

wall. The peritoneum is stripped up both below and above this incision; the spleen is placed in the pocket thus made, and fixed there by sutures passed through the parietal peritoneum and suspensory ligament of the spleen. Additional fixation can be secured by sutures through the margin of the spleen itself or by scraping its lower end in order to set up granulations.

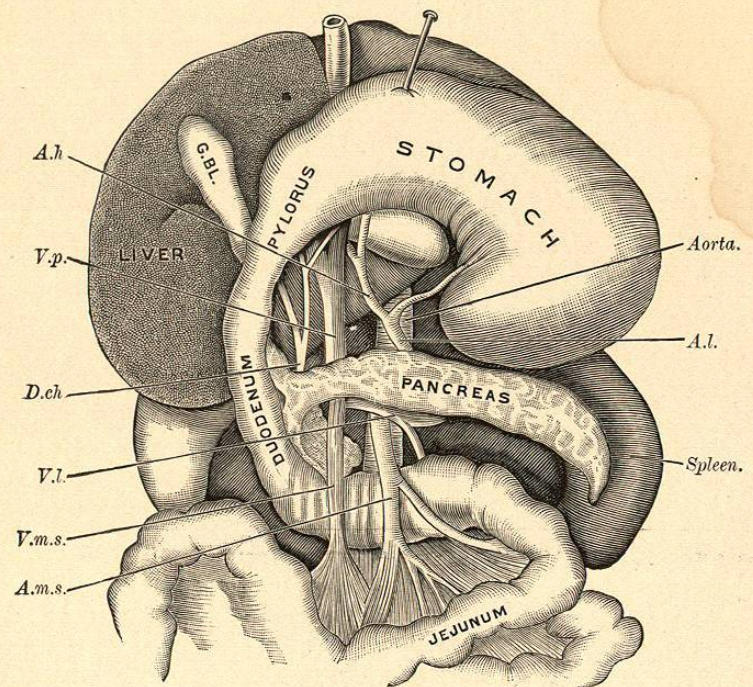
If a movable spleen is hypertrophied or contains a tumor, it should be removed. The extirpation of a movable spleen has, according to Stierlin, a mortality of only 6.25 per cent. Some surgeons have preferred splenectomy to splenopexy, the former operation being easier to carry out, being an absolute cure and having, as above stated, a slight mortality. Certainly in twisting of the pedicle splenopexy ought never to be performed unless operation is undertaken within a very short time.

INJURIES AND DISEASES OF THE PANCREAS.

BY PROF. W. KORTE.

Anatomy and Physiology.—The pancreas is accessible in several ways. The gastrocolic omentum may be divided between ligatures and the stomach and transverse colon separated. (Fig. 333.) The pancreas

FIG. 333.

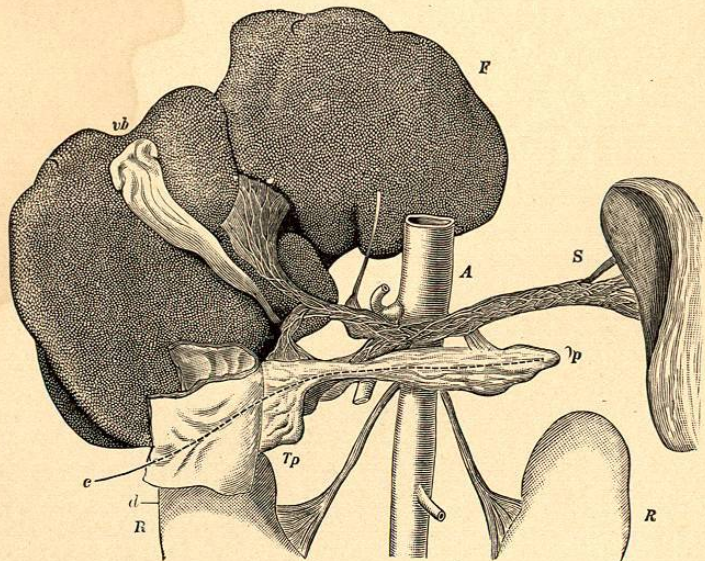


Upper portion of the peritoneal cavity of a child. The liver is drawn upward, the gastrocolic ligament is divided, the stomach is drawn upward and the colon downward. The whole peritoneum is removed. *A.m.s.*, superior mesenteric artery; *V.m.s.*, superior mesenteric vein; *V.l.*, splenic vein; *D.ch.*, common bile-duct; *V.p.*, portal vein; *A.h.*, hepatic artery; *A.l.*, splenic artery. (Henle.)

will then be discovered loosely covered by the posterior peritoneal layer of the lesser omental cavity. Through this incision the whole of the

pancreas is exposed. A portion of it is accessible above the lesser curvature of the stomach after the gastrohepatic ligament is divided. If the omentum and transverse colon are drawn upward as in performing posterior gastro-enterostomy, the tail of the pancreas is visible covered by the transverse mesocolon, which may be torn through between its arteries, the large left colic artery being avoided; or the peritoneum which lies to the right of the duodenum may be torn through, the duodenum itself being pushed toward the median line and the head of the pancreas exposed in this manner. The pancreas may also be reached retroperitoneally through an incision in the right or better in the left loin. Fig. 334, drawn from nature to illustrate a case of arrested development of the pancreas, gives a good idea of the relations of the liver, pancreas, and spleen.

FIG. 334.



Aplasia of the pancreas: *Tp*, head of pancreas; *Qp*, tail of pancreas; *c*, probe in canal of Wirsung; *d*, duodenum; *F*, liver; *vb*, gall-bladder; *S*, spleen; *RR*, kidneys; *A*, aorta. (Lan cereaux.)

The choice of method depends chiefly upon what portion of the pancreas is to be exposed. If a tumor or abscess has pushed its way up under the lesser curvature of the stomach, it may properly be reached in that situation; but usually both tumors and inflammatory lesions develop in the cavity of the lesser peritoneum and are best reached after division of the gastrocolic omentum. There are other cases in which the infracolic or retroperitoneal or lumbar route affords advantages.

The relations of the common duct to the pancreas are of the greatest importance. This duct lies in a gutter of the head of the pancreas,

or sometimes in a canal, so that a tumor or inflammatory swelling of the head of the pancreas can easily compress the duct.

In a few instances the head of the pancreas has been found to surround the duodenum. This condition is spoken of as annular pancreas. Accessory pancreas in the wall of the stomach or intestine is another recognized anomaly.

The secretion of the pancreas is a clear, watery, sticky fluid with alkaline reaction. It contains a good deal of albumin and its concentration varies between wide limits. It contains three ferments: a diastatic ferment, capable of splitting up and emulsifying fats, and a ferment capable of transforming albumin in peptone. The ferment which emulsifies fat is found only in the pancreas. According to Abelmann, the removal of the pancreas from a dog interferes with the resorption of albumin and stops entirely the resorption of fats which are not emulsive. Intestinal bacteria seem to be capable of splitting up fats to a certain degree.

Minkowski and Mehring made the important discovery that removal of the pancreas in animals is followed by diabetes.

General Symptoms.—Our knowledge of diseases of the pancreas is limited, although the gland has important functions in connection with nutrition, and is doubtless more often affected in diseases of the intestinal and biliary tracts than surgeons have any idea of. There are unfortunately no means of recognizing any but very severe diseases of the pancreas.

Thus far pathognomonic symptoms of pancreatic disease are but ill defined. The presence of sugar in the urine raises a suspicion of pancreatic disease, but nothing more. In many cases of diabetes no change in the pancreas can be recognized, while, as stated, the pancreas may be completely destroyed without causing the appearance of sugar in the urine. Irregularities in the resorption of fat, and especially in the splitting up of fat, also suggest disease of the pancreas. But so-called fatty stools are in no sense pathognomonic, since they occur in other diseases and may not be present in diseases of the pancreas. Failure of the organism to make use of the albumins of food, and especially the presence of great quantities of muscle-fibre in the stools, suggests disease of the pancreas.

If jaundice is present without symptoms of calculus, or if there is a distended gall-bladder, one should think of compression of the common duct by means of a tumor. Such a tumor may exist in the gall-duct itself, in the papilla of the duodenum, or, more frequently, in the head of the pancreas. Carcinoma of the pancreas is sometimes accompanied by bronzing of the skin, a symptom which is not unknown in carcinoma of other organs. Spontaneous colicky pains and pains on pressure in the epigastrium are symptoms of pancreatic disease and also of other diseases.

The most important symptom is the presence of a tumor in the region of the pancreas. This can be made out in only a few cases because the pancreas is so surrounded by liver, stomach, and

intestine that it can rarely be felt in persons with rigid or fat abdominal walls. If a tumor can be made out, it is easy to determine whether it lies behind the stomach and colon by distending these organs with air.

If a swelling in the region of the pancreas can be demonstrated in a patient who is losing weight, and suffers from jaundice and colicky pain for which no explanation can be found in the gall-bladder, stomach, or intestine, the probable diagnosis is pancreatic disease.

Diseases of the stomach and intestine, and especially diseases of the biliary tract, are often starting-points for disease of the pancreas. In not a few instances injury in the epigastric region has led to pancreatic disease. The interest of the surgeon is centred in the various injuries, inflammations, tumors, and concretions of which the pancreas may be the seat.

CHAPTER XXVIII.

INJURIES OF THE PANCREAS.

SITUATED as is the pancreas, at the back of the abdominal cavity, partly covered by ribs, liver, stomach, and colon, it is well protected from injury. If a patient is run over or crushed between cars, the force must be sufficient to overcome the elasticity of the ribs before the pancreas suffers. A blow directed upward—for example, the kick of a horse—may produce an injury of the pancreas.

As the pancreas is covered by other organs (stomach, liver, intestine, and spleen), it is rarely injured alone, and the existing injury of one of these other organs makes the prognosis more grave.

Examinations upon the cadaver show that in certain conditions, especially in gastropptosis and coloptosis, a part of the pancreas is covered only by the abdominal walls and reduplicatures of the peritoneum. Under such circumstances it may be injured by direct violence—for example, in stab-wounds—although other organs are uninjured.

SUBCUTANEOUS INJURIES OF THE PANCREAS.

The three chief causes of subcutaneous injury of the pancreas are the passage of a wagon-wheel across the abdomen, a crush between car-buffers, and the kick of a horse. If the injury is slight, the blood escapes into the tissues of the organ and beneath the peritoneum which covers it. Such an effusion of blood may form a pancreatic or peripancreatic cyst. Injury of the organ may lead to inflammation, suppuration, or necrosis.

If the force of the injury is great, the pancreas may be crushed against the vertebral column and partially or wholly divided. In one such case Mikulicz opened the abdomen and evacuated the blood. Five months later the patient died of pneumonia, and at autopsy a complete transverse scar showed how the injury had divided the pancreas.

Injury of the pancreas cannot be known with certainty until the abdomen is opened, as the patient complains merely of the symptoms of abdominal injury. Shock is well marked and the abdominal muscles are rigid. In every case of severe contusion of the pancreatic region the surgeon should think of possible injury of the pancreas, and if there are signs of swelling or hemorrhage in its vicinity the organ should be exposed by opening the lesser cavity of the peritoneum, or through the transverse mesocolon. If the wound in the

pancreas is peritoneal simply, it may be sutured, otherwise it should be tamponed with gauze.

OPEN WOUNDS OF THE PANCREAS.

Gunshot- and stab-wounds of the pancreas are rare accidents, and for the reasons stated above injury to the pancreas is usually complicated by injury to the surrounding organs. A careful search through European medical literature since 1898 revealed the reports of 8 cases of direct wound of the pancreas, 4 of which were recovered from. All of these patients were treated by laparotomy. In 1 case the wounds were sutured, but the usual treatment was by tamponade. These cases show that in gunshot-wounds of the epigastric region the pancreas should always be examined. Küttner mentions a case of stab-wound of the pancreas in which immediate laparotomy and suture succeeded in saving the patient, although the stomach also was wounded.

If the abdominal wound is large, the tail of the pancreas may prolapse; the head of the organ is so fixed behind the duodenum as to be practically immovable. If such a patient is seen soon after the accident, and the organ appears clean and uninjured, it may be sponged and restored to its normal position. If there is any doubt as to its circulatory condition, it should be ligated and excised and the wounded surface reduced to a minimum by suture.

CHANGES IN POSITION OF THE PANCREAS.

The head of the pancreas is so firmly adherent to the movable duodenum that changes in its position are practically unknown. The tail of the organ is attached to the spleen, and it may be displaced with the spleen. In rare cases the pancreas has been found in the sac of a congenital or acquired umbilical hernia, or in a diaphragmatic hernia.

CHAPTER XXIX.

DISEASES OF THE PANCREAS.

HEMORRHAGE IN THE PANCREAS AND ITS VICINITY.

SPONTANEOUS hemorrhage may occur in the pancreatic tissue, producing distention of the organ and sudden death. This accident occurs chiefly among stout individuals and takes place suddenly without warning, so that a person apparently in perfect health is seized by an attack of intense epigastric pain with nausea and vomiting, followed by rapidly increasing collapse and death. The cause of such hemorrhage is not fully understood, for in certain cases the pancreas appears perfectly normal; in other cases, however, fatty degeneration of the gland or disseminated fat-necrosis, or degeneration of the vessel-walls exists before the attack of hemorrhage.

Slighter hemorrhages may also occur in the pancreas in connection with general circulatory disturbances. Hemorrhage from traumatism was spoken of in the preceding chapter.

The diagnosis of pancreatic apoplexy cannot be made with much certainty, and on account of the rapid course of the affection treatment has thus far proved useless. Operation and control of the hemorrhage by gauze packing are rendered difficult or impossible by reason of the intense collapse.

There are a few cases in which hemorrhage has ceased spontaneously after the first attack and a blood-cyst has formed in the pancreas. Rasunowski operated successfully several weeks after such an acute attack.

The patient may recover from the hemorrhage and suffer from the destruction of pancreatic tissue which is secondary to it. Operation may then be required on account of the pancreatic necrosis. This idiopathic hemorrhage should be carefully distinguished from the hemorrhage occurring in an inflammation of the pancreas, or acute hemorrhagic pancreatitis, as it is called. (See page 722.)

INFLAMMATIONS OF THE PANCREAS.

Inflammations of the pancreas have recently excited a great deal of surgical interest and many cases have been reported. It is quite likely that slighter forms of inflammation frequently accompany affections of the mucous membrane of the upper portion of the alimentary canal or of the biliary passages, but these milder forms escape notice.