

tion, although our series of patients with repair of this type is too small to allow conclusions as to results.

Extreme effort should be made to find the distal stump of common duct which allows end-to-end anastomosis in practically all cases, thus preserving the sphincteric action of the ampulla of Vater.

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DISCUSSION.—DR. ALFRED BLALOCK, Baltimore: Dr. Cole is to be congratulated on his excellent results in this type of difficult surgery. I arise to speak briefly of a method which Dr. William P. Longmire of Baltimore has developed in the laboratory, which has been used by him on several patients. Dr. Longmire would be the first to insist that this method should not be used except in those instances in which the more orthodox procedures, as described by Dr. Cole, have been attempted.

These patients usually have had repeated operations attempted. An incision is made which approaches the left lobe of the liver, thereby avoiding troublesome adhesions which are usually present on the right. Mattress sutures are placed in the left lobe of the liver and a wedge-shaped rather large piece of liver removed until one encounters a dilated duct which is seen at this point. A small area of liver surrounding the duct is removed. One may bring up a loop of jejunum and suture the mesenteric border of the jejunum to the lower edge of this denuded liver segment. An opening is made in the jejunum and an anastomosis is made between this opening and the end of the dilated duct. This shows the completed procedure with the jejunum sutured to the liver.

The first such operation was performed by Dr. Longmire about 14 months ago on a patient who had a traumatic stricture of the common duct. Previous operation had been attempted on several occasions. There had been considerable elevation of serum bilirubin and this fell during the postoperative period, not entirely to normal but it approximated normal. The jaundice disappeared.

Dr. Longmire has used this procedure on three patients to date and the results are encouraging. In a patient operated upon last week the dilated duct on the left was really tremendous—at least a centimeter in diameter—and a very good anastomosis was performed. He has attempted it on several patients who have congenital atresia of the bile ducts, but in cases thus far he has not found a suitable dilated duct.

DR. FRANK H. LAHEY, Boston: I think it is well worth while, even though we have all discussed strictures of the bile duct again and again, to go over the subject again and again because everyone's results with this condition are far from satisfactory. I do not care what method you use to reconstruct injuries to the bile duct, they are in general makeshift procedures. A great many of them do not work or work only for a time and have to be done over. It makes no difference what type of tube you put in; if there is a defect in the duct and you do not get the ends together, most of them will eventually plug, require removal and the insertion of another tube. These operations are trying and tedious, and one does not have the gratifying reward that so often goes with other types of trying and tedious surgical procedures. Many of these patients eventually become jaundiced and get into trouble again.

For these reasons it is, I believe, valuable to discuss the various methods and, as in previous discussions, we wish again to speak of one which has given us the best results of all types of repair of these ducts. In any repair of an injured bile duct we have learned that one of the most important factors is the preservation of the sphincter of Oddi. Without the sphincter there will be a high percentage of cases that will have frequent ascending infection and undesirable jaundice and chills.

The other factor which we have learned in an experience now with more than 200 of these cases of duct repair, is that to get a satisfactory result one must have mucosa-to-mucosa anastomoses. We have learned that the introduction of tubes is a truly makeshift procedure and that while, as stated above, many of them will work, in spite of what has been said about them many will fail over a long period of time.

The principal method which Dr. Cattell and I have developed and discussed at various meetings is the demonstration and liberation of that portion of the common duct which runs through the head of the pancreas and is behind the duodenum where it is always protected from injury. We have learned from operations on the head of the pancreas and from dealing with many duodenal ulcers adherent to the common duct, that by rolling the duodenum to the left and splitting the head of the pancreas, a long section of uninjured common duct can be found. It is possible to so mobilize this that in many of the cases, the freed lower end of the common duct can be brought up to where it can be approximated without tension to the lower end of the hepatic duct, and a direct mucosa-to-mucosa, end-to-end anastomosis can be done. In constructing these ducts it is necessary to support the anastomosed duct and to ensure patency of the tube while accurate healing is taking place. For this reason we have introduced a T-tube and left it in place for several months. It is important that this T-tube not be introduced through the suture line but either above or below, so that one arm passes through the anastomosis, and when it is withdrawn it leaves no defect in the suture line. This operation is not applicable to all cases, because many of the patients have been operated on several times and so much hepatic duct has been destroyed that a satisfactory upper end for anastomosis cannot be found. When it is applicable it is, in our opinion, the most useful and most dependable of all methods in terms of long-standing patency.

Another thing that we have learned about repair of injured ducts is that they should be attacked promptly. We used to wait until the patient had developed external sinuses, but we have now learned that the ideal time is while structures are still soft, pliable and movable, and that many times better results can be obtained then, than when, as a result of delay, cicatrization, fixation and distortion of the anatomy have occurred.

We would strongly urge that if repair is to be undertaken on injured ducts, that is, ducts that are known to be injured, it be done as soon as possible after operation. The operation is messy and oozy, and the structures are much more satisfactory to deal with at this time, but it will make possible better restoration of the ducts than will be possible at a later time.

As to the tubes themselves, I do not believe any interpretation of what the end results are will yield dependable figures unless they are observed carefully over a considerable period of time. Many of them drain satisfactorily for a year or two, only to plug eventually.

Personally, I do not like inflexible tubes such as vitallium. In my opinion they have no greater likelihood of maintaining patency than do rubber tubes and they have the great disadvantage of producing pressure and not adjusting themselves to the tortuous tracts into which they must often be inserted. No matter what type of tube we have used, many of them have had to be taken out and another tube inserted within three years because of their becoming plugged with bile salts.

It is, of course, trite to say that if one thinks only of the number of gallbladder operations done each year in the country, one realizes the exposure to the possibility of duct injuries and the very distressing surgical complications which go with them. It is so rightly said by everyone discussing this subject that the best approach to it is to teach that surgery of the biliary tract is dangerous surgery and must be done with good exposure, under good light and with accurate anatomic demonstration of every detail.

DR. HERMAN E. PEARSE, Rochester, N. Y.: I think it is interesting to note that Elliott, in a presentation before this Association found 26 per cent successful results. Now, though we have different methods and personal preferences our score has risen to approximately 80 per cent. That is worthy of comment. I am inclined to agree with Dr. Lahey that the best way to repair the damage is by direct end-to-end anastomosis. If one can reconstitute the patient's anatomy the way God made him, one will have better physiologic function. However, I have no quarrel with the Roux type of procedure and use it when necessary.

Contrary to the opinion of some, I have no stock in vitallium. I have tested out most of the available materials and have found that vitallium is the best for this purpose. It has faults and so I am searching for a better material.

The final point is that in the Roux type of biliary anastomosis, for which we should give credit to Allen Whipple for popularizing, the best length of the anti-peristaltic loop has never been accurately determined. Dennis used a 24-inch loop. I was inclined to use a 10- or 12-inch loop. These patients were studied under the fluoroscope and it was found that the barium would reflux up that loop approximately six inches. In spite of this, some develop cholangitis with a ten-inch loop. Recently, in conjunction with Dr. Radakovich, we have found in dogs that the minimum length for protection is 12 inches.

DR. WARREN H. COLE, Chicago (closing): I wish to thank the discussants for their valuable contribution to this subject today. I believe the method presented by Dr. Blalock and Dr. Longmire has splendid possibilities and should be tried when the duct cannot be found at the hilus. About a year ago I tried a modification of their

procedure on an infant with congenital atresia of the bile duct, but even though I amputated the entire left lobe I could not find a dilated duct to use in any sort of anastomosis.

Dr. Lahey has emphasized the importance of obtaining a mucosa-to-mucosa approximation whenever possible. However, on certain occasions a true anastomosis of this type cannot be accomplished.

In closing, I wish to emphasize that we should find the distal end of the common duct if at all possible, because the sphincter of Oddi is an important structure which the surgeon cannot duplicate.