

INTRAHEPATIC CHOLANGIOJEJUNOSTOMY FOR BILIARY OBSTRUCTION — FURTHER STUDIES*

REPORT OF FOUR CASES

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ANASTOMOSIS OF one of the intrahepatic biliary ducts to the jejunum following a partial resection of the left lobe of the liver for certain extensive benign strictures of the extrahepatic biliary system was described in a previously published article.¹ The procedure was suggested for those cases in which the usual methods of biliary reconstruction had proved inadequate. Experimental studies and a report of a case in which this method was used successfully were presented.

Three additional patients have since been treated by this procedure and it is the purpose of this paper to review our experience with the operation.

TECHNIC

A V-shaped bilateral subcostal incision extending farther to the left than to the right, used in all cases, gave satisfactory exposure. Extension of the incision to the right of the mid-line permitted mobilization of the entire left lobe of the liver. Although all patients had been subjected to at least three previous right upper abdominal operative procedures, adhesions in the left upper part of the abdomen were not numerous and mobilization of the left lobe of the liver from the diaphragm and the surrounding structures was readily accomplished. The diameter of the intrahepatic duct isolated for the anastomosis was indicated by the size of the catheter which could be passed into the duct: Case 1, No. 14 French catheter; Case 2, No. 14 French catheter; Case 3, No. 20 French catheter; Case 4, No. 18 French catheter. Smaller ducts, of course, were present, but if the incision was carried deep enough into the liver to expose a major branch of the intrahepatic biliary system, a duct of the desired caliber was found to be available in these adult patients with chronic biliary obstruction (Figs. 1 and 2).

The major intrahepatic ducts lie in the inferior or caudal half of the substance of the left hepatic lobe, at times quite near the inferior surface. As the hepatic incision was carried into the middle third of the substance of the left

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lobe, a dense fibrous cord which contains a major branch of the intrahepatic biliary system was encountered. This fibrous cord was located without undue difficulty as it is much firmer than the surrounding hepatic tissue. Before dividing this structure, additional length of the duct for anastomosis was obtained if the cord was freed distally by curetting away the surrounding hepatic tissue. Since the fibrous cord, however, contains a branch of the hepatic artery and a branch of the portal vein, it was incised with caution. Bleeding from the artery and the vein must be controlled without encroaching on the

FIG. 1

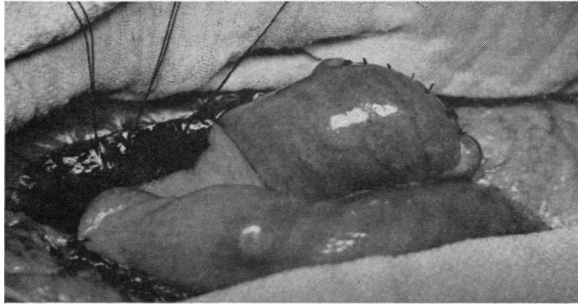
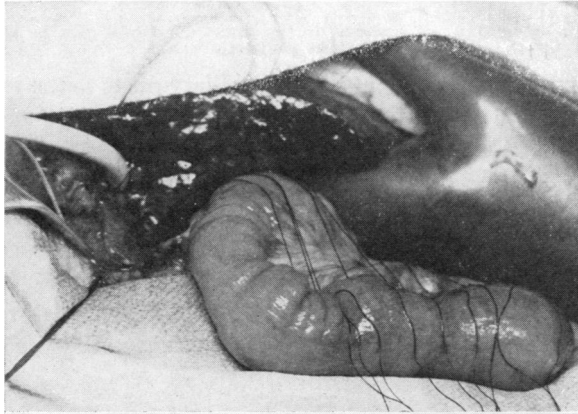


FIG. 2

FIG. 1.—Cut surface of left lobe of liver with catheter in intrahepatic duct. Roux type jejunal segment mobilized for anastomosis. Note position of duct opening immediately beneath the level of the anterior abdominal wall.

FIG. 2.—Anastomosis completed. Antimesenteric border of jejunum being sutured to superior surface of liver. End of catheter, which passes through the anastomosis, can be seen protruding into wall of jejunum.

lumen of the duct. For positive identification, a catheter was passed proximally into the duct and bile was aspirated before the anastomosis was begun.

A careful mucosa-to-mucosa anastomosis of the duct to the jejunum was greatly facilitated by the excellent exposure and accessibility of the end of

the duct provided by the technic. Instead of attempting to suture structures located deep in the hilar region of the liver, anastomosis of the duct in this procedure was performed just beneath the level of the anterior abdominal wall. As many as 14 interrupted 00000 silk sutures were placed about the circumference of the anastomosis for accurate approximation of the mucosal layers.

The length of one side of the wedge-shaped segment was determined by the depth of the selected duct from the anterior edge of the liver. The incision was continued in such a manner as to remove a segment of hepatic tissue so that the anastomosis might be readily performed and so that the intestine would not be acutely angulated when it was placed over the cut hepatic surface.

A rubber catheter passing from the duct into the intestine was, in the past, sutured into the anastomosis with catgut. It has been felt, however, that this is unnecessary, and that the catheter might become a source of difficulty at a subsequent time should it not be passed.

A Roux segment of defunctionalized jejunum was used in the later cases rather than the jejunal loop described in the original operation. This single limb facilitated the operative procedure and probably provided a more completely defunctionalized intestinal segment than did the jejunal loop with a proximal enteroenterostomy.

POSTOPERATIVE COURSE

A satisfactory explanation is not available for the marked rise in the serum bilirubin which occurred during the first postoperative week in three of these cases. The serum bilirubin returned to an approximately normal level within four weeks after operation in two cases but did not return to the normal range for two months in the other two cases. There was a moderate drainage of bile-colored fluid from the incision during the first few days after operation in all the cases, but such discharge stopped promptly after removal of the intraperitoneal drains. Daily elevations of temperature occurred in all the cases for at least two and a half weeks after operation.

Postoperative complications developed in two patients. A large intraperitoneal abscess, presumably resulting from a previous exploration, was inadvertently opened during the operation in Case 3. Subsequent drainage of five large intraperitoneal abscesses was required. In addition, a high intestinal fistula, which developed through a former operative scar, was treated by constant suction and it closed spontaneously. Severe, unexplained bleeding into the gastrointestinal tract, with repeated passage of tarry stools during the second and third weeks after operation, occurred in Case 4. Erosion of the jejunal mucosa by the catheter in the biliary-jejunal anastomosis was suggested as the cause of this hemorrhage. Repeated transfusions were given and the bleeding stopped spontaneously. Three months after operation this patient was readmitted to the hospital deeply jaundiced and died within a few hours. At postmortem examination, the cholangiojejunal anastomosis was widely patent and was well healed. There was free communication of the right and the

TABLE I

Case No.	Date Operation	Postoperative Complications	Survival	Remarks
1	4/2/1947	None	2 years	Well 22 months. Recent upper abdominal abscess and external biliary fistula which healed spontaneously. Severe cerebral arteriosclerosis. Biliary drainage adequate at present.
2	3/20/1948	Multiple intra-abdominal abscesses. High intestinal fistula.	13 months	Prolonged, difficult postoperative course. Occasional attacks of cholangitis. Now well. Has bile in stools. Serum bilirubin slightly elevated.
3		None	11½ months	Well since operation.
4	9/14/1948	Unexplained hemorrhage into gastrointestinal tract.	3 months	Slow recovery but jaundice cleared completely. Patient well until onset of fatal attack homologous serum jaundice.

left main intrahepatic ducts at the hilus of the liver. The extensive destruction of the hepatic cells seen in the microscopic sections of the liver was compatible with a diagnosis of homologous serum hepatitis, and this was considered to be the cause of death (Fig. 3). Evidence of a spreading cholangitis was not discovered. A brief summary of the four cases is given in Table I.

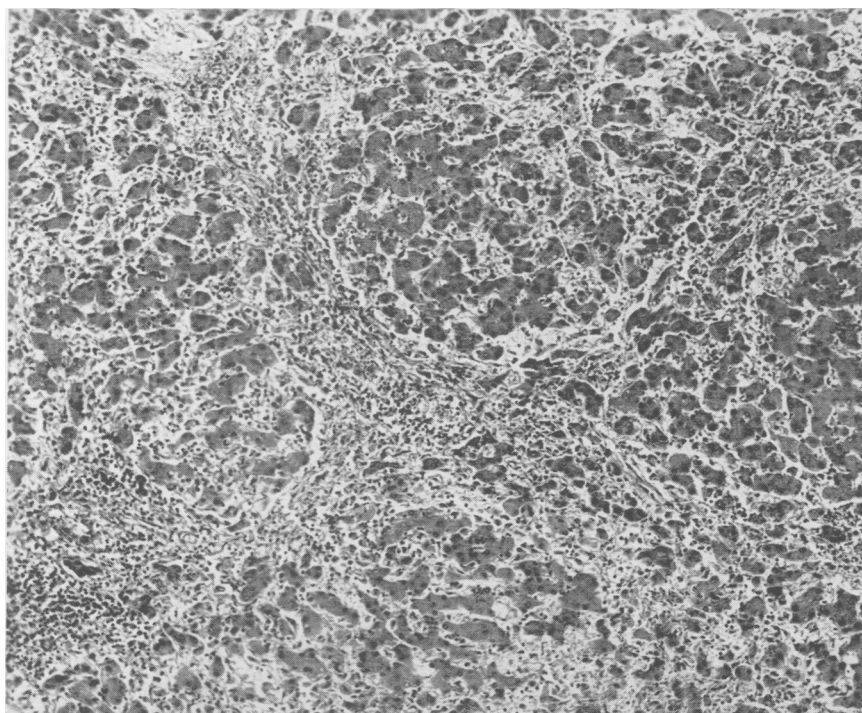


FIG. 3.—Photomicrograph of liver in Case 4 at the time of death, three months after operation, showing acute hepatic necrosis compatible with homologous serum jaundice.

DISCUSSION

Walters and Phillips² state that 20 per cent of patients operated on for repair of stricture of the bile duct will require another operation because of the recurrence of biliary obstruction. Lahey,^{3, 4} Cattell,⁵ and others have emphasized the difficulties encountered in secondary biliary repairs, such as extensive scarring in the region of the hepatoduodenal ligament, the obliteration of landmarks, and the destruction of the proximal end of the common bile duct or of the common hepatic duct.

Numerous methods have been devised for the treatment of these difficult recurrent cases of biliary stricture; all, however, have involved reexploration of this densely scarred and distorted hepatoduodenal region in which there is the ever present danger of serious injury to the portal vein or the hepatic artery. When the upper end of the common hepatic duct is extremely short or nonexistent it is difficult to perform an accurate mucosa-to-mucosa anastomosis in this area, regardless of the method used.

Our experience with cholangiojejunostomy was encouraging in all four of the cases in which the procedure was attempted. Mobilization of the left lobe of the liver was accomplished without undue difficulty. Bleeding from the cut surface of the liver was satisfactorily controlled by the mattress sutures described in the original technic.¹ The size of the intrahepatic ducts, the thickness of their walls, and the accessibility of the ends of the ducts made it possible to perform accurate mucosa-to-mucosa anastomosis with the jejunal segment in all cases. Other surgeons^{2, 3} have successfully utilized the procedure in instances of extensive extrahepatic biliary obstruction.

It is not known what result may be expected to follow this operation if the obstruction in the biliary system extends high enough to block the communication of the left and the right main intrahepatic ducts.

However, Lahey⁴ reported successful anastomosis by Doctor Cattell of the left hepatic duct when it was impossible to find the right because of the depth of the scarred duct within the liver. Atrophy of the right lobe and enlargement of the left occurred with adequate maintenance of hepatic function. If only a portion of the intrahepatic biliary system is to be drained, our experience would suggest that partial hepatectomy and cholangiojejunostomy be considered.

Since our unsuccessful experience with this procedure in infants with congenital biliary strictures,¹ the method has not been further pursued in such cases.

SUMMARY

Intrahepatic cholangiojejunostomy with partial hepatectomy was used in four adult patients in whom extensive benign biliary obstruction recurred as a result of failure of the usual methods of biliary reconstruction.

In all cases it was technically possible to perform a satisfactory cholangiojejunal anastomosis. In the selected cases in which the procedure was indi-

cated it had three advantages over the usual methods of repair: (1) Less scarring and fewer adhesions were encountered in the left upper part of the abdomen than in the right. (2) After exposure of the intrahepatic duct its superficial position in relation to the anterior abdominal wall facilitated the performance of an accurate anastomosis with the jejunum. (3) There were not any vital structures to be avoided in the immediate operative area, such as the portal vein and the hepatic artery.

One patient has been entirely well for 11½ months following operation. Two patients have been greatly improved (one for two years, the other for 13 months) but have had intermittent difficulties related to the abnormality of the biliary tract. One patient died three months after operation as a result of homologous serum hepatitis. He had made a complete recovery from the operation and was well at the time of onset of the fatal illness.

The procedure should be considered in certain cases of extensive destruction of the extrahepatic biliary system if previous reconstructive procedures have failed.

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DISCUSSION.—DR. RICHARD B. CATTELL, Boston: Mr. President and Members of the Association: Dr. Walters has had a large experience in the repair of traumatic strictures of the bile ducts and as a result his report today is of particular interest to all surgeons interested in this problem. The most impressive thing has been the improvement of results in his last series of cases and particularly during the past year, for which he is to be congratulated.

There are two general operative methods that can be utilized to repair common duct strictures. The first is the anastomosis of the proximal biliary duct or ducts to some portion of the gastrointestinal tract. Dr. Walters has employed this in approximately 80 per cent of his cases and prefers an anastomosis to the duodenum. The second method of repair is the anastomosis of the proximal duct or ducts to the distal duct, thus restoring the continuity of the biliary tract with preservation of the sphincter of Oddi.

It seems to us after the experience that Dr. Lahey and I have reported on several occasions with the treatment of over 250 of these strictures that it is possible in most instances, irrespective of the amount of damage or amount of duct removed, to accomplish a duct to duct anastomosis. As a result of this the number of cases in recent years in which we have accomplished repair by anastomosis to the gastrointestinal tract has markedly decreased. As Dr. Lahey reported before this Association last year, there is enough of the duct within the pancreas that can be dissected up and utilized to bridge a wide defect.

Comparing our experience with that of Dr. Walters, we find that our repairs are about the reverse of his in that we do duct-to-duct anastomosis in about 80 per cent.