

## BACTERIAL INFECTIONS OF THE URINARY TRACT.

By MARY STEWART.

The term bacterial infection is used when it is found that a disease is due to bacteria and their presence is established by isolation of the responsible organism. Infections of the kidney may be caused by bacillus coli, staphylococcus, streptococcus, tubercle bacillus and many other organisms; more than half are caused by bacillus coli. Pathological changes in the kidney vary with the infecting organisms and its route of invasion. Bacillus coli involves the renal pelvis and is the organism usually found in pyelitis. Hemolytic streptococci cause glomerulo nephritis. The patient usually complains of frequent or painful micturition, chills, headache, and general malaise; there is usually an elevation of temperature.

In order to establish a diagnosis of renal infection, a careful history should be taken and a complete physical examination should be made. All tests should be carried out intelligently and proper preparation should be made for X-ray and cystoscopic examination. Urinalysis, blood count, and other kidney function tests may also be ordered and the non-protein nitrogen content of the blood should be ascertained. Urinalysis will show whether blood, pus, or casts are present. Blood counts will show whether the white blood cells or the polymorphonuclear cells are increased, thus indicating the degree of resistance to infection. In the light of these findings, the urologist will decide whether or not a cystoscopic examination is to be done.

Hydronephrosis, caused from an obstruction such as a calculus, can be visualized in the X-ray plates. Pyelonephritis may be either acute or chronic and is more common in women than in men. In women it has many causes but may occur as an acute disease in childhood or during pregnancy. In men it may be associated with acute retention of urine due to prostatic hypertrophy.

The nature of the symptoms of abscess of the kidney depends on whether the abscess is large or small, and whether there are other constitutional conditions such as a general septicemia. A rise in temperature, pain, chills, painful micturition, and tenderness on the affected side will usually be present. The white blood count will usually disclose a high degree of leucocytosis. The urinalysis will show the presence of albumin, bacteria, and varying amounts of pus. As the disease progresses, kidney function is diminished, uremia may develop and death result. Sometimes the disease becomes chronic and, if this is the case, a gradual rise in the non-protein nitrogenous content of the blood will result and the patient may develop a tolerance of the infection. Thus, a patient may have a non-protein nitrogen of 90 mgm., and not be critically ill.

The patient should be kept in bed in a bright, well-ventilated room, free from draughts. His clothing should be light and warm. Daily baths should be given. He should be encouraged to take as much fluid as he desires up to about 3000 ccs. in 24 hours. If he is unable to take this amount by mouth, the balance should be made up by intravenous method. A soft or light diet may be given. The fluid intake and output should be carefully checked and recorded. Good general nursing care is an essential.

Sulphathiazole in small doses is sometimes used and is found very satisfactory. The concentration of the drug in the urine is much higher than in the blood, hence the smaller doses ordered. Fluids are given in generous amounts. A complete blood count should be taken before the drug is administered and white and differential counts should be made in four days and repeated in a week. Should the white or polymorphonuclear cells fall below normal, or a rash appear, the drug should be discontinued. Neoarsphenamine, in small doses, is administered intravenously with success in streptococci or staphylococci infections. These drugs must be given under the supervision of the physician in charge of the case and any unusual reaction or change in the patient's condition should be reported to him at once.

Mandelix acid is effective in infections due to bacillus coli or staphylococcus. If the drug is to be effective it must be present in a concentration of 0.5 to 1 per cent., and the urine must be strongly acid; pH (the symbol for acid concentration) must be maintained at 5.5 if the treatment is to be successful. Fluids are restricted. The treatments should not be continued longer than a week or two and the appearance of albumin or blood in the urine is an indication for discontinuing them.

The kidney is frequently the site of a tuberculous infection and, as the disease progresses, the bladder becomes involved. It may occur in persons who have never had any pulmonary involvement, but is always a secondary infection. It is usually unilateral but may become bilateral. The symptoms include polyuria, hæmaturia, pyuria, and dysuria. The disease is usually fairly well advanced before these symptoms appear. Constitutional symptoms are usually absent but as the disease advances there may be pain in the loin on the affected side. Cystitis may become troublesome and usually causes the patient to seek medical advice. Diagnosis may be made by means of a culture from the urine or by guinea pig inoculation. Catheter specimens may be obtained from each kidney in order to demonstrate whether unilateral or bilateral infection is present.

The patient may be advised that a nephrectomy is the treatment of choice providing that the disease is not bilateral. All urinary discharges from these patients must be carefully handled as they are usually loaded with tubercle bacilli. Following a nephrectomy many of these patients make a good recovery, but in a certain number of cases healing is delayed or chronic sinus forms. This is unfortunate but is due to the patient's lowered resistance which is the cause of inability to heal by first intention.

After they leave the hospital, these patients should continue to be kept under close observation so that any new lesion may be detected in its early incipency. They should be taught to appreciate the importance of personal hygiene and its value in daily living. They should be encouraged to eat plenty of good food and to get sufficient rest—in short, to seek good living conditions. They will thus be able to return to their normal occupations in a relatively short time but should have regular medical examination after they begin working. Nothing should be allowed to interfere with this duty to themselves and to their friends.

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