

an obstruction, either temporary or permanent, prevents the escape of pus.

**Treatment.**—As the attack of renal colic requires the most powerful anodynes, morphine hypodermatically should be employed at once. As the stomach is highly irritable, it is useless to give medicines by the mouth for this purpose. Enemata of laudanum act efficiently if sufficient time be given them. The inhalation of ether may be practiced until more permanent relief can be given. The warm bath is serviceable by inducing relaxation. If gravel or sand of uric acid is present, its solution and excretion should be effected as speedily as possible. The urine should be alkalinized by the free use of the potash and lithia salts; soda must be avoided, as the urate of soda is not readily soluble. Probably the best preparation is the officinal *liquor potassii citratis*, of which a tablespoonful may be taken every three hours. Recently the borocitrate of magnesium and the benzoate of lithium\* have been used successfully, both of these agents having remarkable solvent effects on uric-acid calculus. The experiments of Roberts,† however, seem conclusive as to the solvent action of the potash salts; these failing, the borates and benzoates may be tried. Nothing can be accomplished by spasmodic efforts. The solvent action must be maintained without intermission for a long period. Should the protracted existence of a uric-acid calculus, with pyonephritis and alkaline urine, render it probable that an incrustation of phosphates has occurred, the benzoate of ammonia should be prescribed, as the most certain means of bringing about an acid condition of the urine. If the calculus is phosphatic, the same procedure is proper to produce and maintain an acid state of the urine until the phosphatic incrustation or the phosphatic calculus is dissolved. When this is accomplished, the method above mentioned must now be pursued. In the treatment of pyelitis those remedies are to be employed which are eliminated by the kidneys and exert a local action—copaiba, cubebs, santalum, juniper, erigeron, eucalyptol, turpentine, etc. These must be used with caution, because of their irritant effects on the kidneys. Probably the most generally useful, and at the same time safe, is eucalyptol. This should be administered in small doses, relying upon the results of a slight impression maintained for a long time. Any of the members of this group may be employed instead of eucalyptol, under the same limitations. The so-called diuretics—scoparius, squill, buchu, pareira, etc.—have also been recommended, but they are less effective than the oils. Cantharides tincture has been prescribed in small doses with advantage in pyelitis. The free use of skimmed milk, and buttermilk when it is grateful or preferred, is decidedly beneficial. When the existence of the tumor can be made out clearly, it should be evacuated posteriorly by

\* "Bulletin Général de Thérapeutique," January 30, 1880.

† "Urinary and Renal Diseases," *op. cit.*

the aspirator. If the calculus can be reached, a free opening should be made and a drainage-tube inserted. The sac can then be kept thoroughly empty, clean, and in the most favorable condition for shrinking and ultimate closure. Recovery has ensued. In a case of the author's in which the sac was opened from behind, the calculus was removed and free drainage secured, but the patient was exhausted by protracted suppuration.

#### HYDRONEPHROSIS—DROPSY OF THE KIDNEY.

**Definition.**—*Hydronephrosis* consists in an accumulation of the urine and dilatation of the pelvis and calyces, with progressive atrophy of the renal structure.

**Causes.**—Hydronephrosis may be congenital or acquired. When congenital it is due to some anatomical anomaly. It is more common in women than in men, because of the functions peculiar to the former. Obstruction of the ureter is the usual cause; the nature of the obstruction may differ greatly. The ureter may be blocked by a calculus, by inflammation and adhesion of the mucous surfaces, by constriction of a band of lymph, by pressure of a tumor, by the displaced uterus, etc. When an obstruction is caused by the impaction of a calculus, it is usually found *in situ*; but not invariably so, for sometimes the calculus crumbles and disappears.

**Pathological Anatomy.**—The dilatation will involve the more of the ureter, the lower down the obstruction is placed. The degree of damage done to the kidney will, of course, be determined by the amount of fluid. In an extreme case the kidney-structure will have disappeared, nothing remaining but a huge membranous bag, the ureters distended into somewhat tortuous cylinders the size of a small intestine, and with more or less thickened walls. When the accu-

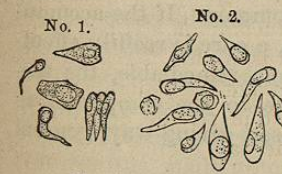


FIG. 44.—Epithelium.  
No. 1, Ureter. No. 2, Urethra.

mulation is small in amount, the pelvis is somewhat dilated, the calyces also, and the papillæ are flattened. As the fluid increases, there will be increasing atrophy of the kidney, the medullary portion first disappearing, and ultimately the cortical part. The sac may be of enormous dimensions, filling half the abdominal cavity, displacing organs and contracting adhesions to neighboring parts. The colon may be compressed and adherent very closely to the walls of the sac. The original capsule of the kidney, thickened by new connective tissue, forms the walls of the sac, the lobulated appearance being due to the internal septa. The fluid in the sac is modified urine—it is pale, of low specific gravity, alkaline in reaction, and contains urea, uric acid, urates, etc., or it may be brownish in color from the presence of

blood, or yellowish and turbid from the presence of pus (pyonephritis). The fluid usually contains traces of albumin, which may be considerable if blood is present, and more or less epithelium may also be occasionally found. The accumulation is usually limited to one kidney, the other being enlarged to compensate for the absence of its fellow.

**Symptoms.**—It is an extremely rare event for both kidneys to be affected, and hence uræmia is not a common, is indeed a rare symptom. The accumulation occurs silently, and hence it is the formation of a fluctuating tumor that first attracts attention. The size depends somewhat on the age of the growth; it may have the dimensions of a child's head. In growing, adhesions form, which give rise to acute, stabbing pains at the time of their formation. When the tumor attains sufficient volume to displace or compress the neighboring organs, corresponding disturbances are occasioned. If the colon is compressed, great accumulation of fæces will take place above that point; if the diaphragm is pushed up, dyspnoea will result; if the stomach is pressed on, there will be nausea and vomiting; if the tumor rests on the abdominal aorta, a pulsation will be communicated to it. It is important to note that the colon in hydronephrosis of the left side may lie in front of the tumor. The author saw a surgeon pass a trocar through the large intestine to reach the sac! The tumor has usually some firmness, does not fluctuate very easily, although distinctly, and is not movable. It may be handled freely without pain, as a rule, unless adhesions have recently formed, when it will be tender.

**Course, Duration, and Termination.**—The course of hydronephrosis is chronic, the onset obscure, the formation of a tumor slow, and the final disposition of the sac a tedious process. Years will be occupied in the development of these several stages. A genuine cure is rarely effected. It may happen that an obstruction within the ureter yields and the water flows away, but this is very uncommon. If the accumulation be due to pressure of a displaced uterus, a cure is readily effected by correcting the displacement. When not remediable, the termination is ultimately fatal, death being due to the complications arising from the pressure on organs, or, the sac giving way, general peritonitis is the result.

**Diagnosis.**—Hydronephrosis is most frequently confounded with ovarian tumor. The former develops from above, the latter from below. The withdrawal and examination of the fluid are usually necessary to come to right conclusions. The fluid of hydronephrosis is usually watery and contains urea, uric acid, and epithelium; the fluid of ovarian disease contains the compound, granular, many-nucleated corpuscles, is dark in color, and somewhat gelatinous in consistence. Hydronephrosis may be confounded with ascites when both kidneys are affected. They are to be distinguished by the changes in the posi-

tion of the dullness, on changes of posture in cases of ascites, which do not occur in hydronephrosis. In the beginning of ascites, if the patient lies recumbent, the dullness is in the flank; in hydronephrosis the dullness is at the site of the tumor, and does not change its position.

**Treatment.**—The sac has been emptied by careful manipulation, the obstruction yielding to pressure. This treatment is applicable but rarely. If the accumulation is sufficient to endanger life, the aspirator may be used, but otherwise interference is to be deprecated.

#### CARCINOMA OF THE KIDNEY.

**Causes.**—Nothing is definitely known of the causes of cancer of the kidney. It may be primary or secondary. It occurs in early life—before five—and in old age, youth and manhood to middle age being comparatively exempt. As regards sex, cancer of the kidneys is more common in men.

**Pathological Anatomy.**—Primary cancer rarely involves both kidneys, and of the two the right is the more frequently attacked. When cancer of the kidney is secondary, the organ attacked by contiguity, one only is affected, but, if there exists a general carcinoma, both will be the seat of deposits. The cancerous kidney attains to great size—according to Rindfleisch to twelve inches in length and six inches in width, and to a weight of sixteen pounds (Spencer Wells). This enormous size is attained in a very short time. Again, although very rarely, the kidney may not be enlarged by cancer deposits. The shape of the organ may be exactly preserved, or there may be irregularities and nodosities; in the former the organ on section presents a uniform whitish or yellowish surface; in the latter the cancer-masses occur in distinct nodules, separated by a defined line from the normal tissues, or become encapsulated. The vessels of renal cancer are abundant, large, and have thin walls, are consequently easily ruptured, the blood collecting in large excavations. Usually there is very considerable hyperæmia of the interstitial connective tissue, which assumes an active hyperplasia. Sometimes there is found in the midst of a mass an isolated soft detritus, made up of cells which have undergone fatty degeneration and may have a foul odor. The cancer elements, according to Waldeyer,\* whose views are accepted by Rindfleisch,† develop from the epithelium of the tubules. The form taken by the cancer is determined by the relative proportion of fibrous stroma and cells and blood-vessels. The more abundant the vessels and cells, the softer and more rapidly growing the cancer, which is then called the medullary carcinoma. If the fibrous framework or stroma is in excess, then the can-

\* Virchow's "Archiv," *op. cit.*

† "Pathological Anatomy," p. 512.

cer becomes scirrhus. The cancer may spread to and involve the pelvis and ureter, and the latter may be filled up with cancer-masses. The pelvis may be filled with blood-clots, stratified as in aneurism. The cancer elements may invade the renal vein, reach into the *vena cava* by coagula, whence emboli are detached, and lodge in the lungs. The cancerous kidney may contract adhesions to adjacent parts, and is apt to do so, or, detached by its increased weight, may become migratory or floating. If it remains in its own position and enlarges to the enormous extent that sometimes occurs, neighboring organs may be much displaced and compressed, those of the thorax as well as those of the abdomen.

**Symptoms.**—Cancer of the kidney may develop to a considerable extent without producing any characteristic symptoms. Pain may be experienced to a greater or less degree in the beginning, but it does not differ from pain due to other causes. It is felt in the lumbar region, under the false ribs, external to the spine, and is a sensation of soreness merely, rather than the acute, lancinating pain traditional of cancer. With or without pain, hæmaturia occurs, and is the first symptom to awaken a suspicion of the nature of the malady, but this symptom is present in one half of the cases only. It is not constant, and there may be considerable intervals of a few days, weeks, or months between the hæmorrhages. Its appearance may be postponed until near the end. It not unfrequently happens that some external injury, a blow, a fall, determines the hæmorrhage or increases its violence. Rarely is the quantity of blood sufficient to cause dangerous exhaustion. The urine may present a faint, smoky hue; it may be reddish or reddish-brown; it may contain clots of various sizes. The corpuscles are more or less crenated and otherwise altered when the urine is merely smoky, but when the quantity of blood is considerable the corpuscular elements are normal. So long as the blood is intimately mixed with the urine, there is no pain connected with it; but, when clots of considerable size are forced through the ureter, the pain will be agonizing—only less severe than that due to the passage of a calculus. Although in the beginning there may be only some deep-seated soreness, or no pain of any kind, in the further progress of the case pains will come on. The pain may be deep and rather dull in the neighborhood of the kidney or in the lumbar region, or it may be sharp, lancinating, and radiate along the intercostal nerves, or downward into the hip, the whole of the corresponding lower limb feeling benumbed and heavy. Sometimes excruciating sufferings are experienced in the sciatic nerve by pressure of cancerous lymphatics, and the limb rapidly wastes. Sufficient enlargement of the kidney to constitute a tumor is the most constant symptom. In sixty-four cases a tumor of the abdomen was recognized in all but three, and in nearly all of these was of a size to be recognized on a cursory examination

(Roberts). The tumor pushes forward into the anterior part of the lumbar region and grows upward into the hypochondrium and downward toward the iliac regions. In children the tumor attains the largest growth, filling the entire abdomen. As the colon lies in front usually, and as the material of the cancerous kidney is soft, the tumor does not furnish a dull or flat note on percussion, but a distinctly tympanic note. Full inspiration or expiration does not affect the position of the tumor, which is usually, but not invariably, immovable; the cancerous kidney may also be a movable or a floating kidney. By carefully relaxing the abdominal muscles the form and density of the tumor may be ascertained. It will be found somewhat elastic, round, and smooth, or hard, firm, and nodular. There may be a ramification of enlarged veins on the abdominal surface of the tumor, and it may have a pulsation in it, communicated from the abdominal aorta. If hæmaturia is absent, the urine may be normal in amount and quality. It occasionally happens that albumin is present when there is no blood, because of a coincident Bright's disease. Uræmia does not occur because the disease is unilateral, but both organs may be involved. When a calculus is present, as is not unusual, pyelitis will complicate the renal symptoms. Particles of broken-down tissue and the so-called cancer-cells are sometimes to be found in the urine, but unfortunately there is no distinctive cancer-cell. The digestion may be unimpaired, the appetite keen, even voracious, but the rule is that the appetite is poor, there is nausea, and the body wastes. With the first symptoms there is emaciation, which ultimately becomes extreme.

**Course, Duration, and Termination.**—This disease does not pursue the same course in all cases. In children the progress is more rapid, the mean duration being seven months (Roberts), whereas in adults the average duration was two and a half years. In some cases in children the duration is counted by weeks, and one case is noted as occurring in an adult which lasted eighteen years. The termination is invariably in death. Sometimes unexpected improvement takes place, but evil symptoms come on again presently.

**Diagnosis.**—Cancer of the right kidney may be mistaken for a tumor of the liver. It is usually possible to demonstrate a sulcus between the liver and the enlarged kidney, or to insinuate the fingers between the two. The position of the colon is an important element, for lying in front of the kidney modifies the percussion-note, which is *dull-tympanic* over the kidney and flat over the liver. From an enlarged spleen it is to be distinguished by the evolution and position of the tumor; by the situation of the colon—in front of the renal and behind the splenic tumor; by the shape and thickness of the tumor—the spleen having a rounded margin and comparatively thin edge which may be grasped; by the history of the case—malaria or leucocythemia of a splenic tumor; by the urine, containing blood and

cancer elements, etc. From ovarian tumor the differentiation is made by the position of the growth, the mode of its development, by its form; by the position of the colon, again; by the occurrence of hæmaturia, etc. From accumulations in the large intestine, in the cæcum—the descending colon—the kidney-tumor is recognized by its size, outline, position, and percussion, by hæmaturia, by the action of a cathartic, or irrigation of the bowel. As cancerous tumors of the kidney sometimes pulsate, they may be mistaken for aneurism. If the patient be placed on the elbows and knees, so that the tumor may glide away from the aorta on which it lies, the pulsation will cease. If a fixed tumor, this expedient can not be practiced. A fixed tumor of that kind pulsating, will produce no expansile movement. It will be very confusing if a minute communication exist between the aneurism and pelvis of the kidney, for then hæmaturia will coexist with a tumor.

**Treatment.**—The remedial management is merely symptomatic, and is chiefly confined to measures for the relief of pain.

#### TUBERCULOSIS OF THE KIDNEY.

**Pathogeny.**—The deposit of tubercle occurs in the two forms—disseminated, localized. In the disseminated form, gray granulations are scattered through the renal parenchyma, and are developed from the sheaths of the vessels, and this form is a part of a general morbid change. It is the localized form with which we are chiefly concerned here. The deposit of tubercle-masses begins at the renal papilla by an extension of the morbid process taking place in the calyces and pelvis. The miliary nodules aggregating, assume the cheesy aspect, soften in the center, are extruded, carrying with them the portion of tissue embraced in the deposit. Thus an excavation is established. The kidney usually increases somewhat in size; it becomes nodular, and the capsule, thickened and indurated, contains various foci of cheesy deposit. The whole organ is ultimately converted into a mere bag with thick walls and projections inwardly of connective-tissue septa, the remains of the original calyces. The testes and epididymis are, in the majority of instances, the seat of the initial changes, and spread thence to the kidneys, or they may begin in the bladder and extend thence into the kidneys. The same cheesy infiltration takes place in the pelvis, ureters, and bladder.

**Symptoms.**—The urine is increased in amount, and contains, when the disease is developed fully, blood and pus, the reaction is acid, and albumin is present. In the further progress of the case, the urine becomes ammoniacal, alkaline, and thick with pus and detritus. When the disease has reached the sub-mucous tissue, shreds of elastic tissue and fragments of cheesy matter, with the bacillus tuberculosis, which indicate clearly the nature of the destructive changes, appear in the urine. Micturition is frequent and more or less painful. This is due

to the tubercular ulceration of the mucous membrane of the bladder, and the catarrh which accompanies it. More or less pain is experienced in the lumbar region, which may be a feeling of soreness and fatigue combined, or of acute pain, paroxysmal in character. Besides the lumbar pain, there are paroxysmal attacks of pain in the back, extending along the ureter, attended with frequent and painful micturition, produced by the passage of shreds of tissue or cheesy masses. There may be no pain. Obstruction to the ureter taking place, there may ensue an enlargement of the kidney of sufficient size to constitute a tumor. The obstruction yielding, the accumulated pus and urine will flow away, and the tumor will collapse; but when the tumor once forms, although it may vary in size, it does not entirely disappear. With the progress of the tubercular ulceration, there is increasing destruction of the renal substance, and hence the quantity of urine is constantly declining. As both kidneys are usually affected, uræmic symptoms come on, when the excretion of urea and other effete materials is prevented. Usually, however, the patient is carried off by the progress of the tubercular ulceration in the intestinal canal and lungs. In the author's cases, there were simultaneous pulmonary lesions, which, however, seemed to make but little progress. Death occurs by exhaustion, or with some head troubles.

**Course, Duration, and Termination.**—The course and duration are much affected by the existence of general tuberculosis, by the extent of mischief in both kidneys, and by the degree in which the bladder is implicated. The duration rarely exceeds one year, though there are occasional examples lasting two, even three years. If the bladder is much affected, the pain and irritation and the loss of sleep from frequent micturition rapidly exhaust the vital powers. If both kidneys are largely damaged, the case will be terminated by cerebral hæmorrhage, or by coma and convulsions.

**Treatment.**—The best results as regards prolongation of life are obtained by the use of quinine in considerable doses (five grains *ter in die*), the benzoates, salicylates, and eucalyptol. To relieve the irritable bladder and permit sleep, the most suitable remedies are chloral and morphine by suppository or enema. If the cystitis is very severe, and the urine ammoniacal, good results are obtained by the author by irrigation of the bladder with a weak solution of salicylic acid and borax.

#### ECHINOCOCCUS OF THE KIDNEY—HYDATID CYST OF THE KIDNEY.

**Definition.**—*Echinococcus of the kidney*, like echinococcus of the liver, is the immature or larval condition of the *tænia echinococcus*, the tape-worm of the dog.