

into the stomach or intestine lies between these extremes. Aside from the risk of rupture, echinococcus of the liver is a serous disease which constantly threatens the life of the patient, although the prognosis is good if an operation is performed in the early stages. The operation is simplified if the cyst has become very large and has produced atrophy of the overlying hepatic tissue; but this is not sufficient reason for delaying operation if the diagnosis is reasonably certain.

Treatment.—Aspiration and injection of antiseptics into the cyst, such as mercuric chloride, or 5 per cent. solution of formalin in glycerin, is a method of treatment which is at least as dangerous as an open operation. When the abdomen has been opened, the surgeon must decide whether he shall complete the operation or wait for adhesions to form between the visceral and parietal peritoneum. Complete operation at once is indicated when the cyst-wall can be sewed to the abdominal wall, when suppuration has greatly weakened the patient, and when there are multiple cysts. In general, an operation completed after adhesions have formed is less dangerous than one which is completed on the first occasion; but it prevents inspection of the abdominal cavity after the cyst is opened, so that a second cyst may be overlooked. For this reason, and because the risk of infection is slight when a proper technic is followed, most practised surgeons prefer operation completed at once.

Suture of the sac in the abdominal wound may lead to pain due to pulling upon the adhesions. It also predisposes to hernia in the cicatrix, and delays often for months complete healing of the wound. These disadvantages are avoided when the sac is wholly excised; but this and other radical methods (Billroth and Bobrow) have their own disadvantages.

The technic of operation performed in two steps is as follows: The patient should be prepared by laxatives and baths as for any laparotomy, unless there are present symptoms of peritoneal irritation. The abdominal incision should be made directly over the tumor, and should be sufficiently long to permit easy access. Most surgeons prefer a longitudinal incision. As soon as the peritoneal cavity is opened, the operator determines the size of the cyst, possible adhesions, the presence of other cysts, etc. Gauze is then placed between the visceral and parietal peritoneum in order to promote the formation of adhesions on all sides of the wound. The place at which the cyst is to be opened later should be marked by a superficially placed silk suture. A large gauze dressing is applied, the patient put to bed, and given a fluid or simple diet for ten days. The dressing is then removed and the adhesions examined. If they are insufficient, the dressing should be reapplied and the second operation postponed for a few days. When the adhesions are satisfactory, the cyst is opened with a sharp knife or a thermocautery. The liver should be supported during this procedure by two sharp hooks lest it tear away from the parietal peritoneum. The opening in the cyst is carefully enlarged, its cavity washed with normal salt solution, and any small cysts removed with forceps.

Gentle traction upon the parenchymatous lining of the sac will usually suffice to pull it out at the time of the first dressing. A continuous flow of bile is likely to follow its removal before it has had time to loosen. The cavity is drained with rubber tubes, and a large gauze dressing applied and changed as often as it becomes saturated with fluid. If the sac suppurates, it should be irrigated frequently. The tubes are to be gradually shortened as the cavity fills with granulations. The skin around the wound should be smeared with zinc salve to protect it from the irritating discharge.

When the operation is completed at once, the cyst may be stitched to the parietal peritoneum before it is opened or after it is opened. A good plan is to surround the exposed portion of the cyst with a wall of moist compresses, and to plunge a trocar into the cyst in order to evacuate as much as possible of its contents. The flabby wall is then incised, pierced with several tension sutures, and drawn well out of the wound. Its cavity should then be sponged dry, all daughter-cysts removed, and the edges of the incision in the sac sewed to those of the parietal peritoneum. The sac may then be irrigated with normal salt solution. Kehr has operated in 25 cases of echinococcus of the liver, usually according to the method last described, and has succeeded in every instance in keeping the peritoneal cavity free from infection.

Any cysts which lie close to the one already opened may be punctured and drained through the cavity of the latter. If they are placed at a distance, a second abdominal incision and separate suture are necessary. In every case one should determine by careful examination whether other cysts are present.

If an echinococcus cyst has already set up adhesions between the liver and parietal peritoneum, the operation for opening it is not more difficult than incision of any deep abscess. If an echinococcus cyst, even one which is suppurating, bursts into the peritoneal cavity, an attempt should be made to save the patient by a prompt laparotomy.

Recently more radical methods of treatment have been advocated. A cyst may be dissected or pulled out. This operation carries with it the risk of rupture of the cyst and that of subsequent hemorrhage or escape of bile. The latter danger can be lessened by the use of tampons. Still, in very many cases a pulling out of the cyst is technically difficult or impossible. Delbet pulls out the inner lining of the sac and closes the cavity by catgut sutures. This method is, of course, inapplicable if the patient has fever or other symptoms of suppuration. Billroth opens the peritoneal cavity, punctures, incises, and removes all daughter-cysts from the main cyst, cleanses the cavity of the latter, injects into it 30 to 50 grammes (1 to 2 ounces) of iodoform-glycerin and closes it carefully by suture. This operation is only permissible in case the sac is free from inflammation and is so situated that its cavity can be perfectly emptied and cleansed. The risk is considerable if one closes the abdominal wound without drainage. Bobrow operates by this method, but uses salt solution instead of iodoform-glycerin. These methods shorten the period of recovery to about three weeks, which is, of course,

a great advantage, but they carry with them a not inconsiderable risk of infection, and death in a few days. The operation is safer as performed by Rasumowsky, who when he has sutured the sac fixes it in the partially sutured abdominal wound. Terrier advocates a partial resection of the wall of the cyst together with the hepatic tissue which lies over it, so as to shorten the period of recovery. Such an operation carries with it a slight risk from hemorrhage.

If the echinococcus develops in the convex or in the posterior portion of the liver, it is best reached by the transpleural route advocated by Israel in 1879. He resects two ribs in the anterior axillary line and introduces gauze to obliterate that portion of the pleural cavity; or the layers of pleura may be sutured. Ten days later the diaphragm is incised, and if the echinococcus cyst has set up adhesions it may be opened at once, otherwise it should be surrounded with gauze and the operation completed at a still later date. Subphrenic echinococcus may also be reached through an abdominal incision if the liver is pushed downward according to Landau's method, or if the anterior portions of the cartilages of the eighth, ninth, tenth, and eleventh ribs are removed according to the method of Lannelongue.

Echinococcus cyst in the posterior portion of the right lobe may be reached through a lumbar incision, to which an anterior incision may often be added with advantage for the sake of orientation.

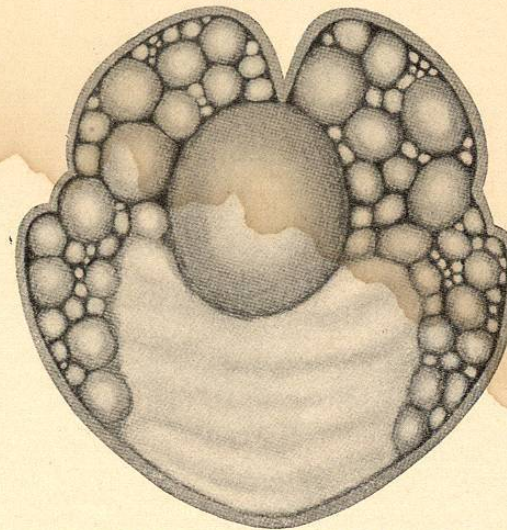
In the after-treatment hemorrhage sometimes occurs, and may be controlled by gauze packing or styptics. There is usually a moderate discharge of bile, but sometimes this amounts to a litre (quart) a day. The flow of bile has been ascribed by some writers to sloughing away of the connective-tissue sac and opening of the biliary ducts behind it, and by others to the presence within the sac itself of dilated bile-ducts which are either ruptured at the operation or by the sudden relief of pressure. If the sac suppurates and is cast off, the flow of bile is limited or prevented altogether, so that Vogt advocates giving up the aseptic dressing after a few days and allowing the wound to suppurate.

In many cases there is a communication between the echinococcus cyst and the biliary tract at the time of operation. After the operation such a perforation will usually close by granulation. If the discharge of bile continues for several months, this may be due to faulty granulation or to incrustation of some portion of the sac. Curettage may be followed by cure. Such a cure will be impossible if a larger bile-duct is obstructed by mucus, or a blood-clot, or a portion of echinococcus membrane, or a daughter-cyst, or a calculus, or the pressure of a deeply situated unopened echinococcus cyst or other tumor. By firmly packing the external fistula one may re-establish internal drainage; but if this fails, an operation must be performed to overcome the obstruction, or to get around it by anastomosis with the lower biliary tract or the intestine through the gall-bladder.

There are cases of multilocular echinococcus in which there are present a great number of small cysts embedded in a connective-tissue

stroma. (Fig. 310.) This is a modification of exogenous echinococcus, and is due to the proliferation outward of a primary cyst at the time when the latter is still small. If none of the cysts is large, the shape of the liver is not much changed. Its peritoneal coat is usually thickened and may be as hard as cartilage. Sometimes the tumor softens in its centre and a cavity is formed, which is filled with a fluid somewhat like pus. Multilocular echinococcus is almost always in the right lobe of the liver. The bile- and blood-vessels which are involved are obliterated or filled with the growing tumor. The central cavity may perforate into the gall-bladder. On section the tumor is whitish or greenish. The connective-tissue stroma often is calcified in places, and the numerous small cysts that are opened give the cut section an appearance similar to that of a sponge. It is not yet determined whether multilocular echinococcus is derived from the tapeworm of the dog or not.

FIG. 310.



Echinococcus cyst of the liver, showing parent and daughter-cyst. (Loux.)

In its earlier stage multilocular echinococcus produces slight symptoms and is diagnosed with difficulty. It forms a hard tumor, proper treatment of which is radical excision. This can be carried out if the tumor is not too extensive and its edges are fairly well marked. If the whole of the tumor can be removed, the wound in the liver should be treated according to the principles given on page 636. Simple incision, curettage, and cauterization are not likely to effect a cure. A cure has followed ligation of the affected lobe of a liver, which was brought out of the wound and was removed after it had become gangrenous.

Non-parasitic Cysts of the Liver.—Congenital dermoid cysts are occasionally found in the liver, and may be removed by operation.

There are also multiple small cysts lined with epithelium of congenital origin, which possess little surgical interest as they cannot be treated by operation. They produce a cystic degeneration of the liver which often occurs in conjunction with cystic degeneration of the kidneys, ovaries, etc. The outcome is usually obstruction of the portal vein and death. If such cystic disease is found upon exploratory incision, the abdomen should be closed at once.

The cysts of the liver which are amenable to operative treatment are divided by Pellmann into five classes: 1. Retention-cysts of the biliary tract. 2. Cysts lined with ciliated epithelium, said by Recklinghausen to be due to mucus retention. 3. Dermoid cysts. 4. Epithelial cysts, or cystadenomata. 5. Lymph-cysts.

Symptoms.—The symptoms produced by one of these cysts are similar to those caused by an echinococcus cyst. A cyst of the liver may attain such a size as to be mistaken for a cyst of the ovary, kidney, etc., and without aspiration it is impossible to differentiate non-parasitic from echinococcus cysts. As stated above, puncture for purposes of diagnosis ought never to be performed. At operation a portion of the cyst-wall should be removed for microscopical examination.

Treatment.—The proper treatment consists in incision and removal of as much as possible of the cyst-wall. If the cyst is pedicled, its complete removal is possible, and many cysts which are deeply buried in the tissue of the liver may be shelled out. By this means a tedious and possibly permanent sinus may be avoided. Most of these cysts have a thicker wall than an echinococcus cyst, so that this shelling out is less difficult than is the case with echinococcus. Furthermore, the escape of cyst contents into the abdominal cavity does not carry with it the same risk as when one is treating an echinococcus cyst. The technic of operation and the after-treatment are the same as those given in connection with echinococcus cyst.

Solid Tumors of the Liver.

Syphiloma.—The surgeon is interested in only two forms of syphilis of the liver. These are the circumscribed gumma of the liver and syphilitic lobulation of the liver. A gumma of the liver is usually a single tumor, varying in size from that of a pea to that of a hen's egg, and usually occurring in one of two situations: near the suspensory ligament or near the entrance of the portal vein into the liver. Lobulation of the liver results from cicatricial contraction following syphilitic nodules. (Fig. 311.) The first symptoms arise when the affected portion of the liver begins to move independently in the abdominal cavity, and produce symptoms similar to those of a floating kidney. Ascites may also be present, due to diffuse disease in the neighborhood of the portal vein, or to pressure upon the portal vein by syphilitic tumors. Icterus is rarely present.

A large syphiloma of the liver is rarely correctly diagnosed.

It is not difficult to determine that the tumor is connected with the liver even though its syphilitic nature is overlooked. If the patient gives a history of syphilis, a short course of treatment will serve to distinguish a syphiloma from a carcinoma. Sometimes diagnosis becomes clear when the abdomen is opened, but often the microscopical examination of a portion of the tumor is necessary. If during operation it becomes evident that a syphilitic tumor of the liver exists, the operation should be discontinued whether the tumor is pedicled or not, since the favorable effect of antisyphilitic remedies in this class of cases is very striking. If there is doubt as to the nature of the trouble, the tumor may be sutured in the abdominal wound.

FIG. 311.



Syphilitic enlargement of the liver and spleen: multiple gummata of the liver; laparotomy and removal of one tumor for examination; cure by subsequent treatment (drawn from life).

Adenoma.—Some benign tumors of the liver are harmless and demand operation only if their great size causes the patient discomfort. Such are fibroma, fibromyoma, and angioma. Adenoma is of significance, since it possesses some of the characteristics of malignant growths. Two kinds of adenomata of the liver are recognized:

- a. Nodular hyperplasia, in which the hepatic cells have multiplied in an irregular way.
- b. Tubular adenoma, in which the cells in their multiplication simulate tubular glands.

Several surgeons have reported successful operation for adenoma of the liver. In such cases the tumor has been large and surrounded by a distinct capsule. Sometimes hemorrhage occurs in the centre of an adenoma, so that at operation the tumor resembles a blood-cyst. The centre may also soften. True cystic degeneration of an adenoma is rarely seen.

Carcinoma.—Secondary carcinoma is much commoner in the liver than primary carcinoma. The former cannot be treated surgically.

If a primary carcinoma can be diagnosed sufficiently early—for example, through an exploratory incision—it is conceivable that it may be removed with success. As a rule it causes such slight symptoms that it is not noticed by the patient until it is large enough to be palpated through the abdominal walls, and by that time loss of appetite and disturbances of digestion are already present. The time for operation has then gone by.

In the secondary form of the disease nodules of various size are scattered throughout the liver, while in carcinoma developing primarily in the liver there is usually a single solid tumor of a more or less spherical shape, while the hepatic tissue outside the tumor is little altered. There are also rare instances of multiple primary carcinoma and also an infiltrating type of carcinoma.

Primary carcinoma usually develops in the right lobe. It may undergo cystic degeneration and give rise to hemorrhages in the hepatic tissue. The disease has no surgical interest unless it can be seen early. The first symptoms of primary carcinoma are a loss of appetite and dislike of flesh and fatty food. But these symptoms are so little characteristic that the diagnosis will scarcely be made until a hard round tumor is felt. If jaundice or ascites is present, operation is not likely to be of benefit.

A few instances of successful operation for primary carcinoma of the liver are on record. In a series of 800 laparotomies performed for disease of the liver, biliary passages, and stomach, Kehr saw only 1 case of primary carcinoma of the liver at a stage when cure by radical operation might even be hoped for.

Operation for Tumor of the Liver.—Excision of a carcinoma of the liver may be dangerous on account of the hemorrhage occurring at the time, or on account of post-operative hemorrhage. If the tumor is situated in the left lobe, an elastic ligature can be employed to make the operation almost bloodless. The right lobe may occasionally be treated in the same way. Langenbuch recommends temporary ligation of the mesenteric artery and temporary ligation *en masse* of the hepatic artery, portal vein, and common duct by passing a ligature through the foramen of Winslow.

The technic of operations for tumors of the liver has been greatly improved in the last few years. It is a matter of indifference whether the incision is transverse or longitudinal. The operator should give himself sufficient room for the work in hand. If the tumor lies on the upper surface of the liver, resection of so much of the cartilages of the eighth to the eleventh ribs as is not covered with pleura will be necessary. Micheli's thoraco-abdominal flap may be of service. The more of a pedicle the tumor possesses the easier the operation. The pedicle should be ligated in sections, and larger single vessels should be separately ligated. Some surgeons always employ in addition gauze tamponade, because of the risk of post-operative hemorrhage. This plan is advisable in most cases. If the hemorrhage is imperfectly controlled and the stump is so situated that it can be

brought into the abdominal wound, it is well to fix it there with sutures so as to make it extraperitoneal. The stump should be sutured to the parietal peritoneum or possibly to the transverse fascia to facilitate the ultimate closure of the wound. If the tumor is not pedicled, the cavity left when it is shelled out of the hepatic tissue may be partially closed by deep stitches. Tamponade will also be necessary. Tillmanns advises in such cases fixation of the tumor in the abdominal wound and its removal at a later date when firm adhesions have formed. But this procedure is not to be recommended.

Kuznezow has recommended a method which successfully controls hemorrhage. He passes long blunt needles carefully through the hepatic tissue, thus avoiding puncture of the large vessels. The ligatures are tied and then the incision is made. If one proceeds in this manner step by step, the operation is well nigh free from hemorrhage. Of course, a carcinoma should not be shelled out of its bed, but excised by a cut passing well away from its margin. Experience has shown that a Paquelin cautery does not control hemorrhage as well as gauze pressure kept up for some time. Some Russian surgeons use steam as a hæmostatic in operations upon the liver.

Sarcoma.—Sarcoma of the liver is still rarer than carcinoma. Only a few cases have been reported of primary sarcoma treated by operation.

Aneurism of the Hepatic Artery.—Aneurism of the hepatic artery is a condition which, so far as known, has never been operated upon. The symptoms resemble those of gall-stone (pain and jaundice) or those of ulcer of the stomach or duodenum (vomiting of blood, or bloody stools). If a pulsating tumor giving a murmur is present, the abdomen should be opened and the vessel ligated either on both sides of the aneurism or at least on the proximal side. Such an aneurism usually develops outside of the liver, so that an operation of this character is feasible.

PARTIAL AND TOTAL HEPATOPTOSIS.

Partial Hepatoptosis.—Partial hepatoptosis is due to a constriction of the liver, usually a result of tight clothing. It may exist to such a degree that the two portions of the liver are united simply by a bridge of fibrous tissue. This condition is more often seen in the right lobe than in the left. Sometimes there is obstruction to the flow of blood through this fibrous bridge. The liver then becomes very painful, and symptoms of peritoneal irritation, such as vomiting and collapse, develop. As a result of chronic venous obstruction, the lobe may become more and more filled with fibrous tissue until it resembles a hard tumor.

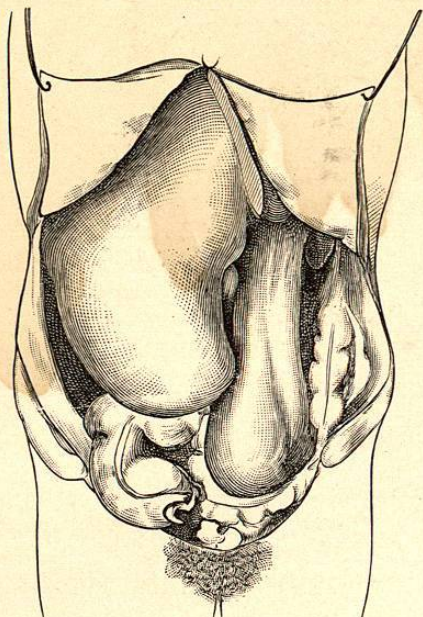
Symptoms.—The symptoms of partial hepatoptosis are local pain, which may extend upward to the breast or downward into the thigh, loss of appetite, and disturbances of digestion. In other cases there

may be no abnormal symptoms. Jaundice is rarely seen. If the left lobe is affected, it may press upon the pyloric portion of the stomach and so give rise to unpleasant symptoms.

Partial hepatoptosis is far commoner among women than among men. An examination will show that the tumor is intimately connected with the liver even though it possess a certain amount of mobility. If the mobility is considerable, the lobe may easily be confounded with other tumors of the abdomen. The chief points of diagnosis are as follows:

1. An enlargement of the liver, and especially of its right lobe downward, perhaps as far as the ileocæcal region.

FIG. 312.



Hepatoptosis, amenable to suspension. (Faure.)

2. An increased consistence of the constricted lobe owing to the thickening of its capsule and fibrous induration of its parenchyma.

3. The horizontal groove which may be felt.

4. The mobility of the constricted lobe, which has been mistaken for a movable right kidney, for a tumor of the liver, or of the omentum, or of the mesentery, as well as for a distended gall-bladder.

Treatment.—A properly fitting bandage will often relieve all symptoms. If this fails, operation is indicated. A number of surgeons have reported successful suture of the lobe to the abdominal wall; or, suture may be combined with tamponade. This operation, which is spoken of as hepatopexy, is not always successful, and some surgeons have been compelled to resect the movable lobe in order to cure their

patients. Such operation is rather to be advised if the tissue of the lobe is greatly altered or if it suggests tumor formation. The fibrous bridge which connects the lobe to the rest of the liver can be ligated in sections and divided, so that hemorrhage can easily be avoided. If there is any risk of post-operative hemorrhage, the abdominal wound should not be entirely closed, so that a tampon may reach to the wound in the liver. This method of treatment is preferable to suture of the stump in the abdominal wound, for the traction of the liver upon the adhesions thus caused may produce unpleasant symptoms. In certain cases it may be advisable to adopt Rydygier's treatment for wandering spleen—that is, to make a pocket outside of the peritoneum into which the constricted lobe of the liver can be passed. Riedel describes a tongue-shaped process of the liver seen in cholecystitis, which is a rather frequent form of partial hepatoptosis. When the inflamed gall-bladder is opened and stitched in the abdominal wall, it is well to suture this tongue-shaped lobe at the same time to the parietal peritoneum.

Total Hepatoptosis.—If the liver is completely loosened from its normal close relation to the diaphragm, so that it is displaced downward and at the same time is freely movable, it is spoken of as a wandering liver. If it cannot be pushed back into its normal position on account of adhesions, etc., it is spoken of as a fixed, dislocated liver. This latter condition is rarely seen. Wandering liver occurs chiefly in women, and is variously ascribed to tight lacing, to the effects of child-bearing, to traumatism, and to rapid emaciation. Langenbuch says that anomalies in umbilical vessels may produce congenital shortening of the round ligament, while any mechanical cause which produces a sudden or gradual strain upon the round ligament may lead to a wandering liver.

Total hepatoptosis is often accompanied with nephroptosis, gastroptosis, and enteroptosis, being, in short, a part of the general splanchnoptosis.

Symptoms.—The symptoms are due to pressure, tension, and perhaps kinking of some abdominal organs. If the condition develops suddenly, pain is more severe; and even if it develops slowly there may be colic similar to biliary colic. A dragging upon the pylorus may lead to gastric dilatation, and pressure upon the portal vein or upon the larger biliary ducts may produce ascites or icterus. Most of these patients suffer from hysteria and various nervous symptoms.

Diagnosis.—The diagnosis of wandering liver rests upon the presence in the lower abdomen of a mass corresponding to a displaced liver. The upper border of this body is separated from the right lung by a highly tympanitic zone which extends from the front well around to the side. The tumor unless held by adhesions is easily replaceable when the patient is lying down.

Prognosis.—The prognosis in hepatoptosis of a slight degree is good.

Treatment.—A properly fitting bandage, attention to diet, and judi-

ciously applied massage will often cause all symptoms to disappear. When such measures fail, operation is indicated; but the results of operation are so uncertain that it should not be too hastily performed. Langenbuch recommends division of the round ligament on the ground that it may be congenitally short, or because a dependent abdomen by pulling on the round ligament may drag down the liver. Several surgeons have reported success following suture of the liver to the costal cartilages, or the liver may be fixed by extensive tamponade introduced between it and the anterior abdominal wall. The lower edge of the liver may be brought out through the peritoneum into a pocket prepared for it (Rydygier's splenopexy).¹

There is an anteflexion of the liver in which the liver turns forward upon its transverse axis. This is also observed in women who have been accustomed to lace their abdomens. The treatment is the same as that described above.

Recently attempts have been made to overcome the ascites which accompanies chronic hepatoptosis or atrophic cirrhosis of the liver by an increase in the collateral circulation between the portal system and the general venous system. Talma recommended stitching the omentum, and if necessary the spleen, to the parietal peritoneum, and a great many operations of this or a similar character have since been performed. There have been some successes and many failures. It is necessary that the cells of the liver should be still capable of performing their function if the operation is to be of lasting benefit. In the German Congress of Surgery, 1902, Bunge reported 79 cases of ascites treated by Talma's method, with 32 cures and 15 improvements, and 32 bad results.²

The best modification of Talma's operation is that suggested by Eiselsberg and Neumann, who carefully rub strip by strip the parietal peritoneum and suture to it the omentum. In this manner the omentum becomes adherent to the anterior abdominal wall throughout a wide area.

¹ These and other methods are described in detail by Bötticher in the Deutsche Zeitschrift für Chirurgie, 1900, vol. lvi., p. 252.

² See also Progressive Medicine, June, 1903, p. 118.

CHAPTER XXV.

SURGERY OF THE BILIARY PASSAGES.

Anatomical and Physiological Considerations.—The position of the gall-bladder and its relations to the external abdominal wall vary greatly. An incision beginning at the lower margin of the ninth costal margin and carried downward along the outer margin of the right rectus muscle directly exposes the normally placed gall-bladder. But the surgeon usually has to do with a pathologically altered gall-bladder, and must be prepared to find it displaced to the right or high up under the liver, or, less often, displaced to the median line, or even to the left side. Rarely the gall-bladder is found situated to the left of the round ligament, although situs transversus does not exist. In one such case the cystic duct opened into a narrow left hepatic duct which joined the normal right hepatic duct near the duodenum. Sometimes the gall-bladder is displaced downward and is found in the lumbar region or in the neighborhood of the cæcum. These changes in position are chiefly due to changes in form and size of the liver, but also to adhesions between the gall-bladder and intestine, by which the gall-bladder is dragged out of its normal position.

The size of the gall-bladder is as variable as its position. If the cystic duct is obstructed by a calculus, the bladder may be dilated until it is as large as a child's head, so that it may be mistaken for an ovarian tumor. It often shrinks, owing to inflammatory processes, until it is no larger than a cherry and is even found with difficulty.

It is unnecessary to describe the anatomical structure of the gall-bladder in detail. For surgical purposes it is sufficient to state that it is made up of a mucous membrane, a muscular layer, and a serous layer. Sometimes its wall is as thin as paper, so that every stitch which is passed into it penetrates its lumen. At other times the wall

FIG. 313.

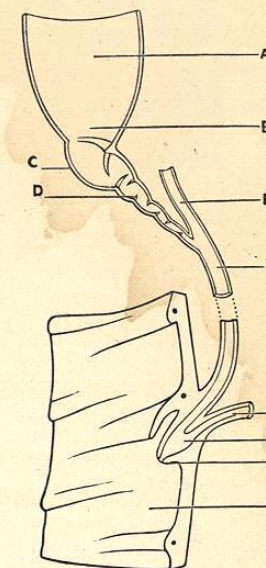


Diagram of the biliary passages: A, B, gall-bladder; C, D, cystic duct with valves; E, hepatic duct; F, common duct; G, pancreatic duct; H, ampulla of Vater; I, biliary papilla; J, second portion of the duodenum. (Testut.)