguished from other forms of renal disease, affections of the peri-nephric tissue and supra-renal capsules, tumors of hepatic, splenic, or ovarian origin; tumors of the mesentery and pancreas, and fecal impaction. Before proceeding to an examination in any case it is advisable to administer a brisk cathartic. This will exclude one possible error of diagnosis, fecal impaction, and the empty condition of the intestine will render palpation more easy and accurate. Renal calculus is the most likely of renal affections to be

confounded with new-growths. Both have the common symptom, hematuria. In calculus it is increased by exertion and diminished by rest. No such rule applies to neoplasms; it is often the reverse; the hematuria is "profuse, spontaneous, and recurrent" (Roberts), and independent of all external influences. Pain in calculus is more acute, boring, gnawing, or paroxysmal in character, and more diffuse, extending along the course of the ureter to the inner side of the thigh and testicle. Movement increases it. Pressure of the affected kidney is also more painful. In hydronephrotic and hydatid tumors fluctuation is more distinct than in the rapidly growing, malignant, and fibro-cystic varieties. Exploratory puncture will aid in the diagnosis. Careful examination and observation of the urine will exclude suppurative disease of the pelvis. From new-formations of the supra-renal capsule and peri-nephric tissue, or hyperplasia of the latter, a diagnosis is impossible. Horn and Bell and Johnston¹¹ report three cases of adenoma of the supra-renal capsule; in one the kidney was not involved, but in the other two the growth had extended into the kidney. Knowsley Thornton, at the Clinical Society of London,¹² in 1890, reported the case of a woman, thirty-six years of age, with an abdominal tumor, which had been diagnosed by Keith as an enlarged spleen, twelve months prior to its removal by abdominal section. After removal it was found to be a sarcoma of the supra-renal capsule, weighing twenty pounds, with a healthy kidney attached to its lower border.

Von Eiselberg¹¹ records a case of fibro-lipoma of

the peri-nephric fat, the size of a child's head, firm and non-sensitive, removed along with the kidney. Harris¹³ met with two cases in which hematuria was the only symptom. He explored the kidney, and found only thickening and adhesions of the peri-nephric tissue. The latter were broken up, and the hematuria disappeared.

Enlargements of hepatic and splenic origin are characterized by the absence of resonance anteriorly, from their close relation to the abdominal wall. On firm pressure the fingers can generally be pushed under the sharp margin of the liver, and in renal growths a space can be made out between the inner margin and the edge of the ribs. Movement with respiration has been considered diagnostic of new-growths in connection with the liver. This cannot be relied upon, because, on the right side at least, renal tumors of any size have this movement communicated to them through downward pressure of the liver. Splenic enlargements are more mobile, the greatest movement in renal tumors being in an antero-posterior direction (Hochsinger), and the notched margin of the organ can generally be made out. Renal tumors, when they extend inward to the middle line, and down toward the iliac fossa, have been most frequently mistaken for ovarian growths. Unless the bowel be adherent anteriorly, ovarian tumors are dull on percussion. Their intra-pelvic connection, or partial location within the pelvis, will exclude a renal origin, and resonance in the lumbar region is their characteristic.

Tumors of renal origin, however, at times possess all the diagnostic features of ovarian disease, as the

following case, reported by Claus¹⁴ at the German Congress of Surgeons, in 1885, illustrates:

“A woman, forty-six years of age, was healthy up to four years previously, when she noticed ‘a rolling’ in the abdomen, increased by deep inspiration and rapid movements. The abdomen grew larger, but for a considerable time there was no pain. A fluctuating tumor was felt in the middle of the abdomen. The urine was normal. The uterus was retroverted; only in front of this a pedicle could be felt. The diagnosis was monocular ovarian cyst. Celiotomy was performed, and the cyst was found to contain dark bloody fluid, and was connected with the kidney. Examination showed the tumor to be a fibroma, with few cells, but abundant fibers. It had developed between the medullary and cortical substance of the kidney, pushing the two apart. The cyst-wall was formed by the distended kidney-capsule.”

Tumors of the pancreas and mesentery are retroperitoneal. They are more centrally located, and their non-connection with the renal region can be shown by “Guyon’s ballottement.” In tumors of the pancreas, steatorrhea and the presence of sugar in the urine would aid in the diagnosis. Mesenteric tumors are very freely movable, as compared with renal tumors.

Failing to arrive at a satisfactory diagnosis, an exploratory incision for diagnostic purposes (which can be utilized as curative) can be resorted to. Either the lumbar or the transperitoneal route may be adopted. When the former, the kidney can be withdrawn in the loin, freely incised, examined by the finger from within and without, and again sutured without fear of any serious structural change. That

such wounds of the kidney readily heal has been demonstrated experimentally by Schachner,¹⁵ and confirmed by Morris¹³ in the human subject, in the case of a man in whom the surgeon made an exploratory nephrectomy for calculus, and found none. The patient died a month later from another cause, and at the post mortem the incision in the kidney was found represented by a linear scar extending through the renal cortex to the pelvis.

Hemorrhage after incision by the knife is rather profuse. To avoid this an opening may be made through the cortex with the Paquelin cautery. This is objectionable because it necessitates a temporary renal fistula when the conditions are such as not to demand a nephrectomy.

TREATMENT.—When the surgeon is reasonably satisfied of the existence of a new-growth, either benign or malignant, he is justified in making an exploratory incision, because it is impossible from the symptoms to differentiate the character, and as the majority are malignant, the element of success in the operative treatment depends upon early removal. In children under ten years of age the weight of opinion is against operative interference. Goodlee¹⁶ believes that in the early stages it is justifiable, and the occurrence of secondary growths in only 28 per cent., as pointed out by Kühn,¹⁷ would support this view. In 1885 Gross¹⁸ reported a mortality of 57.57 per cent. in cases of sarcoma from the operation, recurrence in 42.58 per cent., and 35.71 per cent. well after thirty-one and a half months; and for carcinoma, 71.42 per cent. fatal.

Newman, in 1888, places the mortality for carcinoma at 56 per cent., for sarcoma at 53 per cent.

Fenger¹⁹ cites eleven nephrectomies by Israel for malignant disease, with two deaths, a mortality of 18 per cent. ; of the nine recoveries two died from relapse, one after six, and the other after three months. The other seven are now alive and well. Two of these may be considered as radical cures, as five and one-half years and four years, respectively, have elapsed since the operation—a percentage of 18 per cent. of radical cures. This is encouraging as to the result of early operative interference. The duration of life without operation is estimated at from two to two and one-half years. Of twelve cases of benign tumors tabulated by Newman, three died from the effects of the operation, a mortality of 25 per cent.

Nephrectomy may be performed by either the lumbar or the abdominal method.

1. *Lumbar nephrectomy.* The patient is placed on the side with the limbs well drawn up, and a firm, round pillow is placed under the loin so as to increase the space between the last rib and the crest of the ilium. Various incisions have been recommended, but that of König allows of most room. It commences about one inch below the margin of the last rib, is carried vertically downward along the outer border of the erector spinæ muscle to the crest of the ilium. If necessary to obtain sufficient room it is continued inward toward the umbilicus to the outer margin of the rectus and even through this to the middle line. The vertical part is completed first ; then, after examination of the kidney, and if the needs of the case demand more space, the peritoneum is displaced forward and the muscles

divided by a transverse incision. With broad and deep retractors the margins of the incision should be held well apart while the kidney is forced into the wound by pressure on the anterior abdominal wall. The perirenal fatty capsule, in the absence of inflammatory changes, can readily be detached by the index finger, the organ isolated and enucleated. The kidney is drawn well into the wound and forward toward the middle line. The pedicle is isolated and separate ligatures are passed around the vessels and ureter, and securely tied. As the vessels are being ligated all tension should be taken off the pedicle, which is divided close to the hilum, examined, and if deemed necessary, separate ligatures applied to the vessels of the stump. A large drainage tube is introduced into the cavity; if much oozing is present, it is preferable to pack with iodoform gauze, and suture the incision. This König calls his retro-peritoneal lumbo-abdominal incision, in contradistinction to the retro-intraperitoneal lumbo-abdominal method. In the latter, when he desires to approach the tumor from the front, he divides the peritoneum in the line of the transverse incision.

2. *Abdominal nephrectomy*, or the trans-peritoneal method, when the incision is made through the anterior abdominal parietes. That with the incision in the linea semi-lunaris is known as Langenbeck's operation. The patient is prepared as for ordinary celiotomy, and after opening the peritoneal cavity both kidneys are examined manually. If one is found healthy then the other is removed through a vertical incision in the meso-colon over the renal

region. With fingers introduced through this opening the kidney can be isolated as in the lumbar operation, the pedicle ligated and dropped back. Drainage can be effected through the lumbar region. The rent in the peritoneum is generally left unsutured, but it is safer to suture it, as Pugh²⁰ has recorded a case of death from obstruction due to strangulation of a loop of intestine in the peritoneal rent after extirpation of the left kidney for sarcoma.

Both operations have their advantages and disadvantages and their proper spheres of usefulness. To compare the subsequent mortality is no criterion, because it is the size of the tumor that necessitates the employment of the abdominal method. The mortality as given by Newman is 30.5 per cent. for the lumbar and 47.1 per cent. for the abdominal operation. The lumbar operation should be preferred in every case in which the size of the tumor will admit of its removal without undue force, or too extensive division of the abdominal wall. Advocates of the abdominal method lay great stress on being able to determine the exact condition of the other kidney. This can also be done in the other method by exposing the sound kidney through a lumbar incision on that side. It will not add to the danger of the operation, and the peritoneal cavity remains unopened.

I give the details of

A CASE OF SARCOMA OF THE KIDNEY; NEPHRECTOMY;
RECURRENCE.

D. B., female, twenty-two years of age, was admitted into the Milwaukee Hospital August 23,

1890, with a diagnosis of renal tumor, probably a sarcoma, made by Dr. O'Malley and confirmed by Dr. Fox, in consultation. She gave the following history: For about two years she had suffered from dragging pain in the right lumbar region. This was marked by periods of paroxysmal exacerbation, accompanied by severe pain in the epigastrium, and vomiting. Such an attack continued for three or four days, during which time everything was rejected by the stomach. These attacks were attributed to disordered digestion and treated as such. They continued to recur and at shorter intervals. Five months before, while engaged in cleaning windows, she slipped and wrenched her right side. This directed attention to the lumbar region, where a tumor was discovered. This tumor had gradually increased in size, and with the increase there were more frequent attacks of pain in the epigastric region, and accompanying vomiting. There is no history of urinary disturbance beyond increased frequency of micturition prior to menstruation, which has always been regular, but during the past six months of diminishing quantity.

The patient is anemic, but fairly nourished; she has lost in past years about eight pounds in weight. Inspection reveals a fulness in the right lumbar and umbilical regions, and on palpation, an oblong tumor, extending from the right renal region posteriorly to a point beyond the middle line and below the umbilicus, can be made out. The lower end of the tumor is rounded and smooth; the upper, under cover of the costal arches, is larger and nodular. The tumor is freely movable and can be separated from the liver on the right side. It gives an indistinct feeling of fluctuation. On percussion, dulness is found to extend from the middle line just below the umbilicus, backward to the lumbar region, continuous with the liver-dulness, laterally and

posteriorly, separated from it anteriorly at a point midway between the middle line and the costal arch. Rectal insufflation of air diminished this area of dulness anteriorly, and thus demonstrated the retro-peritoneal location of the tumor. For ten days prior to the operation the urine varied in quantity from 16 to 32 ounces daily, was of a specific gravity of 1020, contained a trace of albumin, and numerous small decolorized blood-corpuscles and bladder-epithelia.

The operation was performed September 3, 1890. On account of the large size and great mobility of the tumor, the abdomen was opened in the middle line. The left kidney was found to be apparently healthy, but enlarged, the ascending colon displaced inward, and the new-growth in contact with the abdominal wall anteriorly. The ascending colon was now dragged as far as possible toward the median line, a small slit made in the peritoneum to its outer side, and through this the tumor was gradually enucleated by the finger. During enucleation numerous large vessels in the perirenal fat required ligation. The ureter was first ligated low down and cut through. On ligating the vessels the patient suddenly ceased breathing, but rallied soon under artificial respiration and stimulants hypodermatically. After section, the renal vein was found to contain partially coagulated blood. The pedicle was dropped back, the rent in the peritoneum left unsutured, no drainage provided, and the abdomen closed. For the first three days following the operation the patient suffered from one of her usual attacks of colic, epigastric pain, vomiting, etc. Beyond this, recovery was uneventful.

The tumor as removed weighed eleven pounds, was covered throughout by large veins, firm and smooth at the lower pole, semi-fluctuating and nodular at the upper. On section, the upper part was

found made up of cavities of varying size, filled with dark sanguineous fluid, or partially coagulated blood. No kidney-substance remained. The lower or solid part contained considerable kidney-substance, and, in the center, a fatty tumor undergoing degeneration. Microscopic examination showed it to be a round-celled sarcoma.

Subsequently the patient considered herself well for about six months, when she had an attack of influenza. Persistent cough followed this, and later her old attacks of colic reappeared. She was re-admitted into the hospital July 1, 1891, when examination revealed a recurrence of the disease in the pedicle; also a small nodule of the same character at the lower angle of the abdominal incision, and numerous crepitant râles throughout the whole chest. She died September 1, 1891. At the necropsy the condition as stated was found, and in both lungs multiple and disseminated secondary growths in all stages of degeneration. The left kidney was one-third larger than normal; the other organs were healthy.

PAPILLOMA OF THE RIGHT KIDNEY; NEPHRECTOMY.

A. S. (first seen in consultation with Dr. Lang, November 28, 1892), twenty-six years of age, the mother of two children, the youngest one and a half years old, dates her trouble back to her last pregnancy. During the period of gestation she had occasional uncomfortable sensations in the right lumbar region. After her confinement these disappeared, only to recur early in the summer of 1891. In August, 1892, she first detected, under the right costal margin, a tumor, which was diagnosticated by Dr. Lang as a floating kidney. As the kidney was not very movable, he directed that a snug bandage should be used. This gave temporary relief. Still the tumor steadily increased, and became more movable.

About the same time, and two days prior to her menstrual period, she had an attack somewhat resembling renal colic, with hematuria. These attacks have recurred regularly at this time since. In the interval urine is always free from blood. The patient is certain that there is no variation in the size of the tumor, or in the discharge of urine, during these attacks. Menstruation is regular. The woman was always healthy. One brother died of sarcoma of the thigh.

The patient was very anemic, having had a very severe attack of hematuria November 28, 1892, the urine appearing as if pure blood, and being of a deep smoky tinge. Examination of the abdomen showed a tumor to the right of the middle line and on a level with the umbilicus. It was freely movable in an antero-posterior direction. In size it was three times as large as a normal kidney, thickened from before backward; the pelvis and both poles could be made out. On December 1st she was admitted into the Milwaukee Hospital, when it was found that rest in bed had no influence on the character of the urine. On the 4th, she began to menstruate, after which there was less blood in the urine. The daily average of urine voided for nine days was 43 ounces, the maximum being 56 ounces, and the minimum 36. The probable diagnosis was sarcoma.

Operation was undertaken December 10, 1892, under chloroform-anesthesia. The kidney was exposed by König's incision. Exploratory puncture with a hollow needle failed to reveal anything. The needle was followed by ignipuncture, with the Paquelin cautery, and digital exploration of the interior of the kidney. The exploring finger detected soft, broken-down tissue, surrounded by an apparently firm wall. This opening was tamponed with iodoform-gauze, an additional forward transverse incision made in the soft parts, and the kidney removed.

The incision was closed by deep sutures of catgut and superficial ones of silk. On the first day following the operation, 21 ounces of urine were voided; on the second, 32; on the third, 29; on the fourth, 35; and thereafter the quantity ranged from 32 to 36 ounces. Primary union of the incision occurred. The patient was kept in the recumbent position for four weeks to insure firm union of the incision, and thus guard against the occurrence of a ventral hernia. Rapid improvement of the general health followed and has continued.

The kidney weighed one pound and three-quarters. On splitting it open longitudinally a rounded tumor the size of a tennis ball was found occupying the lower half of the medullary portion, and extending into the pelvis as a soft papillomatous mass. The pelvis was filled with coagulated blood, and two smaller papillomata were found springing from its upper part. A great part of the tumor consisted of disintegrated coagulated blood, on washing which away, the papillomatous character of the new-growth could be demonstrated. The cortex of the kidney was healthy, but somewhat atrophied from pressure over the most prominent part of the tumor.

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