

## PART V

### DISEASES OF THE URINARY SYSTEM

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#### GENERAL DISCUSSION

The kidneys occupy rather a peculiar position among the organs of the body. Since it is their duty to secrete from the blood those substances which are the more or less harmful products of katabolism, they are primarily somewhat more resistant to the action of these toxins than are other cellular elements, and they are at the same time subject to injury when the blood contains foreign elements or varies to any great extent from that of the normal body.

The kidneys secrete according to the varying qualities of the blood and the varying speed of flow through the renal capillaries. Generally speaking, the higher the pulse pressure, the greater the urinary flow.

No secretory nerves have yet been demonstrated for the kidneys. The vasomotor nerves for the kidneys and the suprarenals are derived from the eleventh and the twelfth thoracic segments of the spinal cord. Vertebral or costal lesions affecting these segments are very important factors in modifying the circulation through the kidneys, and thus their secretion and nutrition.

The normal constituents of the urine vary widely, under normal as well as under abnormal conditions. The following abnormal findings are not rare.

**Hematuria.** Blood may be found in the urine in small quantities, as the result of most forms of nephritis. The passage of a calculus is usually associated with more marked hemorrhage. Blood from the bladder is fresh in appearance. The red blood cells are less disintegrated and fragments of the bladder epithelium are often recognizable. Fractional catheterization shows blood increased in quantity in the last part if the hemorrhage is in the bladder, in the first part if the hemorrhage is found in the urethra, and about equally through all parts if the hemorrhage is from the ureter or the kidney.

**Hemoglobinuria.** When the hemoglobin is dissolved out of the red blood cells, it is speedily eliminated by the kidneys. This is the case after the use of certain drugs, in malaria, and in some other blood diseases.

**Albuminuria.** Albumin is eliminated by the kidneys chiefly as the result of disease of the kidney epithelium. This may vary from slight hyperemia to very severe kidney lesions. As a tem-

porary occurrence and in small quantities the presence of albumin in the urine must not be considered a very serious matter. It may be the result merely of overtire, or possibly from an orthostatic spinal condition (orthostatic albuminuria). It should always arouse the suspicion of a kidney disease when it is found, and the patient's condition be the subject of more careful investigation.

**Indicanuria.** This occurs most commonly as the result of intestinal putrefaction. It is present also in cancerous cachexia, in pus accumulation anywhere in the body, in high fevers, and, generally speaking, wherever the blood is absorbing the products of proteid decomposition.

**Pyuria.** Pus is present in the urine as the result of infection of the bladder or of the kidneys. It is very necessary to determine as speedily as possible the source of the pus. In women the possibility of contamination of the urine from a vaginal discharge must not be forgotten. In men, abscesses which drain into the urethra are to be considered. Catheterization should eliminate these factors. Catheterization of the ureters shows which kidney, if either, is affected. Injection of the bladder and sometimes of the ureter may precede the X-ray examination. Without this injection the X-ray may show the abscess in the kidney in some cases.

**Chyluria** is a rare condition in this country, and is usually due to infection by the *filaria sanguinus hominis*. (q. v.)

**Glycosuria.** Sugar is eliminated in the urine in diabetes mellitis (q. v.) and also as the result of the overeating of sugar. There seems to be considerable difference in the sugar toleration of different individuals. In some people the most unbridled eating of candy or honey does not seem to be followed by glycosuria; in others comparatively small amounts of carbohydrate excess give rise to glycosuria. In diabetes mellitis, certain poisons, long fevers, and other conditions, acetonuria, diaceturia, and oxybutyria are frequently present. These are of more or less serious import, according to the other conditions with which they may be associated. The occurrence of diacetic acid and oxybutyric acid in the urine in diabetic patients usually precedes the onset of coma and death.

**Other Urinary Constituents.** Calcium oxalate occurs in the urine as the result of deficient oxidization processes. Leucin, tyrosin, and cystin are usually associated with diseases of the liver. *Echinococcus* hooklets may be found in the urine when a hydatid cyst is present in the kidneys, or breaks into any part of the urinary tract. The urine may contain various infectious agents, as the gonococcus and the ordinary pyogenic bacteria, molds and yeasts, and certain protozoa. Such findings are only of value when perfectly fresh urine taken under aseptic conditions is examined.

## CHAPTER XXV

### DISEASES OF THE KIDNEYS

#### ACUTE HYPEREMIA

(Active hyperemia; active congestion)

This condition may be the first stage of acute nephritis or it may be present for a few days and terminate apparently with recovery. The most common cause of the condition is the presence of irritating substances in the blood.

Experiments upon animals and upon healthy individuals show that the salts of all the common metals, including sodium chloride, the immune serums, or any foreign proteids injected into the circulation, or any of the active medicines in common use, produce the symptoms of active hyperemia of the kidneys, increase the multiplication and loss of the renal epithelium and thus are largely responsible for the prevalence of renal diseases occurring in middle life. The gargling of potassium chlorate permits small quantities of this drug to be swallowed; the application of turpentine stupes and the giving of alcohol rubs permit certain amounts of these drugs to be breathed into the lungs or absorbed into the blood; and it has been shown conclusively that even these small quantities of irritating drugs act upon the kidney epithelium to a certain slight, but irreparable extent. Most of the acute infectious diseases are associated with kidney symptoms. Prolonged exposures to cold and focal infections are factors.

Lesions of the tenth to the twelfth thoracic vertebræ and the corresponding ribs are etiologic factors.

Nephrectomy of the opposite kidney, blocking of the opposite ureter, or Dietl's crisis on the opposite side, produce active hyperemia, probably of reflex origin and similar to that produced by a blow upon the back, or by suddenly produced bony lesions of the dorso-lumbar area.

**Diagnosis.** The symptoms are not pronounced. There may be a dull pain in the loin, a slight feverishness and a slightly increased pulse rate. The urine is scanty with no marked variation in the total elimination of the ordinary solids. A few blood cells, a few hyalin casts, a trace of albumin and some cells from the kidney tubules are present.

**Treatment.** First, all irritating drugs must be stopped; bony lesions as found must be corrected; the lower ribs should be raised; and whatever contracted muscles are found should receive atten-



tion. Free drinking of water is to be encouraged. This may have lemon juice, or any other fruit juice, added to it, and may be either hot or cold. A free milk diet is good. Tea, coffee, alcohol, spices, meats are to be omitted from the diet until recovery.

Most cases recover in a few days under this treatment.

### PASSIVE HYPEREMIA

(Chronic or passive congestion)

Most commonly passive congestion of the kidney is due to the ordinary causes of venous interference, such as mitral lesion or cirrhosis of the liver. The kidney is large and purple presenting the appearance called cyanotic induration. Direct pressure upon the renal veins may be caused by abdominal tumors, pregnancy, ascites, visceroptosis, and other somewhat less frequent conditions. Rarely thrombosis or embolism of the renal vein may be responsible for passive hyperemia. Nephroptosis may occur as part of Glenard's disease or it may exist independently and be a cause of passive congestion.

The symptoms of passive congestion include a rather constant dull aching in the loins; scanty, highly colored urine, which may contain small quantities of blood, albumin, casts, renal epithelium, and an excess of uric acid; to these symptoms must be added all those due to the cause of the hyperemia.

**Treatment.** The removal of the cause of the congestion, if this is possible, is the first need. Palliative treatment is of value in all cases. This includes the treatment already advised for active hyperemia, together with such measures for the relief of the circulatory embarrassment as may be indicated. It may be necessary, in passive congestion, to reduce the amount of water taken into the body to a certain extent.

### ACUTE NEPHRITIS

(Acute Bright's disease; acute diffuse nephritis; catarrhal nephritis; acute parenchymatous nephritis; including glomerular and tubal acute nephritis; and acute productive and desquamative nephritis)

Acute nephritis is inflammation of the kidneys, usually of sudden onset, and characterized by some pain and gastro-intestinal symptoms, diminished urine with varying amounts of albumin and casts.

**Etiology.** Acute nephritis may appear at almost any time of life. It is due to changes in the circulation of the blood or to toxic or infectious elements in the blood.

The bony lesions are factors in producing acute nephritis. Blows or strains affecting the eleventh and twelfth thoracic ver-

tebrae and the corresponding ribs are important. Lordosis is generally recognized as a cause of albuminuria and is a predisposing cause of acute nephritis. Irritants in the blood include alcohol, which is very efficient in producing nephritis; certain drugs, especially turpentine, the coal tar derivatives, cantharides, ether and others. The bacterial diseases, especially the exanthemata, are usually associated with acute nephritis, but the protozoan diseases, such as malaria and syphilis, rarely cause the acute form. Injury to the skin, such as result from severe burns, poison oak, trauma, may cause nephritis. Exposure to cold may be responsible.

**Pathology.** The kidney shows more, or less localized areas of inflammation; the affected cells are undergoing granular degeneration; the capsule is somewhat adherent; and the entire kidney slightly increased in size. Other organs of the body show the effects of the edema. Special varieties are described according to the locality affected.

**Glomerular Nephritis** is found most frequently in scarlet fever and diseases of somewhat similar character. The inflammation may be rather strictly localized in the glomeruli in this form. Edema is practically invariable in the glomerular form.

**Tubular Nephritis** is especially due to alcohol or other forms of poison. The inflammation of the tubules is somewhat less strictly localized than is the case in the glomerular form. Edema is sometimes slight or absent.

**Diffuse Nephritis** involves not only glomeruli and tubules, but also the interstitial tissues.

**Hemorrhagic Nephritis** is especially characterized by the presence of blood in the urine and the occurrence of numerous small hemorrhagic foci in the kidneys.

**Acute Productive Nephritis** is characterized by rapid multiplication of the connective tissues in localized areas of the kidney which results in the formation of wedge-like areas of fibrous tissue. It is somewhat more speedily fatal than are other acute forms.

**Lymphomatus Nephritis** is an acute form which is characterized by marked lymphocytic and leucocytic infiltration of the intermediate zone of the kidney.

**Diagnosis.** The symptoms of acute nephritis are sometimes typical and sometimes easily confused with gastro-intestinal attacks. Chilliness followed by a slight fever with nausea, sometimes vomiting and pain in the loins or sometimes between the shoulders, is characteristic; a puffiness under the eyes, sometimes in the lids, and a generalized swelling of the face, usually occurs rather early; the skin becomes pale and waxy-looking; later the ankles, and following this the legs and other parts of the body are affected; ascites may be marked and the external genital organs are frequently enormously distended; the highly concentrated urine may irritate the bladder and urethra to such an extent as to initiate cystitis.

The occurrence of any of these symptoms, even if edema is absent, should cause an examination of the urine to be made. The total quantity is diminished in acute nephritis, sometimes even

complete suppression may occur; the color is dark, the specific gravity high; there may be marked cloudiness from the presence of the anatomical elements; albumin may reach 1% or 1.5%, or may be absent; renal epithelium, red and white blood corpuscles, and cells from the bladder may be present; casts may be hyalin, blood, epithelial, or granular, all forms may be present in a single specimen; the urea and the normal inorganic constituents are diminished.

The onset of uremia is marked by visual disturbances, headache, backache, vomiting and convulsions.

**Treatment.** The consideration of the causes of nephritis in any given case should determine to a certain extent the methods of treatment employed. All irritants must be omitted from food and drink; alcohol, tea, coffee, tobacco, meats, spices, are to be forbidden; a strict milk diet is by far the best thing. During the acute attack rest in bed is necessary; very free drinking of hot water is to be encouraged.

Treatment should be given twice each day during the presence of the acute symptoms, later, less frequently. The mobility of the lower thoracic and upper lumbar spinal column should be increased; reflex muscular contractions of the dorso-lumbar region should be corrected; the ribs raised; and whatever lesions may be found are best corrected as speedily as possible.

Prolonged sweating is useful so long as this does not weaken the patient. Colonic irrigation may be useful; it may be continued for hours, in severe cases. The urine should be examined carefully and frequently.

After recovery from the acute attack, the patient should return for examination and for urinalysis at intervals of a few weeks, in order that the occurrence of the chronic form may be avoided.

**Prophylaxis.** Acute nephritis may be avoided by using a good wholesome diet; by the correction of lesions of the eleventh and twelfth thoracic vertebrae, especially by the avoidance of alcohol and of exposure to cold. During the acute infectious diseases the treatment of the dorso-lumbar areas goes far toward preventing the occurrence of nephritis. The urine should be watched and the first appearance of albuminuria, casts, or renal epithelium should be followed by vigorous treatment.

**Prognosis.** Recovery usually occurs within one to three weeks. If the cause of nephritis persists, the condition may pass into the chronic form.

#### KIDNEY OF PREGNANCY

The typical kidney of pregnancy precedes eclampsia, as a general thing, and is a toxic tubular nephropathy. The toxins produced by the fetal metabolism are, for some unknown reason, retained within the body in an apparently



virulent form; the kidney tubules suffer markedly, while the glomeruli are little affected. With the emptying of the uterus, the kidney condition is immediately relieved.

Women who have had acute glomerular nephritis, or in whom the causes of glomerular nephritis exist, are apt to suffer exacerbations of this disease during pregnancy. Emptying the uterus may give relief, but the kidney disease may go on to death days or months after child birth.

The treatment is that of acute nephritis (q. v.) with the modifications indicated by the state of pregnancy. The urine should be analyzed at intervals through pregnancy, whether symptoms of renal disturbance appear or not.

### CHRONIC PARENCHYMATOUS NEPHRITIS

(Chronic Bright's disease; chronic exudative nephritis; including chronic tubal, chronic glomerular, and chronic diffuse nephritis; large white kidney; small white, or contracted kidney)

This is an inflammatory process, involving chiefly the glomeruli and the tubules of the kidney, and only secondarily the interstitial connective tissue.

**Pathology.** The large white kidney is present in the earlier stages of the disease. It is paler than normal; the capsule is not usually adherent; on section, the kidney presents a yellowish color, with areas of congestion or hemorrhage. There is some overgrowth of the connective tissue, especially in Bowman's capsule.

The small white kidney may follow that just mentioned, as the result of the contraction of the newly formed connective tissue. The capsule is adherent over considerable areas; there are fatty degeneration and atrophy of the glomeruli and tubules and the interstitial connective tissue is increased. Occasionally, waxy degeneration may be present.

Another form of kidney is that called the large red kidney, which is present in chronic hemorrhagic nephritis. In this type the hemorrhagic foci are followed by cicatrices; the contraction of these leads to a pitting of the surface of the kidney, which thus presents a distinctly bumpy appearance. On section, the kidney is seen to be mottled with brown areas resulting from the earlier hemorrhages.

**Etiology.** This form of nephritis may follow repeated attacks of the acute disease, or it may begin slowly. It is usually the result of irritations, of a mild degree, more or less constantly present. It is certainly due in a considerable number of cases to the habitual use of drugs.

The kidney recovers from injury by the multiplication of the cells left intact. Any of the salts of the common metals, any drug which affects any of the secretions of the body, the poisons associated with any of the bacterial infections, and the serums used in the treatment of some of these, have all been shown to cause loss of kidney epithelium, and this loss is repaired by the multiplication of the cells already present in every case. The kidney epithelium has only a limited power of reproduction and while it is true that slight injuries, such as may be due to the factors just mentioned, are followed by apparently complete repair, it is also true that such demands for multiplication cannot be indefinitely

met. When repeated irritation has exhausted the power of a considerable portion of the renal epithelium to repair itself through the multiplication of its parenchymatous cells, the phenomena of acute parenchymatous nephritis become marked and usually serious.

The place of **bony lesions** in the etiology of this form of nephritis is probably twofold. In the first place, lesions affecting the eleventh and twelfth thoracic segments of the cord interfere with the normal vasomotor control of the kidneys and thus render them more easily injured and less well nourished; bony lesions affecting the centers controlling the action of the liver, spleen and intestines, may result in the accumulation of the toxic products of katabolism within the body, and these toxins are important sources of irritation to the kidney glomeruli and tubules.

**Diagnosis.** The symptoms of acute nephritis may be continued in a somewhat less pronounced form into the general symptoms of chronic nephritis. In other cases the disease begins with subacute symptoms from which recovery does not occur. Usually the earlier symptoms in this disease do not suggest a kidney complication—a progressive loss of appetite, with increasing weakness, some nausea, attacks of acute gastritis, and varying headache which rarely completely disappears. Examination of the urine during this time should lead to the diagnosis; too frequently, however, urinalysis is postponed until the appearance of edema; this frequently affects only the eyes and the ankles at night for some time; later the area extends over more or less of the entire body, and it may be so pronounced that the patient is almost unrecognizable; the complexion assumes a pallid, pasty appearance, and appears translucent. Death may result from edema of the larynx or the lungs, by the embarrassment of the heart directly, or as the result of hydropericardium; or the disease may terminate by the appearance of uremic symptoms—these include headache, nausea, vomiting, diarrhea, dizziness, and insomnia, which go on to delirium, coma and death.

The analysis of the **urine** should be repeated at intervals of a few days, in order that the actual condition of the metabolism of the body, as well as of the kidneys may be determined. The total quantity is diminished at first; in later stages it may be nearly or quite normal in quantity; and during the time when the exudates are being absorbed, the total quantity may be considerably increased. The albumin is very high, sometimes reaching 3% by Esbach's test; the total daily quantity of normal constituents is diminished; the urine is turbid and dark in color; blood cells, all forms of casts and granular debris are present.

**Treatment.** The treatment consists first in removing the causes of toxemia. Constant attention to diet and hygienic living is necessary. Whatever treatment is indicated by an examination



of the spinal column especially in the region of the eleventh and twelfth thoracic vertebræ should be given and this should be repeated at rather frequent intervals for several weeks. The treatment for acute nephritis may be employed.

Probably in no other disease than nephritis is definite adjustment of the vertebræ corresponding to the renal segments more urgent. Frequently specific adjustment of this region is almost immediately followed by definite improvement in renal functioning. Owing to marked ligamentous changes it is oftentimes difficult to secure thorough release of the parts. Then again lesions lower down in the spine or innominata, and even ones higher up, may play a primary role in so far as the maladjustments are concerned. The corresponding ribs should also be released. All of this should be considered in conjunction with syphilitic, streptococcus and other infections, metabolic toxins, alcoholism, and the general hygiene that makes up the daily habits of the patient.

**Prognosis.** Complete recovery from chronic parenchymatous nephritis is rare, though many of the subacute cases recover provided thorough attention to spinal lesions, intestinal hygiene and elimination of all infective processes is instituted. The best that can be hoped for treatment in serious cases is to delay the inflammatory process and to give what parts of the kidney may be left the best opportunity for doing good work. It seems that the nephritis associated with scarlet fever is of special virulence.

The results of osteopathic treatment during the time when the kidney is large or normal in size are very good. In many cases a symptomatic cure has been reported; this means, no doubt, that with a good circulation and nervous control, the parts of the kidney which remain intact are perfectly able to meet all of the ordinary requirements of the body. Such patients should be warned, however, that a certain amount of their kidney tissue has been injured as the result of the disease and that they should pay special attention to their habits of living if they wish to live the long and happy and useful lives to which they are entitled.

### CHRONIC INTERSTITIAL NEPHRITIS

(Chronic non-exudative nephritis; chronic Bright's disease; cirrhotic kidney; primary, genuine, contracted, red, glomerular, or gouty kidney)

Chronic interstitial nephritis is an inflammation chiefly affecting the connective tissue of the kidney and associated with degeneration and atrophy of the parenchymatous cells. Cardio-vascular changes are always marked in this disease.

**Pathology.** Several varieties of pathological change are described in connection with chronic interstitial nephritis.

In the primary form of the disease, the kidneys are red in color and very small, both kidneys together may weigh less than three ounces; the capsule is

much thickened and very adherent; the kidney itself is brown in color, finely granular, containing many cysts; the connective tissues are greatly increased in quantity, and are hardened and shrunken; the parenchymatous cells show granular, fatty, or waxy degeneration, as well as atrophy. In gouty patients, deposits of sodium urate and other uric acid compounds may be present. When the condition is secondary to arteriosclerosis, the vessels of the kidney show more marked changes, while the capsule is less adherent and less thickened. While the surface of the kidney is smoother in the typically senile form, the entire kidney takes part in the atrophy, the capsule is very thick and adherent, and both the cortex and pyramids are rather uniformly atrophied. There is, in the senile form, a marked increase in the pelvic fat.

**Etiology.** The causes of chronic interstitial nephritis are many; yet the real nature of the underlying etiology is vague. Parenchymatous nephritis is always associated with more or less marked interstitial inflammation and this may go on to so great an extent that the interstitial changes ultimately mask the primary parenchymatous affection.

With the onset of old age there is a tendency to overgrowth and contraction and toughening of all connective tissues in the body. These changes are, in the case of the kidney, merely a part of the general onset of senility. Heredity is certainly a cause of interstitial nephritis, as it is of interstitial inflammations and premature senility of the entire body.

A part of the phenomena associated with senility is found in the progressive rigidity of the articular tissues. This is associated with a posterior curve in the upper thoracic region, and a bending forward of the head and neck. The lower limit of this posterior upper thoracic curve usually comes at about the ninth thoracic segment. A somewhat increased mobility in this region is followed by rigidity of the tenth thoracic and throughout the remainder of the spinal column. In some cases the whole spinal column is uniformly rigid.

The effects produced by this rigidity are several—the activities of the liver, perhaps the spleen, certainly the intestinal tract, are somewhat diminished; the power of these organs to neutralize poisons is correspondingly lessened; this results in more or less toxemia. The nervous control of the vessels of the kidneys is also impeded. In other ways the accumulation of the more or less toxic products of katabolism is rendered inevitable. The rigid thorax is not associated with proper habits of breathing. Cardiac difficulties complicate the picture. All of these things are more or less directly due to the rigid spinal condition.

The protozoan infections, such as syphilis and malaria; habitual alcoholism, especially what is ordinarily called "moderate" drinking; the overuse of proteid foods, and overeating of too great a variety of complicated foods; are certainly causes of this condition. Too little exercise and excessive exposure to cold, damp climates; gout, and rheumatism are also important factors. Like senility,

gout, and several of the causes already mentioned, interstitial nephritis seems to be favored by the general conditions of modern civilized life, with all that is associated with that term. Streptococcus infection (e. g., tonsillitis) by way of the blood stream probably plays an important role in certain cases.

**Diagnosis.** The symptoms may be latent for many years, during which the kidney changes are being gradually produced. Not rarely the kidney disease remains unsuspected until some pulmonary or cardiac or hepatic disease is forced to a fatal termination by the sudden exacerbation of the kidney difficulty. Post-mortem examination of such kidneys shows that disease has been slowly progressing, though unrecognized, for many years.

Occasionally the first symptoms are those of uremia—headache, nausea, vomiting, dyspnea, visual disturbances, convulsions or stupor, ending in coma and death, or slow recovery. Sometimes the symptoms are more gradual, and include failing vision, sleep disturbances, disordered digestion, sometimes frequent micturition. This state may go on slowly for some years, and it may be interrupted by uremic attacks. The urine is usually considerably increased; the hyperacidity of the urine leads to bladder disturbances, which may cause considerable annoyance; the daily quantity may reach a gallon or more; the specific gravity may be as low as 1002; albumin may be absent or present in mere traces; the total elimination of solids and urea is considerably diminished. The low urea is an important factor in diagnosis and prognosis. Red and white blood cells, hyalin and granular casts are found with difficulty. The indistinct urinary findings may cause the diagnosis to be considerably delayed.

The circulatory disturbances include a high blood pressure, sometimes exceeding 200 mm. of Hg. The arteries are hard, thickened, and sometimes tortuous. Not all of the arteries are equally affected, and in examining the condition of the vascular system the radial, temporal, carotid, and other accessible arteries should be palpated. The heart is hypertrophied; the aortic sound accentuated. Cardiac asthma may be present.

The respiratory disturbances include dyspnea, sometimes with signs of hydrothorax. Epistaxis may be the first symptom. Orthopnea and Cheyne-Stokes breathing are present in the later stages.

The nervous symptoms include drowsiness, which may be associated with marked insomnia. Apoplexy may be the first sign of the condition. Various sensory disturbances may be present. Retinitis, partial or complete blindness, tinnitus aurium, and fatigue may be early symptoms. The retina shows characteristic changes. Vomiting, nausea, diarrhea are the most prominent digestive disturbances.

In addition to the edema, which is not usually pronounced in interstitial nephritis, the skin may show marked dryness, and



occasionally crystals of urea are found. Cyanosis and pallor are usually present. Pruritis and a very obstinate eczema are very annoying symptoms. Uremic attacks may appear suddenly, or uremia may come on gradually, and terminate in death.

**Treatment.** The prophylaxis of interstitial nephritis must be begun some forty years before the onset of the disease. A good wholesome way of living and eating should prevent the disease altogether. Very likely syphilitic (predisposing) and streptococcus infections are important considerations.

When the symptoms appear, the patient must be put upon a very rigid diet and daily regime. Exclusive milk diet is frequently of value for a short time, though it should not be attempted to put the patient upon a milk diet for the rest of his life. After a preliminary week or two weeks of milk and fruit juices alone, he may begin to take fruit, vegetables and some cereals. He should be instructed to make his entire diet upon vegetables, fruits, milk, with only very small amounts of sugar, salt, starch or meat. Indeed, in many cases these four articles are best omitted altogether.

The warm dry climates are best and it is frequently of value to change from a low to a high altitude or vice versa.

The correction of the spinal rigidity, which is universally present, is of great value. Treatment should be given very gently, with movements which exert no recognizable stimulation upon the nerve centers. It is best in the beginning to give treatments every day, or every other day until the spinal column and the ribs show some increased mobility. Still do not neglect definite corrective work. After this, treatment should be given three times each week, then twice, then once, until a very flexible spinal column is secured. After this the patient needs to return for examination and perhaps a few treatments two or three times each year.

"Venesection is of marked benefit in uremia. About a pint of blood should be taken, under aseptic conditions, from a large superficial vein. The sudden lowering of venous pressure produced in this way often causes immediate kidney activity and relieves the toxemia very speedily, far better than the usual sweating and other methods."—McConnell.

"In addition to the specific osteopathic treatment, we must pay close attention to diet, and I prefer ordinarily to fast the patient twelve to twenty-four hours, following it with as nearly a milk diet as the patient will stand for, and later add some vegetables, spinach and lettuce—some cereals, eggs and fish as the case progresses. In addition to this, if the blood pressure be not too high, showing the absence of arteriosclerosis, I believe in the Turkish baths, because the skin is one of the chief aids in elimination, and will take much work off of the kidneys. I prefer to have the patient sleeping in the open air as in tuberculosis, because you have a constitutional disturbance, and you increase the oxidation of the waste materials by means of the open air sleeping and relieve the kidneys of that much work. We have to protect these cases; ordinarily I advise the woolen underwear and give them plenty of rest. I do not believe in rest in the recumbent position too much, for then we have too much passive hyperemia. I advise alternating the upright position and the recumbent

position. The use of salt water enemas in these cases is helpful, using the normal salt solution and having the patient take from one to two quarts of water at night before retiring and retaining as much as possible over night."—F. H. Smith.

**Prognosis.** The diseased kidney tissue cannot be restored. On the other hand, it is very remarkable how great efficiency is possible to badly diseased kidneys. The treatment as outlined gives the best possible circulation through the kidneys and relieves them to as great a degree as is possible of the burdens that they have been unfairly compelled to bear throughout life. If the patient is obedient and cheerful, he should be able to live his life out in a fairly comfortable manner. If he fails to obey instruction or if the kidney lesions are too pronounced, he may die either as the result of the associated cardio-vascular disease or from uremia; or some intercurrent disease, such as pneumonia or gastritis, may be fatal on account of the kidney lesion rather than on account of its own severity.

## PYELITIS

(Pyelo-nephritis; pyonephritis)

This term is applied to inflammation of the pelvis of the kidney and the pyramids. Also, the term pyelo-nephritis is applied to those conditions in which the mass of the kidney is recognizably involved.

**Pathology.** The catarrhal form is the most common. A pseudo-diphtheritic inflammation is occasionally present. Tubercular pyelitis is occasionally found. Suppurative pyelitis is usually due to metastasis.

**Etiology.** Pyelitis rarely occurs as a primary disease. The most frequent cause is a renal calculus. Gonorrheal inflammation lower in the urinary tract may extend upward through the ureter to the pelvis of the kidney, especially when the renal circulation has been impaired. The colon bacillus may be responsible for pyelitis under similar circumstances. Infections, such as are associated with acute nephritis, or renal carcinoma or tuberculosis may cause pyelitis. Occasionally drugs in the urine may inflame the membranes of the renal pelvis.

**Diagnosis.** It is usually difficult to make a diagnosis of pyelitis except as the causative factors are recognized. Sometimes it is possible to find the epithelium from the pelvis of the kidney in the urine. It is usually difficult to distinguish these from the cells of the inflamed bladder.

Pain is often acute, extending down the ureters. This is especially severe when the condition is associated with passage of a renal calculus. The fever may be very irregular, hectic or typhoid.



Symptoms resembling those of uremia rarely occur. Reflex muscular contractions of the lumbar region are extremely marked, and hypersensitive areas are usually found.

**Treatment.** The treatment varies according to the cause of the disease. If the X-ray examination shows a stone, surgery may be indicated. Free drinking of water, application of heat and cold, relaxation of the lumbar muscles, adjustment of the lower dorsal and lumbar vertebræ and innominata, are all important factors in relieving the pain and promoting recovery.

**Prognosis.** The prognosis depends upon the associated conditions. Purulent cases are liable to infect the peritoneal cavity and cause death.

### RENAL NEUROSES

All attempts toward demonstrating the existence of nerves directly governing the secretion of urine have failed. On the other hand, the secretion of urine is known to depend upon the rate of the blood flow through the kidney; this in turn depends upon the difference between the arterial pressure and the venous pressure, and also upon the caliber of the renal arterioles. Vasomotor nerves to the kidney have been demonstrated by different observers. These are derived from the eleventh and twelfth thoracic segments of the spinal cord. The renal splanchnic nerves from these segments pass by way of the hypogastric plexus. Gray fibers from these ganglia and from the aortic plexus pass to the blood vessels of the kidney.

The fact that the kidneys are profoundly affected by nervous conditions is shown by the urinary variations associated with certain nervous diseases. For example, in hysteria, especially after a crisis, great quantities of extremely pale urine of low specific gravity are voided. After an epileptic attack, on the other hand, very little urine is secreted for some hours. Individuals who undergo any nervous shock, excitement, passion of any kind, suffer from changes in the urinary secretion and these are most commonly like those found in hysteria.

Local influences which act upon the eleventh and twelfth thoracic segments, including both acute and chronic conditions of trauma, such as a blow across the back, may shock these nerve centers, so that urine is not secreted for some time after, and when the flow again begins, it may be scanty, dark, of high specific gravity, and may sometimes contain blood, casts or albumin. A wrench or sudden jar may have the same effect.

Bony lesion of the tenth thoracic to the first lumbar vertebræ may be responsible for disturbed kidney secretion. It seems to be a cause of chronic parenchymatous nephritis, and also it increases the danger of renal involvement during the presence of the acute infectious diseases.

In every case of renal disturbance it is very important that the nervous relationships should be investigated. Not only the disturbed structural conditions, but also those factors associated with emotional disturbance must be corrected, if the patient is to make the most speedy and complete recovery.

### RENAL CALCULUS

(Nephrolithiasis; gravel, renal colic; pyelitis calculus)

Renal calculi are concretions in the kidney substance or in the pelvis of the kidney. They are of various sizes and are called renal sand, renal gravel, renal stone, or calculus, according to the



size of concretions. When the stone makes a mold of the pelvis, it is called a coral or dendritic calculus. The most frequent of these stones are precipitates of uric acid and the urates. Others are composed of calcium oxalate, the phosphates, or, rarely, calcium carbonate or fatty deposits. Calcium oxalate calculi are dark and very irregular in size; they are called mulberry calculi. The presence of renal calculi is usually associated with varying degrees of pyelitis. The blocking of the ureter may lead to hydronephrosis.

**Etiology.** The cause of renal calculus is not very well known. It is most frequent in children and in old people. Men suffer more than women. Gout and the hygienic conditions associated with gout seem to be important factors. Those conditions which lead to the elimination of an excess of the nitrogenous wastes in the urine seem to be important in the etiology of renal calculus. Injuries to the kidney region may be a factor.

**Diagnosis.** The symptoms may be atypical. The passage of a stone through the ureter may cause most agonizing pain, extending downward to labia or penis, which begins suddenly, terminates suddenly, and is followed by the passage of the stone through the urethra, or by its retention within the bladder.

A stone which is too large to enter the ureter, and which fits snugly in the pelvis of the kidney, may attain tremendous size with no symptoms whatever. The most important diagnostic point is found in the X-ray plate.

**Treatment.** Hot baths and hot applications to the loins and over the abdomen, the free drinking of hot drinks, and very strong pressure over the tissues near the lumbar vertebræ, may be sufficient to relieve the pain, so that the stone may be finally passed into the bladder. Its passage through the urethra is usually less painful. During the spasms of pain of renal colic, it may be necessary to use chloroform or morphine.

The further formation of gravel or stones may be prevented by a nonpurin diet, and by free water drinking.

When an incarcerated pelvic stone is recognized, its surgical removal should be considered.

**Prognosis.** This depends upon the structural conditions associated with the presence of the stone and upon the obedience of the patient to instructions given him concerning diet and habits of living.

#### AMYLOID KIDNEY

Amyloid, waxy, or lardaceous degeneration of the kidney is associated with a similar condition existing in other viscera.

**Pathology.** The kidney is large, pale, usually smooth, and sometimes marked by prominent veins. On section, the kidney presents a somewhat

"bacon-like" appearance. The usual tests for amyloid substance give positive results. The amyloid change usually begins in the walls of the capillaries of the tufts. The disease is nearly always associated with a diffuse nephritis. Amyloid disease is due to wasting diseases—the cachexias, tuberculosis, prolonged suppuration, especially of the bones, intestinal ulcers, and many other purulent diseases. It is frequently present in tertiary syphilis. Less frequently it is associated with uncompensated heart lesions, leukemia, gout, or malaria.

**Diagnosis.** The symptoms are those of nephritis and are frequently masked by the symptoms of the associated disease. The urine presents few diagnostic changes. When amyloid casts are found the diagnosis is sure. Edema is occasionally, but not always, present.

**Treatment.** This depends upon the nature of the causative condition, and is rarely of much value, so far as the kidney condition is concerned. As a rule, the condition of the patient is hopeless by the time the amyloid disease of the kidney is recognizable.

### PERINEPHRIC ABSCESS

Suppuration around the kidney is a rather rare condition. It is usually secondary to purulent nephritis, purulent appendicitis, or abscess of the liver. Occasionally the infectious agent is carried by the blood from distant parts of the body.

**Diagnosis.** The pain characteristic of abscess formation is located in the loin on the affected side, and may extend down into the thigh, or up into the thorax. The thigh on the affected side is usually flexed. The general symptoms are severe, including rigor, fever, heavy sweating, and prostration. When the kidney is involved, pus may drain into the urine. Otherwise, no recognizable changes may be present. As the pus accumulates the tumor becomes palpable.

The treatment is surgical. The prognosis must always be grave and the kidney is usually permanently damaged.

### HYDRONEPHROSIS

This is an accumulation of urine in the pelvis of the kidney. It is usually unilateral.

**Pathology.** The pelvis of the kidney is dilated and the pressure thus exerted upon the kidney parenchyma produces variable degrees of atrophy. The pressure upon the mucous membrane by the pelvis and calyces, first thins the membrane and then leads to a marked overgrowth of the connective tissue, which supports it. The fluid which is retained is very much like diluted urine. When infection occurs, blood and pus are found abundantly in the retained liquid.

**Etiology.** The condition is due to an occlusion of the ureter. It may be congenital or it may be due to impacted calculus; to cicatricial stenosis of the ureter; to pressure by tumors, pregnancy, or adhesive bands; to torsion of the ureter, as in floating kidney; or to other more rare causes of ureteral occlusion.

**Diagnosis.** The symptoms are not distinctive. There may be pain in the loins and running down the thigh. Digestive disturbances, often with diarrhea, may be present, or obstinate constipation may result from pressure.

Physical examination shows the presence of a tumor, which may be elastic or fluctuating. An intermittent form, usually due to movable kidney, presents many difficulties in diagnosis. The X-ray should show the location of the impediment.

**Treatment.** Surgery of the urinary tract is always difficult, but this represents about the only possibility of relief in hydronephrosis. An exception to this statement is found in the case of floating kidney. (q. v.)

**Prognosis.** Occasionally the pressure of the urine forces a way through the ureters. Rarely there may be a rupture of the sac. In those conditions in which the obstruction can be removed, the prognosis depends upon the severity of the causative factors.

### FLOATING KIDNEY

(Ren mobilis; nephroptosis; movable, palpable, dislocated, or wandering kidney)

The kidney is held in place rather insecurely, chiefly by means of the fat in which it is imbedded. When for any cause, it is allowed to move slightly from its normal position, so that it may be palpated, the term "palpable kidney" is applied to it. When its change of position is sufficient to allow its upper edge to be palpated, but it does not fall below the level of the umbilicus, the term "movable kidney" is used. The position of the palpable kidney and the movable kidney changes with deep respiration.

The "floating," "wandering" or "dislocated" kidney can be pushed around rather freely and it does not change its position with deep respiration.

**Etiology.** Lesions of the dorso-lumbar region and the lower ribs are important in etiology. By far the most common cause of floating kidney is rapid emaciation, especially following a period of plumpness or obesity. Increased weight of the kidney due to congestion or to tumor, such as hypernephroma, are rare causes. Pregnancy, tumors, ascites, tight lacing, are all somewhat important factors in etiology. Floating kidney may be a part of the general visceroptosis of Glenard's disease.

**Diagnosis.** The condition is recognized by palpation. The patient should be examined in various positions; as, standing with body somewhat bent forward; lying upon the table, upon his back, side and face; and in Sim's position. Other changes of position may permit the kidney to be palpated more readily.

The X-ray gives valuable information, especially after the ureters have been injected. The urine rarely shows any particular modification, except those due to slight hyperemia after Dietl's crisis.



The symptoms may be either local or general. Vague nervous states are usually present. These are very much the same as those found in other constant nervous irritations. Dietl's crises or "incarceration symptoms" are attacks of severe pain, sometimes with symptoms of collapse, which occur in floating kidney and were at first supposed to be due to the incarceration of the organ. It now seems certain, however, that the symptoms are due to the torsion of the ureter or of the renal vessels.

**Treatment.** The general treatment for visceroptosis should be instituted. Tight lacing and other faulty habits of dress must be corrected. The kidney should be pushed back into its normal position and held there by properly fitted bandages or corsets. The correction of lesions affecting the lower thoracic spinal column and the lower ribs is an important factor in securing better tone of the abdominal muscles and of the supporting tissues of the abdominal organs. The patient must be guarded against heavy lifting, running upstairs, straining at stool, or any violent muscular effort. A full diet in order that the patient may gain in weight is frequently beneficial.

Attempted surgical relief of the condition is much less common now than it was a few years ago. In some cases the kidney may be attached to the abdominal wall with benefit, but this should not be advised until milder measures have failed.

### NEOPLASMS OF THE KIDNEY

The kidney is subject to both benign and malignant tumor growths. The adenoma may be single or multiple and usually undergoes cystic degeneration. Lymphadenoma, angioma, fibroma and lipoma may occur and may produce little or no symptoms until the tumor has reached considerable size.

Sarcoma is sometimes found in children. It may be associated with rhabdomyoma. Carcinoma is somewhat less rare as a primary condition. Renal carcinoma is somewhat common as metastasis. The hypernephroma is a tumor of the kidney, due to the presence of an overgrowth within the kidney of masses of tissue, resembling aberrant suprarenal masses. These are frequently capsulated and resemble benign growths, but their rapidity, metastases, and peculiar secretory activity causes them to be somewhat more properly included among the malignant neoplasms of the body.

**Diagnosis.** Dull pain in the loins is usually present. The tumor cannot be recognized by palpation until it reaches considerable size. The X-ray is often helpful in diagnosis. Hematuria, casts, cells from the tumor, may be present in the urine. The occur-

rence of cancerous cachexia with the symptoms above mentioned may make the diagnosis fairly certain.

**Treatment.** The surgical removal of the entire kidney while the growth is very small, should leave the patient in good condition. Unfortunately the diagnosis is not usually made until the tumor has reached so great a size and has given rise to such wide metastases that there is no possibility of relief. Children die somewhat more speedily than adults. Death usually occurs in a few weeks to a year after the appearance of the first symptoms.

## CYSTIC KIDNEY

(Renal cyst)

Renal cysts are congenital and multiple. Rarely cysts may appear in the kidneys during later life, as the result of degeneration processes occurring in the kidney parenchyma. Renal adenoma may become cystic.

**Diagnosis.** The symptoms are somewhat like those of chronic interstitial nephritis. The diagnosis is extremely difficult and is frequently made only post-mortem.

When there is reason to suppose that only one kidney is involved, or the cyst is solitary, surgical treatment may give a reasonably favorable outlook. If both kidneys are involved, the condition is invariably rapidly fatal, after the appearance of the first symptoms.

## EMBOLISM OF THE KIDNEY

After leaving the renal arcades the renal arteries are terminal. Emboli reaching these produce small connected infarction areas. These are rarely diagnosed ante-mortem, but may be suspected when patients with endocarditis, or any other recognizable source of emboli, suffer from a sudden pain over the kidney with tenderness in that region and the sudden appearance of blood in the urine.

Rest and palliative measures are the only treatment required. The infarct area usually becomes filled with connective tissue and if this accident occurs several times the kidney is irregularly shrunken and presents a mottled appearance on section.



## CHAPTER XXVI

### DISEASES OF THE BLADDER

#### THE NEUROSES OF THE BLADDER

The nervous control of the bladder is partly reflex and is somewhat directly voluntary. The lumbar segments of the spinal cord receive sensory impulses from the bladder and the urethra as well as from the skin, muscles, articular surfaces, and other pelvic viscera. Descending impulses from the cerebral cortex and the lower brain centers act upon the micturition center in the lumbar cord, and thus the voluntary control of the bladder is secured.

Conditions which interfere with the normal activity of any of these nerve centers are included in the term neuroses of the bladder. It is a very common occurrence for involuntary micturition to occur under the influence of intense emotional excitement. In neurasthenic individuals and in some functional insanities the muscular tone of the bladder is deficient, probably as the result of the asthenic state of the nerve centers in the lumbar cord, and the bladder is permitted to remain unemptied for considerable time—in some cases as much as a gallon of urine has been thus retained. In this atonic form the bladder does not become ruptured unless there is associated with the neurosis some local disease.

More commonly the inhibitors of the micturition center are asthenic and the bladder becomes unduly irritable. This is almost invariably the case in hysteria, and is present in most individuals to a slight extent when they are affected by fatigue or long-continued emotional strain. Under such circumstances micturition occurs at short intervals, with the voiding of very small quantities of urine. The treatment of this condition is that of the underlying neurosis.

Local sensory disturbances act upon the micturition center also. Disturbed bladder control is usually present in women who suffer from disease of the vagina, uterus, and more rarely of the ovaries or tubes. Sometimes this lack of control may be due to mechanical pressure, as by tumors or malpositions, rather than as the result of a lack of nervous control. In men the irritation arising from disease of the prostate, urethra, and more rarely the scrotum affect the nervous control of the bladder. This is more apt to occur in men who are of neurotic temperament.

Bony lesions include most commonly lumbo-sacral and sacroiliac subluxations. Less frequently lesions of the coccyx and of the upper lumbar vertebræ are concerned in disturbed control of



the bladder. The bladder disturbances which result from organic nervous diseases are considered with these diseases.

## ENURESIS

(Bed wetting)

The reflex nerve control of the bladder is completed at birth. In a baby the filling of the bladder initiates the nervous mechanism which empties it. The process is entirely involuntary, and so far as can be determined, unconscious. During the second year of life the spinal nerve tracts to and from the brain become developed and functional. At this time, it is best for a child to be taught to exercise voluntary control over the act of micturition. It is not necessary that he should be taught to exercise this control, since he will grow naturally into the habit of consulting his comfort and convenience, but a certain amount of education leads to somewhat earlier and certainly more efficient bladder control. Efforts toward establishing the volitional control before the necessary nerve connections are made, are useless. The whole process may be greatly delayed by ill-judged attempts at education, especially when this takes the form of whipping, or of punishment which unduly excites the whole nervous system, especially in neurotic children.

A child which is only a few months old has regular habits, if it has been well cared for, and with a little attention on the part of the nurse, the bladder may be emptied without soiling the clothing, but a child under one year is rarely able to delay micturition voluntarily.

When bed wetting or involuntary micturition during the daytime persists beyond the second year of life, the condition of the child's health must be investigated. Any of the functional nervous diseases may be responsible for this condition. Nocturnal epilepsy and petit mal must not be forgotten in the search for causes. Local conditions sometimes require careful study. Innominate and lumbo-sacral lesions are much more common among children than is generally recognized. The correction of these lesions may be all that is necessary for immediate recovery. The possibility of anemia and malnutrition should be investigated. In either sex uncleanliness, rectal irritation, vesical calculi, highly acid and concentrated urine, worms, tight clothing, masturbation and bad training are etiological factors which have only to be recognized in order to receive suitable curative measures.

The child who suffers from bed wetting should not be permitted to drink much water during the evening hours, nor to eat his heartiest meal at night. After he has been in bed an hour or two, he should be awakened and induced to empty the bladder. The habit will soon become fixed. Care should be taken that the night

clothing fits properly. A firm and plain talk with the child old enough to understand conditions, is much better than scolding or punishments.

The prognosis is good in all cases, except those due to epilepsy.

### ACUTE CYSTITIS

Inflammation of the urinary bladder occurs at almost any time of life, but its etiology varies at different periods of life. A predisposing cause of cystitis is found in lesions of the lumbar vertebræ, the sacrum, innominates and coccyx. These act by disturbing the nervous control of the blood vessels of the bladder, and also by interfering with the reflex mechanism which controls its emptying.

The milder forms of **catarrhal** cystitis are associated with redness, swelling and epithelial exfoliations of the mucous membrane lining the bladder. In children the condition is most frequently due to chilling, caused by sitting in cold, wet places. It may result from injury, as by falls or by the improper use of a catheter, or by the pressure of fetus in parturition. More commonly catarrhal cystitis is due to the influence of irritating substances in the urine, or the retention of the urine until irritating substances have been produced by fermentation. Gouty urine is usually irritating. Alcohol and drugs frequently cause cystitis.

Several **infectious** agents may set up a cystitis, which varies in severity. During the progress of any of the infectious diseases, the bladder may become infected. Gonorrhea usually reaches the bladder by extension from the urethra. Various forms of yeast and mold infection of the bladder have been described. Infection by means of the pyogenic organisms may result in the formation of small abscesses or ulcers in the wall of the bladder. Diseases of the pelvic organs may affect the bladder by extension.

In all cases of cystitis the symptoms include pain, which is usually just above the symphysis pubis and which often extends around to the back over the lumbo-sacral articulation, down into the external genitals and into the thighs. Reflex muscular contractions across the lumbar and sacral regions and involving the abductors of the thighs are commonly present. Micturition usually occurs at very short intervals, though occasionally the bladder may become enormously distended. The urinary findings include bladder cells, pus, sometimes blood, sometimes mucus, and sometimes the infectious agent; this should give the diagnosis.

**Treatment.** The treatment should include the relaxation of the reflex muscular contractions, correction of lesions as found, and such movements as increase the mobility of the lumbar and pelvic bones. The leg movements are very efficient in relieving tension.



The local treatment depends upon the underlying cause of the cystitis. Rest and warm applications are beneficial. In all cases a constant and thorough washing of the bladder with a warm, non-irritating, sterile fluid is indicated. This is best secured by having the fluid flow from above downward. In order to secure this constant irrigation with no danger of sepsis, it is best to use the urine itself, by having the patient eat little or no food and drink very freely of hot and cold water. In order to make the water more palatable, fruit juices may be added, but no alcohol or any substance which could possibly irritate the kidneys should be permitted. A rigid milk diet for a few days is very good, if it is possible for the patient to take the milk as directed. The only essential feature is providing a great quantity of bland urine.

The gonococcus and probably the yeast and mold infections first invade the superficial epithelium. As this is constantly being pushed off by the growth of the cells from the deeper layers, it is evident that to a certain extent these infections are self-limited, providing the bladder epithelium reproduces itself with sufficient rapidity and the exfoliated cells are carried away as rapidly as possible by nonirritating irrigation.

"The prognosis in acute cystitis is good, but when the condition is chronic, it is less favorable; it is not unfavorable, however, under proper treatment. When it is due to tuberculosis, enlargement of the prostate, or is associated with disease of the kidney, its recurrence is almost certain.

"Where there is profuse suppuration with rapid decomposition, the bladder should be washed out at least twice daily. Where the cystitis is slight in grade, and the urine is not decomposed, irrigations may be used every two or three days. A negative microscopical examination is the only proof that a cure has been effected, when after frequent examinations and over a long period of time it remains so."—P. F. Kani.

## CHRONIC CYSTITIS

The mucous membrane in chronic cystitis is less swollen and is usually of a peculiar bluish color. Erosions, polypoid growths and thickenings of the connective tissue of the bladder wall are characteristic. Occasionally these pathological changes may partially or completely obstruct the ureteral passage, and the urine thus dammed back into the ureters and the pelvis of the kidney on the affected side. The pain is less severe in chronic cystitis than in acute, and occasionally is referred to other parts of the body. Backache, which may suggest lumbago, is usually associated with contractions of certain muscle groups of the lumbosacral neighborhood and with a loss of tone of other muscle groups. Examination of the urine shows varying amounts of pus, mucin, blood, bacteria, and albumin. The kidney may be affected, also, in which case renal epithelium and true casts are present. Also, the examination of the catheterized specimen should show the nature of the infectious agent.



The etiology and treatment of chronic cystitis are the same as that of acute cystitis. The prognosis is somewhat less favorable but if uncomplicated, recovery should occur, provided the patient is reasonably obedient to instructions given him.

**Neoplasms of the Bladder.** Primary tumors of the bladder or rarely tumors of other pelvic viscera may extend to and invade the bladder. These cause varying degrees of cystitis and other symptoms, according to whether the wall of the bladder is, or is not, penetrated.

The diagnosis, treatment, and prognosis of vesical neoplasms is that of the origin of the tumor.

**Vesical Hemorrhages.** Hemorrhage of the bladder occurs as the result of a number of very different conditions. Late in pregnancy, it may be due to hemorrhage per diapedesin or hemorrhage per rhexin. Dilatation of the veins may result in the formation of vesical hemorrhoids, and these are very liable to rupture. Vesical calculi may so injure the wall of the bladder as to produce severe hemorrhages. Any of the causes of cystitis may be so serious as to cause rupture of the blood vessel or capillary hemorrhages.

The diagnosis rests upon finding the blood in the urine, the recognition of the underlying causes and upon the cystoscopic examination. The X-ray should show the presence of calculi. After filling the bladder with a collargol solution, any marked irregularities of the bladder wall become evident.

## DISEASES OF THE URETHRA

Diseases of the urethra are usually surgical and are discussed in text-books of genito-urinary diseases. Specific infections and the adhesions of connective tissues, and overgrowths which result from earlier inflammation are the most important causes of urethral diseases. Direct injury is not rare. Disease of the urethra is usually associated with severe local pain and reflex muscular contractions over the sacrum. Recovery from these conditions, either without surgery, or after the necessary surgical operations have been performed, is made more speedy and complete if these reflex muscular contractions and any bony lesions that may be found upon examination receive suitable attention.

## DISEASES OF THE PROSTATE

**Acute prostatitis** is usually due to infection by the gonococcus, tubercle bacillus, staphylococcus, bacillus coli, or other bacteria. Lesions of the sacrum, innominates or coccyx, or of the lumbar vertebræ are predisposing factors. The symptoms include pain on sitting, defecation or urination, vesical and rectal tenesmus and hematuria. Abscess may result, which may drain without much evil after-effects, or may break into the rectum, bladder, or neighboring tissues.

**Chronic prostatitis** may result from repeated attacks of the acute form, or from the constant action of the etiological factors. The symptoms include referred pains in rectum, perineum, back, legs, and upward toward the kidneys, melancholy and neurasthenic states, circulatory disturbances, and various disturbances of sexual functions. Chronic rheumatism and endocarditis are probably often due to chronic prostatitis.

**Hypertrophy of the prostate** is common in elderly men. Infections, constipation, bony lesions of the pelvic girdle, and circulatory disturbances are

etiological factors. The symptoms include those of chronic prostatitis, and careful examination gives evidence of the enlarged prostate. Care must be taken to avoid confusing chronic prostatitis, hypertrophy and prostatic neoplasms.

**Neoplasms of the prostate.** Carcinoma may be primary. It occurs in men over fifty years old, most often after the age of sixty years. Pain is more common in carcinoma than in hypertrophy, and blood is more often found in the urine. The mass is found to be larger upon one side than the other; is distinctly lobulated, and of stony hardness, all of which help to distinguish it from hypertrophy. Sarcoma is softer than carcinoma, and is less distinctly lobulated. Obstinate sciatica in men past the half-century age should suggest the disease. Metastatic growths may be found in the bones, by the X-ray, sometimes very early in the disease.

**Treatment.** In all these cases the treatment must be decided after examination of each patient. Surgical interference is often of doubtful value, yet is necessary at times. Catheterization, dilatation, and irrigation must be performed, when necessary, under the most aseptic precautions possible.

Correction of the bony lesions is an important factor in the treatment of all cases; in certain cases this is all that is necessary to secure recovery. In nearly all cases careful but thorough massage every week or ten days per rectum of the contiguous tissues and to a certain extent of the gland itself is beneficial.

Examination of the prostate should be a routine procedure in the examination of men whenever the diagnosis is uncertain, especially when chronic rheumatism, nervous or toxic states of unknown cause, or pain in the region supplied by the lumbar and sacral nerves are included in the symptoms.