amounts of antitoxin are found in the serum, perhaps enough to account for the immunity.

The prolonged presence of bacilli of low virulence in the nose or pharynx, or mild attacks of the disease which have not been recognized may cause the development of antitoxic immunity. As stated in an earlier chapter, the loss of suitable receptors may be a factor in the acquisition of this immunity.

Hypertrophic tonsils and chronic pharyngitis appear to be predisposing causes in children.

Spontaneous recovery (active immunity) is due solely to the formation of the specific antitoxin by the tissues of the patient. We may regard the relationship of the leucocytes to diphtheritic infection as not definitely settled. Marked leucocytosis sometimes occurs. Certain observers hold that this condition is an unfavorable prognostic sign, although Besredka and others take the opposite view. An accompanying streptococcus infection may account for a hyperleucocytosis.

Active Immunity. The duration of active immunity to diphtheria varies greatly. Usually one has diphtheria but once, yet not infrequently susceptible individuals have repeated attacks. In some instances the susceptibility continues into adult life.

The advent of serum therapy justifies no relaxation in the customary prophylactic measures, such as isolation of the diseased, quarantine and disinfection. A patient should not be considered harmless until his mouth, pharynx and nose are free from bacilli, a condition which may be brought about by antiseptic applications, and for the determination of which repeated bacteriologic examinations are necessary. The danger that others who have been in contact with the patient may carry the infection should be met by appropriate treatment. It is not to be forgotten that antitoxin does not destroy the organisms. The injection of antitoxin is our most effective measure for individual prophylaxis.

Prophylaxis. The efficacy of diphtheria antitoxin is so well known that little comment is needed. It has caused a reduction of more than 50 per cent. in the mortality of the disease; from 41 per cent. to 8 or 9 per cent., according to Baginsky.

Serum Therapy. For prophylaxis from 500 to 1,000 units are generally recommended, although some foreign authorities give only 250 units. Rarely, individuals who have received such treatment develop diphtheria within twenty-four hours after the injection. In these cases it is probable that infection has already occurred and symptoms appear before the antitoxin is thoroughly distributed. Naturally one may contract diphtheria after the antitoxin is eliminated.

For curative purposes the amount actually required depends on the virulence of the infection and the duration of the disease. Inasmuch as the virulence may not be known accurately, what appears to be an excess of antitoxin is always demanded. Having in mind the average dose of 3,000 units recommended by the forthcoming United States Pharmacopeia, the physician must be guided by the conditions in the individual case. Less than 2,000 units are rarely indicated, and as many as 10,000 and 14,000 units have been given without detriment. There should never be any hesitation about repeating a dose within twenty-four hours in the absence of distinct improvement.

Ransom and Knorr state that if the antitoxin is given intravenously, which may be done without danger, the action of the serum is about eight hours earlier than when given subcutaneously. In severe and in late cases it is advisable to use this method of introduction, the serum first being warmed to the temperature of the body.

It is probable that few cases are so mild or so hopeless, unless moribund, that the omission of antitoxin is justifiable. The belief that antitoxin favors the development of diphtheritic paralysis is no longer held. If there has been an actual increase in the percentage of cases which suffer from paralysis, as sometimes stated, it is because a larger number of severe cases is saved; and the severe cases are those which most frequently develop paralysis. If we accept the view of Ehrlich that a special toxin of weak affinity for the

antitoxin, i. e., the toxon, causes the paralysis we find all the more justification for large doses of antitoxin, for antitoxin neutralizes the toxon as well as the toxin. On the basis of experimental work Ransom concludes: "Transferring the results (of experiments) to practice among human beings, we may expect liberal doses of antitoxin given early in the illness to influence favorably the subsequent paralysis; and this favorable influence is likely to manifest itself, not so much in the local paralyses (soft palate, etc.), as in such fatal symptoms as failure of the heart. Severe cases, however, are likely to be followed by some paralysis in spite of even large doses of antitoxin."

Cases in which there is severe mixed infection, septic diphtheria, respond less favorably to antitoxic therapy than uncomplicated cases. At some time a mixed serum therapy suited to the mixed infection may be possible.

The suggestion made by Wasserman of a combined treatment with bactericidal and antitoxic serums has not been applied practically.

Inasmuch as the serum of the patient does not develop agglutinins, the agglutination test is of no value for the recognition of the disease. If animals are immunized with the bacillus, agglutinins are said to be formed. The serum of such an animal may be used for the identification of a culture made from the throat, but this would have no practical value, for the diagnosis may be established by the ordinary bacteriologic methods much more quickly and satisfactorily. It is difficult to obtain a homogeneous suspension of the bacillus for the agglutination test.

Agglutination Test.

Clinical Reports

STRANGULATED FEMORAL HERNIA IN A MAN OF SEVENTY-FIVE.

RESECTION. RECOVERY.

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The following case presents some unusual features that seem worthy of notice:

Patient.—C. P., aged 75, male, white, farmer, widower, born in Virginia.

Family History.—Parents died, after short illness, of cerebral hemorrhages, but at an advanced age. One brother died of intestinal obstruction, one of sunstroke. Two sisters are dead, but cause of death unknown. Of six brothers, five had acquired hernias. None, except this patient, has been operated on. He has a nephew who is ruptured.

Previous History.—The patient has had the usual infectious diseases of childhood. In 1895 he had cellulitis in his arm, following a wound of the hand, and he was disabled for four weeks. In 1898, he had a mild attack of pneumonia. With these exceptions, he has been unusually well, and until the present time he has been doing farm work every day.

Present Illness.—On May 17, about 8 a. m., while lifting heavy logs, he had a sharp, severe pain in the right groin, but worked an hour longer. The pain increased and became unbearable so that he was obliged to return to his home, a distance of six miles, a half a mile of which he walked. He noticed the swelling over Poupart's ligament, and was seen by two physicians between 4 and 6 p. m., but neither was able to reduce the mass by taxis. He vomited once during the afternoon and spent a sleepless night. May 18 he was no better, and he was brought to this city. His bowels did not move any time after the initial pain until after the operation.

Examination.—When admitted to the hospital he was unable to walk and complained of pain in the groin; his pulse 90, full and strong, and temperature 97 F. He had not vomited during the previous twelve hours and was not nauseated. Near the lower attachment of Poupart's ligament there was a tumor about the size of a walnut, tense, not fluctuating and

without impulse on coughing. It could not be reduced. The external inguinal ring could be felt and the swelling was below it. The skin was not inflamed. The abdomen was slightly distended.

Operation.—The patient was etherized and an incision about five inches long was made parallel and just below Poupart's ligament. The sac was exposed and was found gangrenous and constricted at Gimbernat's ligament. A knife was introduced on a grooved director and the stricture incised and torn sufficiently to release the hernia. The sac contained about two drams of bloody serum and a knuckle of sphacelated intestine. The abdomen was opened through the right rectus, and one and a half inches of ileum removed and an anastomosis made by a Murphy button. A wedge-shaped piece of omentum was excised. The sac was next transfixed by sutures, snipped off, and the stump returned to the abdominal cavity through the femoral ring. Then a radical operation for femoral hernia was done after the method of Bassini; kangaroo tendon was used for the buried sutures. The abdominal wound was next closed with catgut and silkworm gut. The operation consumed one hour and fifteen minutes.

Result.—The patient made a good recovery, sat up on the twenty-second day and left the hospital one month from the day of admission. The button was passed on the tenth day.

Remarks.—Only a very small percentage of hernias in men are of the femoral variety, and the occurrence of rupture in five of six brothers, while only a coincidence, naturally suggests an inherited weakness. In those cases of strangulated hernia in which the active reflex symptoms, nausea and vomiting, are replaced by a quiet, even painless period, we are sometimes deceived and imagine our patient is better. It is a condition which often precedes a fatal termination, and this can not be emphasized too strongly. The surgeon-general's library contains the report of many cases of femoral hernia with complications, but few in which a resection was done in an older patient than in the case here reported.

TRAUMATISM OF THE RIGHT KIDNEY.*

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History.—G. C. F. came under my care April 28, 1905. Ten days previously he had been kicked by a horse, in the right lumbar region, while at work in a livery barn. During these ten days he had been cared for at Kersey, Colo., where the accident occurred. He was prostrated by the force and shock of the injury and for some days suffered intensely. Six or seven days later, as he was feeling much better, he dressed and walked for a few minutes. This was followed by considerable hemorrhage from the bladder, a slight trace of which was observed the day after the injury. As this complication continued, he was removed to Weld County Hospital, where I first saw him. His previous history presented some interesting and noteworthy points. Three years earlier, while in the United States Navy at Norfolk, Va., he had been operated on for appendicitis. Peritonitis and a fecal fistula developed and posterior drainage was made. Later empyema appeared, and this was also drained. Before the integrity of the bowel was restored he underwent a series of six operations. In a year's time he was restored to health, receiving as a legacy an extensive system of adhesions on his right side from diaphragm to pelvis.

Examination.—He was a young man, aged 23, of good development, well nourished, and when not in pain looked well. His condition at this time was marked by severe pain in the right side of the abdomen and very bloody urine; temperature normal and pulse about 80. The right abdomen was very rigid and slightly swollen. The side on a level with and a little anterior to the quadratus lumborum showed the site of the impact, being still discolored.

Hospital History.—During the ten days succeeding his admittance to the Weld County Hospital he showed some im-

provement, the urine gradually cleared and the pain diminished. Morphia, of which he had been receiving thus far one to two grains daily, was now gradually omitted. The swelling, external to the adhesions, was slightly increased, and the rigidity remained. At this time of apparent improvement, contrary to instructions, he got out of bed and walked as far as the ward lavatory. This indiscretion was followed by a return of both pain and hemorrhage. The pain was very severe, extending from right kidney to testicle, and intermittent in character. He would lie on his right side, knees doubled up, one hand supporting his scrotum. The urine at this time became so bloody that a catheter was frequently required to relieve the bladder. In consultation with Drs. Church and Hughes it was agreed that the renal colic was due to blood clots passing down the right ureter, and that the tumor was probably a sac of extravasated blood. The advisability of operation was considered at this time, but he was strongly opposed to this, his previous experience giving him a strong distaste for the knife. This condition of pain and hemorrhage continued for several weeks, with occasionally a short amelioration of symptoms. As a rule from one to two grains of morphia were required during the twenty-four hours to control the pain, the amount being gradually increased. By this time he had become thin and very anemic; his appetite was poor and bowels constipated. The tumor was very marked, and the rigidity was extending. The pain while sometimes that of renal colic, was usually a general pain through the abdomen, burning in character, and extending well over to the left side. The temperature presented an occasional rise of a degree or two; the pulse was the same as before, but somewhat weaker. During the first ten days of June, the hemorrhage continuing, his weakness increased, and his condition was rapidly becoming critical. At this time a consultation was held and we decided that operative measures presented the only sign of hope. This conclusion was communicated to him and his consent was obtained.

Operation.—We operated on the morning of June 13, just eight weeks after his injury. Kocher's oblique incision was made, by means of which the kidney may be exposed and, if necessary, removed. After going through the layers of muscle and fascia, instead of perirenal fat or kidney presenting in the wound, we found we had opened a large cavity, which seemed full of blood clots. On removing those most superficial, which were partly organized, we encountered a profuse and active arterial hemorrhage. At this moment the anesthetist, Dr. Weaver, stated that the pulse suddenly increased to 140. Compression controlled the hemorrhage until a number of strips of gauze were tightly packed into the cavity; at the same time strychnin and normal saline solution tided the patient over and prevented death on the table. He lived eighteen hours.

Autopsy.—This revealed what we considered an unusual and remarkable condition. The right kidney, entirely free in the cavity, which contained two quarts of blood clots, was broken into three pieces, retaining not the slightest connection with vein, artery or ureter. We considered that his days had been prolonged by the system of adhesions, which walled off and limited the hemorrhage, and that the gradual stretching and tension of these, as the swelling increased, created a great deal of the abdominal pain.

A PECULIAR CASE—PERHAPS NEURASTHENIA.

WILLIAM HIMMELSBACH, M.D.

SAN FRANCISCO.

History.—Woman, aged 35, single. When I first saw the patient, in June, 1903, her condition was that of a pronounced neurasthenic. There was mental depression, irritability alternating with apathy, pain in neck and along the spine, tremor of the hands, occasional twitching of muscles of the face, and dilated pupils. She had been in bed two weeks. Her previous history was that of a well-balanced, active woman, fond of outdoor recreations of all kinds and passion-

* Reported at the Weld County Med. Society, 1905.