PARTIAL HEPATECTOMY WITH INTRAHEPATIC CHOLANGIOJEJUNOSTOMY*

A USEFUL ADDITION TO TECHNICAL METHODS FOR THE MANAGEMENT OF COMMON DUCT STRICTURE

HARWELL WILSON, M.D., AND C. E. GILLESPIE, M.D.

FROM THE DEPARTMENT OF SURGERY OF THE UNIVERSITY OF TENNESSEE

ONE OF THE MOST DIFFICULT PROBLEMS encountered by the experienced surgeon concerns the repair of a stricture of the common bile duct. Intrahepatic cholangiojejunostomy with partial hepatectomy, a procedure recently introduced by Longmire, is a valuable technic for use in certain unusual and especially difficult types of biliary stricture.

ETIOLOGY AND PREVENTION OF BENIGN STRICURE OF THE COMMON BILE DUCT

It is well known that benign stricture of the common bile duct may rarely occur as a result of infection in and about the duct. Fibrosis of the ampulla of Vater may result in stricture. The majority of benign strictures of the common duct result from injury to the duct acquired during the course of cholecystectomy. Such injuries are most likely to occur when clamps or sutures are placed blindly in an attempt to control bleeding which may take place during a routine cholecystectomy. Experienced surgeons have repeatedly called attention to the necessity for great care in the management of such problems in order that serious complications may be avoided. The surgeon or first assistant can almost always control such hemorrhage by compression of the hepatic artery between the index finger and thumb after the finger has been inserted into the foramen of Winslow. Adequate light, good retraction and proper anesthesia are, of course, necessary before such a situation can be managed safely.

A number of injuries of the common bile duct have occurred in operations that were considered by the original operator to be technically easy. In such instances, the common duct is usually pulled up, ligated and divided without the knowledge of the operator. Adequate surgical training and constant attention on the part of the surgeon are necessary to decrease the incidence of this distressing complication.

METHODS PREVIOUSLY USED FOR THE REPAIR OF COMMON BILE DUCT STRICTURES

The fact that so many methods of repair have been devised for stricture of the common duct is good evidence that no one method is uniformly successful. It is also true that no one method is applicable to all cases. The methods in use have consisted of variations of two general principles. These are (1) end-to-end suture of the duct and (2) suture of the proximal end of the duct to the

* Read before the Southern Surgical Association, White Sulphur Springs, W. Va., December 8, 1948.
stomach, duodenum or jejunum. Advances have been made in this field, but the problem will long remain a serious one. It is generally agreed that a mucosa-to-mucosa, end-to-end anastomosis of the common duct is the procedure of choice where this can be accomplished. Cattell\(^1\) has been able to accomplish repair by this method in a remarkably high percentage of cases by mobilizing the portion of the distal common duct which lies in a retroduodenal intrapancreatic position. Allen,\(^2\) by popularizing the Roux Y procedure, made

![Diagram of liver resection and bile duct repair](https://example.com/diagram.png)

**Fig. 1.**—Resection of left lobe of liver. Bleeding from the cut liver edge is controlled by utilizing overlapping mattress sutures which are tied over a strip of gelfoam. At the site of the intrahepatic duct one mattress suture is placed through the liver substance above the duct and another is placed through the liver below the duct to avoid inclusion of the duct by mattress suture. An artery (A) which requires individual ligation often accompanies the intrahepatic duct (B). A small amount of liver tissue adjacent to the duct is removed with a curette.

Inset shows incision used. Left lobe of liver is delivered into wound after dividing the triangular ligament.

a definite contribution to the problem. Dragstedt\(^3\) and Zenninger\(^4\) have also made helpful suggestions in the management of such cases.

In an occasional case which has resulted from injury or infection, almost no remnant of the common bile duct may be found. It is in such cases that intrahepatic cholangiojejunostomy with partial hepatectomy may offer the possibility of cure in an otherwise hopeless case.

**LONGMIRE PROCEDURE**

As a result of studies on human livers obtained at autopsy, Longmire concluded that the left main hepatic duct drains the left lobe of the liver, the
quadrate lobe and most of the caudate lobe. Evidence was also found which suggested that the right and left duct systems might communicate through numerous fine ducts in the caudate lobe. Before the Society of University Surgeons in January, 1948, Longmire reported upon a patient in whom he had successfully performed an anastomosis between the main left hepatic duct and the jejunum after performing a partial heptectomy to expose the duct. It was pointed out that the dilatation produced by chronic obstruction affords a larger duct for anastomosis than otherwise would be found.

FIG. 2.—The Roux Y is utilized in securing an end-to-end anastomosis between intrahepatic duct and jejunum. The anastomosis is performed around a catheter which is brought out the jejunum by the Witzel method. Interrupted sutures are used in performing the mucosa-to-mucosa, end-to-end anastomosis. The end of the jejunal loop is partially closed on either side prior to performing the anastomosis in order to compensate for the disparity in size of structures to be united.

FIG. 3.—After completion of the duct anastomosis the Roux Y is completed and the catheter is brought outside through a stab wound. Penrose drains are also brought out through stab wound.

Case Report: D. M., a 44-year-old white male, entered the hospital on our service January 31, 1948. The patient's chief complaint was jaundice accompanied by recurring bouts of chills and fever.

Sixteen months prior to the time we saw the patient he had undergone cholecystectomy. The gallbladder was said to have contained many stones. The postoperative course was uneventful except for an unusually profuse drainage of bile from the wound for a number of days. Subsequent to his original operation the patient began to experience recurrent attacks of jaundice which varied in intensity. He was hospitalized on three
occasions because of this complaint. On March 21, 1947, the patient underwent an exploratory laparotomy and was told that no obstruction was found in the bile ducts. His condition was not improved by this operation.

The jaundice varied somewhat in intensity but never disappeared. Fever recurred at irregular intervals. The stools were clay colored and there were varied digestive complaints. The patient lost 40 pounds in weight and was forced to give up his work.

Physical examination on admission to our service revealed a debilitated white male who was obviously jaundiced. There was a healed upper right rectus scar. Slight tenderness was noted beneath the right costal margin.

Laboratory studies revealed the presence of bile in the urine and the absence of bile in the stools. The serum bilirubin at this time was 3 mg. per cent and the Van den Bergh reaction was reported as positive direct. The prothrombin time was 20 seconds as compared with a normal control of 40 seconds.

On February 3, 1948, an exploratory laparotomy was done by one of us (C. E. G.). After long and careful dissection with division of many dense adhesions, a diligent search failed to disclose any evidence of a common bile duct, except for a short distal segment which was located behind the duodenum. Three small irregular stones were found in this duct remnant. At the hilus of the liver a small duct approximately 3 mm. in diameter and 2 mm. in length was found making its exit from the liver substance. A small amount
of bile drained from the duct, but we were unable to catheterize this structure. It was decided to perform a hepatoduodenostomy. Accordingly, a small longitudinal incision was made in the superior wall of the duodenum, which had previously been freed by incising the peritoneum along its lateral border. The duodenum was then lifted and the margins of its opening in the superior wall were sutured to the undersurface of the hilus of the liver. This was sutured about the point of exit of the duct from the liver to give the effect of a sort of cup-like container beneath the duct opening.

The patient was not improved by the procedure. The jaundice persisted, as did the recurring attacks of chills and fever. It was our opinion that the Longmire procedure, namely, partial hepatectomy and anastomosis of the bile duct of the left lobe of the liver to the jejunum, was indicated.

On March 13, 1948, this procedure was accomplished. A modified inverted V type of subcostal incision was used. The triangular ligament supporting the left lobe of the liver was divided and the left lobe of the liver delivered into the wound. The lobe of the liver was compressed between the left index finger and thumb while the partial resection of the liver was accomplished. Through-and-through overlapping mattress sutures were used to control bleeding from the cut surface of the liver.

A bile duct was found of size sufficient to allow the placement within it of a number 14 French catheter. Liver tissue immediately adjacent to the duct was curetted away in order to leave 5 mm. of the duct protruding beyond the cut surface of the liver. A Roux Y loop of jejunum was utilized to make an end-to-end anastomosis between the jejunum and the bile duct. Care was taken to secure an accurate mucosa-to-mucosa anastomosis. The anastomosis was performed over a catheter and the catheter was brought out the jejunum in the Witzel manner.

Microscopic examination of the portion of liver removed showed the presence of a rather diffuse hepatitis. There was an increase in the connective tissue in many of the periportal areas and there was also a rather extensive inflammatory reaction present.

Fig. 5.—Serum bilirubin determinations before and after liver resection and intrahepatic cholangiojejunostomy.

On March 13, 1948, this procedure was accomplished. A modified inverted V type of subcostal incision was used. The triangular ligament supporting the left lobe of the liver was divided and the left lobe of the liver delivered into the wound. The lobe of the liver was compressed between the left index finger and thumb while the partial resection of the liver was accomplished. Through-and-through overlapping mattress sutures were used to control bleeding from the cut surface of the liver.

A bile duct was found of size sufficient to allow the placement within it of a number 14 French catheter. Liver tissue immediately adjacent to the duct was curetted away in order to leave 5 mm. of the duct protruding beyond the cut surface of the liver. A Roux Y loop of jejunum was utilized to make an end-to-end anastomosis between the jejunum and the bile duct. Care was taken to secure an accurate mucosa-to-mucosa anastomosis. The anastomosis was performed over a catheter and the catheter was brought out the jejunum in the Witzel manner.

Microscopic examination of the portion of liver removed showed the presence of a rather diffuse hepatitis. There was an increase in the connective tissue in many of the periportal areas and there was also a rather extensive inflammatory reaction present,
PARTIAL HEPATECTOMY

characterized by the presence of infiltration with polymorphonuclear leukocytes and with round cell infiltration.

The immediate postoperative course was a stormy one characterized by fever. A partial wound disruption required secondary closure on the twelfth postoperative day.

Bile was noted in the stool on the third postoperative day and has continued to be present. The patient's general condition has gradually improved and he has gained approximately 20 pounds in weight. The patient states that he feels better than he has since the onset of his original biliary symptoms. He has returned to full time work as a stationary engineer. The serum bilirubin determination has returned to normal.

SUMMARY AND CONCLUSIONS

1. The gravity of common bile duct injuries is emphasized and the commonly used methods of repair are briefly reviewed.

2. No one method of bile duct repair is applicable to all cases.

3. Cholangiojejunostomy with partial hepatectomy offers a method of re-establishing continuity of the biliary tract in some exceptionally difficult cases where restoration of continuity by other methods has heretofore been impossible.

4. One case treated by cholangiojejunostomy and partial hepatectomy is reported.

5. Regardless of the type of treatment used in re-establishing continuity, such patients are subject to the possibility of recurrent difficulty over a period of years.

REFERENCES


DISCUSSION.—Dr. Frank H. Lahey, Boston: I am sure that it is of value to all who have to deal with stricture cases, to be aware of the various methods that can be used, because anyone who has dealt with many of them will willingly admit that they are difficult, that they are often unsatisfactory and that, no matter what is done, eventually many of them get into trouble again. On the other hand, I believe we should present the results of our experiences to bear out what the author has stated; that is, any method that does not preserve the sphincter is not as good as one that does. It will be impossible in some cases to do an end-to-end anastomosis, as Doctor Cattell and I have tried to bring to everyone's attention. We are not sure whether or not we devised this, and we do not care. We do know that it is not recognized and utilized as a method as often as it should be, and we have urged its use on every occasion when we have discussed this problem.

We want to stress these things again. If a bile duct is injured it is not the common duct in most cases, it is the hepatic, the high hepatic that is injured. This means that that portion of the duct in the pancreas, behind the duodenum, is protected from injury and is