DISEASES OF THE PERITONEUM.

PERITONITIS.—INFLAMMATION OF THE PERITONEUM.

Definition.—Inflammation of the peritoneum occurs in two forms—*acute* and *chronic*. It may be limited to a part, or involve the whole of the membrane: in the former it is *local*, in the latter *general* peritonitis. It may be an independent affection, or *primary*, or it may be caused by the extension of a morbid process, from adjacent organs or tissues, or *secondary*.

Causes.—As a primary disease peritonitis is rare, but it may occur at any age, even during intra-uterine life. Intense cold, severe and protracted counter-irritation by blisters, and blows on the abdomen, may excite the inflammatory process. Very much the most frequent cause is the extension of internal lesions of the abdomen—e. g., perforations of the stomach, intestines, bladder, etc., or inflammation of these organs. To this category may be added the causes of pelvic inflammation of the uterus and annexed organs. It is not unfrequently an intercurrent malady coming on in the course of certain cachexiæ, as pyæmia, albuminuria, and the eruptive fevers.

Pathological Anatomy.—The first step in the inflammatory process is the occurrence of hyperæmia, the capillaries being enlarged and distended, and the blood-pressure is so increased within the area of inflammation that extravasations of blood occur at various points. An arrest of the normal secretion and an abnormal dryness are then evident; next an exudation, very thin but adhesive, forms on the inflamed surface and glues the neighboring parts together, but not firmly, for they may be easily separated. Simultaneously, a reddish, serous fluid is poured out into the cavity. The inflammation will now assume one of two directions—it will take the *adhesive* or *exudative* form. The fibrinous exudation already mentioned is almost pure fibrin and contains but few cellular elements. Presently, however, the cells of the endothelium become swollen, their contents granular, and their nuclei undergo multiplication. If, now, the process ends with the adhesive inflammation, the proliferation of the endothelium will soon be arrested, a delicate connective tissue will be formed from the new cellular elements, blood-vessels soon appear, and a distinct neo-membrane is the result, binding neighboring surfaces together, or forming bands of adhesion of greater or less extent. If the inflammatory process assumes the other direction, the effusion increases. It is at first sero-fibrinous, i. e., a serous fluid, having masses of flocculi of lymph floating in it. The deposit of fibrin, which in the other form (adhesive) is slight in extent, and which disappears in the process of

formation of the neo-membrane from the new cells, in this form (exudative) is very much increased, and constitutes a coating of considerable thickness. The endothelium undergoes extensive proliferation; the connective-tissue corpuscles of the basement membrane also, and new vessels develop. On separation of the fibrin layer from the serous membrane, the latter bleeds from rupture of minute new-formed vessels; it appears dense, thick, and œdematous. The swelling, hyperæmia, and œdema, also extend to the sub-peritoneal connective tissue, and ultimately to the muscular tissue, which in turn becomes softened, pale, and flabby. When the inflammation occurs in the peritoneal layer of the liver or spleen, the tissue adjacent to the inflamed membrane is paler than normal, softened from œdematous infiltration, and otherwise altered. The effusion poured out into the cavity assumes various appearances and characteristics. The quantity varies from a few ounces, in the dependent parts of the cavity, up to several gallons. It may be sufficient to force up the diaphragm to a level with the third rib, make the heart lie transversely by pushing up the apex, displace the lungs, etc. The effusion may be chiefly fibrinous with but little fluid. When this is the case, the thickest deposits are seen over the solid organs, the liver and spleen, and it may be general, uniting the whole surface, or limited in extent, forming occasional adhesions. The neo-membrane contains vessels, often of considerable size, and having walls of exceeding tenuity. These vessels rupture easily, and considerable hæmorrhage results, and this, mixed with the effusion, constitutes another form, the so-called hæmorrhagic effusion. The adhesions, when isolated and not general, undergo great changes ultimately, by reason of the extensive motion possessed by the abdominal organs. They may, by subsequent contraction, cause great deformity of organs and seriously impair their functions, and in the case of the intestine may induce twisting, encroach on their caliber, and bring about slow occlusion. The small intestines may by means of such adhesions be agglutinated together, forming an almost solid mass, irregularly rounded, as the author has seen, in certainly one well-marked case. The effusion may be serous—a faint greenish, or greenish-yellow, or milky fluid, similar to the fluid of ascites, except in the presence of flocculi of fibrin, bits of false membrane, and casts of cells of the endothelium. The effusion is sero-fibrinous, when there is a large quantity of fibrin suspended in it. When absorption of the fluid takes place, the solid exudation undergoes the changes already described. The effusion may be purulent. When this is the product of the inflammation, its cause is, as a rule, perforation and the escape of purulent or decomposing matters into the peritoneal cavity. When the effusion is purulent, the amount of fluid contained in the abdomen varies greatly. There may be thick masses of pus, or the pus may be mixed with a quantity of serum, constituting a sero-purulent fluid.

The changes of chronic peritonitis are similar to those of the acute form. There is often little or no fluid exudation, and when present is not abundant, and has a purulent or sero-purulent form. The principal fact is the existence of false membrane, either general or in local bands. The intestines, as already described, are sometimes united in a bundle and form a globular mass of some compactness. Occasionally a part of the neo-membrane, especially where it has attained the greatest thickness, undergoes a calcareous transformation; or it may become soft, friable, and granular, doubtless preparatory to absorption, or it may be converted into connective tissue. Divided by membranous adhesions, the cavity of the peritoneum may be converted into various secondary cavities, some containing serous and others purulent collections. The latter may be converted ultimately into a cheesy mass. In chronic peritonitis, tubercular deposit is common, and gray granulations are disseminated through the false membrane and the sub-serous connective tissue. Tuberculous peritonitis is usually connected with tuberculous ulceration of the mucous membrane of the intestine, and tubercular adenitis of the mesentery, and is coincident with pulmonary tuberculosis.

Symptoms.—When idiopathic or primary peritonitis occurs in a previously healthy individual, it sets in with a chill, an intense fever, and very severe local pain and tenderness. If it succeeds to a perforation, the onset of the peritoneal mischief is announced by an intense pain, felt in the region of the accident, and rapidly extending thence over the abdomen. Then the fever movement is but slight. If peritonitis from perforation happens in the course of typhoid fever, or in any other adynamic state, there may be few symptoms besides distention of the abdomen and increase of the adynamia. When it results from an extension of inflammation by contiguity of tissue, it is announced by an exaggeration of the fever, by pain and tenderness of the abdomen, and by vomiting—the last-named symptom being especially significant if it has not existed in the case previously. In what mode soever peritonitis may begin, the symptoms most characteristic are, pains in the abdomen, gaseous distention, rapid failure of strength, and fever, somewhat remittent in type, with the remission in the morning. The pain in the abdomen is usually an intense, cutting, boring pain, somewhat more severe at certain places, but felt all over the abdomen. The slightest touch aggravates the pain, and hence the patient avoids movement, suppresses cough, and breathes with the chest-muscles. For the same reason the breathing is short, quick, and superficial, to avoid motion of the diaphragm. The decubitus of the patient is unconsciously assumed to prevent pressure of the muscles on the tender peritoneum. He lies on his back, if the peritonitis is general, with the thighs flexed on the pelvis and the shoulders elevated, and, when he is told to extend the limbs, he does so very cautiously and soon abandons the attempt, his countenance as well as his expressions indicating the increased pain the effort has given him. In the beginning of the disease, the abdominal muscles are kept contracted and rigid to guard the peritoneum from injury by movement, but it is also a reflex state of tonic muscular contraction, which occurs simultaneously in the muscular layer of the bowel, and is due to the irritation of the terminal nerve-filaments in the peritoneum. But paresis of the bowel soon succeeds to tonic rigidity, in accordance with another law—over-stimulation, or long-continued, exhausts the irritability of the organic muscular fiber. The bowel then becomes extended by the accumulating gas, and soon (on the second or third day) an extreme degree of meteorism is the result, which, in fatal cases, continues up to death. This extreme distention of the abdomen adds to the difficulty and pain of breathing. The sonority of the percussion-note is tympanitic over the course of the large intestine especially, and the abdomen generally, except the dependent parts in the flanks and iliac fossæ, where the accumulation of fluid imparts to it the character of dullness. The normal hepatic dullness lessens materially or disappears, because of the displacement of the liver upward and its partial rotation on its long axis. The position of the dullness on percussion varies with the changes of position of the patient. It is occasionally possible to hear a friction-sound by auscultation, but the duration of it in any case is very brief. The tongue is coated and the appetite impaired at the onset. Rarely is vomiting absent. It begins soon after the disease sets in, and at first articles of food and gastric mucus come up, then biliary matters from the duodenum. Vomiting may occur spontaneously, or be excited by taking medicine, food, or drink. In some rare cases the vomiting has been incessant, and finally stercoraceous. In such cases obstruction is supposed to exist, but not confirmed on *post-mortem* examination, only peritonitis being found. Constipation is the rule in case of peritonitis, but occasionally diarrhœa is present; then, usually, some coincident disease of the bowel exists, as tuberculosis or septicæmia, for example. Constipation is the necessary result of the paresis of the bowel; but paralysis of the sphincter may be so complete as to permit the escape of fecal matters by mere pressure on the abdomen. An extension of inflammation to the vesical peritoneum causes strangury and irritable bladder. Hiccough is a frequent and most distressing symptom, and is due to a reflex irritation of the diaphragm, transmitted from the nerve-endings in the peritoneum. The pulse in peritonitis is small, quick, and frequent, the tension high, and when cardiac failure comes on in fatal cases it becomes excessively quick and small, and may disappear at the wrist when the heart is still acting. It will range in ordinary cases from 100 to 140; when collapse approaches, the pulsations may reach 160 to 200. When collapse comes on, the temperature, which had risen to 103° Fahr., sinks

below normal. As has been already pointed out, the respirations are costal in type, very shallow, and becoming more so with the failure of the vital powers. There is then cyanosis. The countenance is anxious, shrinks; dark, livid circles surround the eyes. In collapse the surface is cold, wet with a cold sweat, the skin wrinkled and sodden, the body exhales a cadaveric odor, the voice is husky, but the mind remains clear though rather apathetic, and at the last the brain is clouded by carbonic-acid poisoning. Or, instead of an unclouded intellect, there may be delirium from œdema of the brain, and, extremely rarely, unconsciousness soon after the onset of symptoms. In many cases, as collapse develops, the peculiar type of respiration—the Cheyne-Stokes respiration—appears, and is highly significant of a fatal termination.

Course, Duration, and Termination.—The course of peritonitis is rapid, the mortality great. The usual termination is in death. When it arises from perforation, a fatal result may occur in two or three days, and, when it is idiopathic, in five or six; but the cases of this variety may last two to three weeks. Peritonitis due to internal obstructions adds to the severity of the symptoms and the gravity of the case, but its course, apart from the principal malady, is not well defined. The gravest cases are those which occur in the course of septic diseases, or are due to the escape of decomposing and irritating matters, by a perforation into the cavity. The only forms which may be regarded as at all favorable are those due to the extension of a simple inflammation, by contiguity of tissue, from the abdominal or pelvic viscera. In these the inflammation is simply exudative and adhesive, or sero-fibrinous. When improvement begins, it is announced by a diminution of the pain, lessening of the meteorism, and cessation of the vomiting. A case of acute peritonitis may terminate in a chronic form of the disease. After a period of improvement, grave symptoms will again set in, induced by the changes in shape, position, and functions of organs, the result of adhesions, contractions of bands of lymph, etc.

Prognosis.—The statements already made sufficiently set forth the grave character of peritonitis. The prognosis in the mildest cases must be guarded, and in all severe cases unfavorable.

Diagnosis.—Peritonitis is to be differentiated from hysterical tenderness of the abdomen, rheumatism of the abdominal muscles, and acute painful affections of the various organs. From hysteria it is differentiated by the hysterical history, by the crying, sobbing, and globus hystericus, by the absence of all constitutional symptoms, and finally by the tenderness being merely an hysterical condition, excessive on the surface, but permitting, when the attention is withdrawn, firm, deep pressure. The suffering of the hysterical state differs from real pain in the disproportion of the expressions and the evidences; while the

most extravagant terms are used to describe the pain, the countenance is placid. In rheumatism of the abdominal muscle, there will probably have been other cases of the rheumatismal character; the pain is limited to the muscles, and deep pressure does not increase it, and the constitutional state does not indicate a severe disease. In acute painful affections it is sometimes difficult at once to decide, but as a rule these begin rather more abruptly, the pain is more acute, and there is not usually a history of a disease from which peritonitis might be expected to arise. The great majority of cases of peritonitis arise from previous disease in the peritoneal or pelvic cavities; it is extremely rare, indeed, for an idiopathic case to occur.

CHRONIC PERITONITIS.—There are two forms: 1. Succeeding to the acute; 2. Tubercular. The acute symptoms subside and there is a gradual absorption of the fluid portion of the exudation. A sero-fibrinous exudation may undergo conversion into a purulent; the fever, which had diminished or ceased, rises again and takes on the septicæmic character—there are chills, fever, and sweats. Rapid decline of the vital powers takes place under these circumstances. Or the effusion may become encysted by the formation of adhesions, as already described, and become a pus-depot, which may be converted, ultimately, into a caseous or calcareous mass. In other cases these purulent collections behave as ordinary abscesses, and manifest a tendency to find their way externally. Abscesses formed above a line drawn transversely across the abdomen through the umbilicus tend to dissect upward, and make their way out through the lungs; those below this line tend to pass down along the course of the femoral vessels. Although there are many exceptions, this may be considered as a natural tendency. In the dissections made by these abscesses, fistulæ may be established externally, with different parts of the bowel, with the thoracic cavity, etc.; or rupture may occur into the peritoneal cavity, again exciting fresh inflammation. The chronic, local, and partial peritonitis, about certain organs, may set up important changes by the metamorphoses of the exudation. Thus, thick and contracting connective tissue about the gall-bladder, and on the upper surface of the liver, compresses the organ, or may obstruct the hepatic duct or the portal vein. The tubercular form of chronic peritonitis is often associated with the corresponding disease of the lungs, or intestinal mucous membrane, or of both. Its onset is obscure, and development slow, so that weeks or even months may pass before the patient is so reduced as to take to his bed. It usually sets in by colicky pains felt especially during the time digestion is going on. Constipation alternates with diarrhœa, and there may be, but not invariably, attacks of vomiting, the matters thrown up consisting of mucus and greenish, bilious-looking matter. The attacks of vomiting may coincide with the colic-like pains.