ACTINOMYCOSIS OF THE PERITONEUM.

In actinomycosis of the intestine the fungus may pass from the intestine into the peritoneal cavity or into the subserous tissue. The cæcum is the usual starting-point of this trouble. As a result there develop numerous hard tumors which are neither tender nor movable, and a fibrous exudate which causes adhesions between the omentum and intestine. Within this granular tissue will be found the characteristic yellow pearly bodies. As time goes on, suppuration takes place within the swelling. The pus may discharge itself externally or lead to the formation of tortuous fistulas between the intestinal coils, with ultimate rupture into the intestine or bladder.

Diagnosis.—Diagnosis will rest upon the presence of circumscribed hard indolent nodules which exist without fever and without pain. Diagnosis will be certain when the characteristic pearls are found in the pus.

Treatment.—Soft places should be incised and the diseased tissue curetted and cauterized. Potassium iodide may be given internally and a solution of the iodide used to irrigate the fistula. A weak solution of mercuric chloride may be injected into the inflammatory masses. If the process is extensive, so as to involve large areas both within and without the peritoneum, the resulting suppuration and formation of fistulas may exhaust the patient so that death follows.

TUMORS OF THE PERITONEUM, OMENTUM, AND MESENTERY.

Carcinoma.—Gelatinous carcinoma, endothelioma, and angiosarcoma occur as rare primary tumors of the peritoneum. Not infrequently malignant tumors of the abdominal organs involve the serosa in the form of numerous small nodules scattered over its surface, with larger nodules in the omentum and mesentery. Such a condition is almost always accompanied by an abundant fluid exudate of a serous or hemorrhagic character which contains many fatty degenerated and carcinomatous cells. It is not possible to differentiate primary and secondary carcinoma of the peritoneum by clinical signs.

The presence of fluid in the peritoneal cavity and the nodular tumors above spoken of are the general signs of carcinoma of the peritoneum. Symptoms due to inflammation are slight, and are quite overshadowed by symptoms referable to the organ which contains the primary growth. If the growth of a cancer leads to perforation of a hollow organ, there will be an acute, rapidly fatal perforative peritonitis. Without such an accident the general condition of a patient whose peritoneum is carcinomatous is similar to that of a patient whose peritoneum is tuberculous. If the patient is of mature years, the trouble is more likely to be carcinomatous, but this inference is not always a reliable one, since cancer of the intestine (usually sarcoma) occurs at an early age.

Treatment.—Treatment is purely symptomatic. If the exudate causes great pain, it should be reduced by puncture; but the relief thus obtained is usually of short duration.

Benign Solid Tumors.—Fibroma, lipoma, myxoma, and similar tumors usually grow from the subserous tissue, and may reach a large size. For the most part they develop in the root of the mesentery, the mesocolon, or the omentum. Such a tumor grows slowly and causes symptoms simply by traction or pressure upon neighboring organs. It is firm with a smooth surface, lying behind the coils of intestine and only slightly movable from side to side. A tumor of the omentum is an exception. It is situated in the region of the umbilicus immediately beneath the anterior abdominal wall and is movable. When such a tumor reaches a certain point in its development, it drags upon the stomach and causes intense pain.

Retroperitoneal and mesenteric lipomata have often been successfully removed. A free incision is made in the median line and the posterior layer of peritoneum which covers the tumor is divided and its vessels ligated. The tumor is next shelled out by blunt dissection. As one approaches the base of the tumor in the region of the mesentery the risk of hemorrhage from ill-developed thin-walled vessels is great. The retroperitoneal wound should be thoroughly dried and closed by suture. The intestine should be examined to see if the blood-supply has been cut off from any portion of it. Should this be the case, that portion must be resected. If a retroperitoneal tumor is situated to one side of the spine, it may be removed through a lumbar incision without opening the peritoneum.

In removing a solid tumor of the omentum it is important to avoid wounding the transverse colon, with which the tumor is often closely associated. Sometimes a tumor which starts from the stomach or transverse colon extends between the layers of the omentum, but such a tumor is not an omental tumor.

The omentum is sometimes the seat of an inflammatory tumor after operations for hernia and inflammation of the appendix, or other operations upon the abdomen. Such a tumor is an inflammatory swelling of the omentum, the immediate cause of which is the ligation of masses of the omentum to control hemorrhage. Such a swelling may cause so much pain for weeks or months after the operation that the diagnosis of a malignant new growth has more than once been made. Sometimes an abscess develops with the usual symptoms, germs coming from the ligatures or being introduced at the time of operation. Such an inflammatory tumor subsides in time under the influence of rest unless it goes on to suppuration. In the latter case it attaches itself to the abdominal wall, when the pus may be evacuated through an incision which does not open the peritoneum.

Torsion of the omentum is of rare occurrence. It usually occurs in connection with hernia, in the course of which the omentum has been matted together, while its attachment to the intestine has been stretched out to a slender pedicle. When these changes have taken place, the omentum may be twisted by external influences until the

vessels of the pedicle are obstructed and a hemorrhagic infarct is the result. This accident will produce a serohemorrhagic exudate and symptoms of peritoneal irritation and intestinal paralysis. The abdomen should be opened and the omentum resected.

Ligation of the omentum is sometimes followed by embolism of the liver or stomach.

Benign Cystic Tumors.—Secondary echinococcus cysts are found in the peritoneal cavity, due presumably to rupture of a traumatic cyst. Their favorite seat is the omentum. Primary echinococcus of the omentum or mesentery is rare.

Cysts of the mesentery are divided by Hahn into serous cysts, chyle-cysts, and blood-cysts. All of these form rounded, tense, freely movable tumors at the umbilicus. Such a tumor may reach the pelvis and become attached to the uterus. The intestine either circles around the cyst or lies in front of it. A similar relation of the colon to a cyst of the mesocolon may be demonstrated by distending the intestine with air. A cyst of the mesentery often causes intense pain, presumably due to pressure upon the mesenteric nerves. It may press upon the intestine and more or less completely obstruct the fecal flow. Cystic tumors of the mesentery have in some instances followed traumatism.

Cysts of the omentum give almost the same symptoms as cysts of the mesentery. Consequently a differential diagnosis is impossible. It is impossible to tell except by puncture the nature of the contents of the cyst. Such puncture is not without danger, since the intestine may lie in front of the cyst. In operating upon such a cyst it is important to split the peritoneum which covers it in such a manner as not to injure the vessels. It may be possible to shell out the cyst by a blunt dissection, or, if this cannot be done without risk of injuring important vessels or the intestine, it is better to remove as much of the cyst-wall as possible and to stitch the remains of the cyst in the abdominal wound. As these cysts are not lined with epithelium perfect recovery may follow this treatment.

An epithelial cyst sometimes develops in the mesentery from the remains of the omphalomesenteric duct. A cyst of this character must be removed entirely, otherwise a fistula will persist.

If an echinococcus cyst cannot be easily removed, it should be sutured in the wound and drained.

Remains of the Wolffian and Müllerian ducts may develop into cysts of the retroperitoneal tissue which can be removed through a lumbar incision without opening the peritoneum.

Teratoma of the Peritoneum.—Lexer, who has made a special study of teratomata of the peritoneum, divides them into simple and complex dermoids, fœtal inclusions, and teratoid mucous tumors. Simple dermoids spring from the abdominal cleft and are usually situated in the omentum or mesentery; or if they come from the Wolffian ducts, they are situated retroperitoneally in the loin. Complex dermoids spring from the ovaries or misplaced testicles and are found

in the pelvic region. Fœtal inclusions come from an undeveloped twin and are usually situated between the layers of the transverse mesocolon or in the bursa epiploica. In other cases they have been found in the mesentery or in the retroperitoneal tissue. Teratoid mucous tumors are either solid or polycystic and contain tissue from all three embryonic layers. They are in most cases the result of bigeminal implantation.

ASCITES.

A collection of serous fluid in a peritoneal cavity not accompanied by inflammation is called ascites. It is due either to general venous obstruction a result of cardiac or pulmonary disease, or to local obstruction of the portal system resulting from thrombosis or cirrhosis of the liver or disease of the spleen. A third cause is general hydræmia the result of renal disease or other cachexia.

The fluid in ascites is usually a clear serum. If it is mixed with blood, it is probably due to carcinoma, tuberculosis, or traumatism. Sometimes the serum contains fatty degenerated cells or leucocytes or free fat-drops, giving it a milky appearance. The condition is then spoken of as chylous ascites. Chyle may enter the peritoneal cavity from ruptured lacteals or when the flow in them is obstructed by the pressure of tumors or by thrombosis or bacteria. The exudate in carcinoma of the peritoneum may also have a milky character on account of the presence of numerous fatty degenerated tumor-cells.

Symptoms.—The presence of free fluid in the abdominal cavity is manifested by dulness on percussion ovor the most dependent portion of the abdomen, a dulness which changes its position with changes in the position of the patient. Furthermore, tapping upon the abdominal wall will usually give a distinct wave of fluctuation. These signs are not often obtained unless the quantity of fluid exceeds one-half litre (quart). The fluid in ascites contains a small amount of albumin (1 to 3 per cent.), while the serous exudate in peritonitis contains from 3 to 5 per cent. The diagnosis is strengthened by proof of the existence of a disease which may cause ascites.

Treatment.—Ascites should be treated by suitable internal remedies. If these fail, puncture is a valuable palliative measure which must often be repeated many times. Operation has recently been recommended for certain forms of ascites, especially for that due to cirrhosis of the liver.

Operative treatment was suggested by Drummond and Morrison in 1896 and by Talma in 1898. The principle of operation is to establish a collateral circulation between the visceral peritoneum of the omentum, liver, and spleen and the parietal peritoneum in order to relieve the portal congestion. With this idea in mind a number of surgeons have operated with a certain measure of success. These adhesions may be set up in a variety of ways: by suture, by tamponade, by stretching or by rubbing the opposed peritoneal surfaces, etc.

Further experience is necessary in order to demonstrate the utility of such operations.

Puncture for ascites should be an aseptic operation. The skin of the abdomen should be disinfected and the trocar boiled. The instrument may be inserted in the linea alba below the umbilicus, the bladder being previously emptied, or in either side in the lower portion of the abdomen, or half-way between the umbilicus and the anterior spine of the ilium. The objection to the last-named situation is the risk of wounding the epigastric artery which runs in the sheath of the rectus muscle. If the recti are widely separated by the increased intra-abdominal pressure, these vessels may be displaced outward; therefore it is better to puncture at a point plainly beyond the outer margin of the rectus muscle. The trocar should be plunged quickly through the abdominal wall. As soon as the point of the trocar enters the fluid the operator's hand will recognize the absence of resistance. It is scarcely possible to injure the intestine by this manœuvre unless one punctures at a spot where intestine is adherent or there is no free fluid. The ascitic fluid should not be drawn off too rapidly lest the resulting distention of the abdominal vessels produce a cerebral anæmia. If a loop of intestine or omentum floats against the inner end of the canula, the flow of fluid will cease. Such obstruction can be overcome by moving the canula from side to side or by thrusting an aseptic probe through it. It is never possible to remove all the ascitic fluid. It is best for the patient to be half-reclining, leaning backward or to one side. If he is sitting upright, he may easily become faint. The little wound may be closed with a bit of gauze and adhesive plaster. Sometimes puncture is followed by a serous drainage, especially if the abdominal wall itself is œdematous.

In the rare cases in which the epigastric artery is punctured blood will flow from the wound in a stream after the removal of the canula, or there will be signs of internal hemorrhage—anæmia, faintness, a small rapid pulse, and vomiting. The hemorrhage may be controlled by pressure of the wound against the ilium; or, if the abdominal wall is much relaxed, a fold of it may be compressed between the fingers. If no assistance is at hand, this compression may be kept up until the hemorrhage stops. The hemorrhage can be readily controlled by passing a curved needle and thread beneath the vessels and tying it over a pad of gauze; or, if this fails, the wound of puncture should be incised, and the vessels exposed and ligated.

It is often necessary to repeat this operation of tapping for ascites many times. A result which occasionally follows is a chronic inflammation of the peritoneum with hemorrhagic exudate.

CHAPTER XI.

LAPAROTOMY.

By Prof. J. v. MIKULICZ and Dr. W. KAUSCH.

PREPARATION OF THE PATIENT.

Every patient upon whom laparotomy is to be performed should be examined from head to foot. Even the simplest laparotomy should be looked upon as an operation of great importance, and the resisting power of the patient should therefore be fully investigated. When time permits, his manner of living should be so regulated that his general health will be as good as possible. The individual resistance plays an important part in treatment by laparotomy. Feeble, aged, emaciated, and ill-nourished persons, as well as individuals with pulmonary and cardiac diseases, often fail to recover from an operation which would be easily borne by a person in robust health. A weakened individual is less able to resist bacterial attack, and he also suffers more from shock, from exhaustion, and from pneumonic processes. Any recent catarrh of the respiratory passages increases the risk of pneumonia after operation. Hence under such circumstances one should postpone the laparotomy if the delay is not dangerous for the patient. The examination of the patient should, of course, include the examination of his urine, preferably the twenty-four hour urine.

Except in cases of peritonitis, the patient should be given a full bath, preferably on the day before operation. The stomach, intestinal canal, and bladder should be thoroughly emptied. If these organs are full, palpation and inspection of the peritoneal cavity and most operative procedures are rendered more difficult. The patient should therefore take nothing by the mouth for some hours previous to operation, and if there is reason to suppose that the stomach is not empty it is better to wash it out. Irrigation of the stomach is advisable in all cases of ileus and of marked insufficiency of the stomach. If the stomach itself is to be operated upon and no counterindication exists, such as fresh hemorrhage, it should be irrigated with sterile water until the fluid returns clear.

The intestine can best be emptied by giving the patient mild laxatives for two or three days before the operation (castor oil, Carlsbad salt, etc.). The strength of these laxatives should be the greatest when the large intestine is to be operated upon. During this period of preparation the patient should receive only a fluid diet. On the evening