

TABLE 2. Results of Hepatocholeangiojejunostomy in 22 Patients

| | Pts. | % |
|-------------------------|------|----|
| Functioning anastomosis | 16* | 73 |
| Recurrent stricture | 5 | 23 |
| Operative death | 1 | 4 |

* 7 patients followed over 5 years

4 patients followed over 10 years

was one postoperative death. Reoperation for recurrent stricture was necessary in five patients.

Hepatocholeangiojejunostomy with a Roux-en-Y jejunal segment and the "fish-mouth" technic of managing the proximal hepatic duct is an effective operation for treatment of benign hepatic bile duct stricture when a mucosa-to-mucosa anastomosis cannot be done or fails.

References

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DISCUSSION

DR. J. ENGLEBERT DUNPHY (San Francisco): We have recently reviewed just under 90 common duct reconstructions over a period of nearly 40 years, many of these going back to the days of Dr. Glenn Bell, and we have found that the best results occurred in patients that had Roux-Y reconstructions.

Similarly, the results of hepaticojejunostomy, not done precisely as Dr. Kirtley described it, but by buttressing the jejunal loop against the liver, without proper end-to-end mucosal sutures—the results here also were superior; so much so that we believe that the ideal form of reconstruction today, except in the acute, immediately identified injury, where end-to-end does seem to be satisfactory, is to proceed with a choledocho- or hepaticojejunostomy.

I have a feeling that healing in the biliary tract is quite different from almost any other site, and that the tendency to stricture formation develops over a matter of many years.

Several of our patients had their stricture develop 15 years or longer after what had been a perfectly satisfactory repair. In one case the stricture developed 30 years after a choledochooduodenostomy.

The advantage of the Roux-Y repair is that one can approach the second operation very much more easily than in any other type of repair. In our own experience when stricture has developed we have opened the jejunal loop, very much as was shown here by Dr. Riddell, and then with a probe in the stricture site have cut down on the stricture. Very often this stricture is just a thin membrane, and it can easily be converted, like a Heineke-Mikulicz, into a wide-open lumen.

I believe, however, no matter how we do these operations and how carefully we perform them, that the patients are never entirely free from the danger of late recurrent stricture.

When cholangitis develops, it is very tempting to treat it with antibiotics. There is immediate improvement. The patient is well for a little while—but has more trouble later. Particularly in younger patients, we are asking for the development of biliary

TABLE 3. Complications after Hepatocholeangiojejunostomy in 21 Surviving Patients

| | Pts. | % |
|---------------------------------|------|----|
| Recurrent stricture | 5 | 23 |
| Cholangitis without operation | 2 | 10 |
| Upper gastrointestinal bleeding | 4 | 19 |
| Stress ulcer | 2 | |
| Esophageal varices | 2 | |
| Subhepatic abscess | 1 | 4 |

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cirrhosis, portal hypertension, and a relatively short-life span.

For this reason we feel that when cholangitis—repetitive cholangitis—occurs, it must be regarded as a sign of stricture, and requires re-exploration, which often can be carried out in a very successful and gratifying way. I have a suspicion that the reoperation in which the slit is made in the anterior wall of the duct only, so that the entire posterior wall is covered with mucosa, will probably have a lessened incidence of re-stricture formation than a complete circular closure.

DR. WALTMAN WALTERS (Rochester): I am very happy to discuss this paper, particularly after following Dr. Dunphy's excellent discussion, with which I agree with one exception. I will speak to that in a moment, at the termination of my 2 or 3 minutes of discussion of Dr. Riddell, Dr. Sawyers, Dr. Scott and Dr. Lane's excellent presentation.

There's no need to reiterate what has been said in the program's abstract; however, I have underlined three parts of it which are very important and worthy of favorable comment.

In the first place, it is to be noted that we have heard a report of 20 or 21 patients, carefully studied, operated upon for stricture of the common or hepatic—common hepatic—bile ducts, over a period of 20 years; and this is, to my knowledge, one of the longest periods of follow-up of a group of such cases.

Secondarily, the low mortality rate of 4% is admirable, and this, indeed, as we look at this entire picture, is a thing to be remembered, because anyone that can do any type of operation for stricture of the common or hepatic bile ducts and obtain 87% good or excellent results is doing a fine job, no matter what method of biliary intestinal anastomosis is used. If I might be allowed a few seconds to make a few philosophical remarks concerning varying operations by surgeons for the same surgical lesion, it would be that experience in the choice of different methods is frequently the result of broader experience and better results in the hands of each surgeon, even those working in the same hospital or medical group.

Frequently the comparative ease with which one particular

surgeon does the operation he chooses to use at the lowest risk and with the best results is the determining factor. The important thing, I believe, is to be able to use that method which meets these requirements.

The information and the data presented to you today are practically identical with that which I reported on several occasions for many years in a follow-up of two series of cases that I had operated on, performing biliary duodenal anastomosis and duct to duct with a follow-up in the first group of from 1 to 5 years; the second, from 5 to 25 years. Moreover, the conclusion drawn, that postoperative cholangitis, with either method, was the result of obstruction at the anastomoses, and not due to intestinal biliary reflux, was borne out in my cases.

Choledocho- or hepaticoduodenostomy or duct-to-duct anastomosis can be done without opening into the general peritoneal cavity, which is not the case when one does the Roux-en-Y biliary jejunal anastomosis. If the patient has been operated on on previous occasions—and sometimes many occasions, as reported today—to me it is much easier and safer to approach the stricture of the common or hepatic bile duct without opening the general peritoneal cavity, which this can be easily done by dissecting close to the under surface of the liver until one approaches the hepaticoduodenal ligament.

Moreover, in most of these cases the duodenum, and (sometimes the hepatic flexure of the colon, the stomach) has become adherent to the area; and this being the case, it is easy to do choledocho- and hepaticoduodenostomies.

With recurring strictures and very little common duct—or common hepatic duct—adjacent to where it divides into the hepatic ducts remains, even there it is a better and safer procedure, because the incidence of cholangitis is no greater than when a defunctionalized loop of jejunum is used, for if bile leakage occurs—and it does occur at times—or where there is bleeding or infection, the discharge of these fluids drain to the outside, rather than into the general peritoneal cavity with little harm resulting.

The advantage of having this occur in this instance was demonstrated to me several years ago when I had to disrupt a double hepaticoduodenostomy which I had performed to control the hemorrhage from the right hepatic artery which had been injured at the same time the common duct was evulsed by the previously operating surgeon.

So, disrupting the anastomosis quickly, because the abdomen was filled with blood and the patient practically in extremis, I quickly sutured the small linear opening in the hepatic artery. A similar running suture was used to close the opening in the duodenum leaving the ends of the two hepatic ducts open. A No. 28 French rubber was inserted as a drain and allowed to remain in place for 28 days, shortening it when bile appeared in the stools, which increased with lessening of external bile drainage which by the 28th day had completely subsided.

The incision healed but a very large hernia developed as I had placed only a few sutures only to partially close it. The first year, as frequently happens in my experience, infrequent episodes of mild cholangitis developed but they then disappeared. (I have seen this happen many times in other cases) and the patient did not have further evidence of biliary obstruction.

I repaired the hernia some years later. This case I reported I believe 2 years ago, when I discussed Dr. Colin Thomas's interesting paper on the advantages of choledochoduodenostomy. (I had reported the case in detail previously.)

Presumably the two hepatic ducts had joined to the duodenum, and probably as a result the pressure of that large catheter against it made a little opening in it. This is a very important case in all respects because it shows how valuable biliary duodenal anastomoses are, because I am sure that if the opportunity is there for bile to enter the duodenum or the attached jejunum, it will do so.

I would like to make one final point, and that is the dilatation of a stricture area in the common bile or hepatic duct will be unsuccessful because the fibrotic strictured area will again contract and obstruct unless held open by an in-dwelling prosthetic

device, which, however, will eventually be obstructed—surrounded by bile pigment debris—or pass from the ductal area into the attached intestine.

PROFESSOR J. PHILIP SANDBLOM (Lausanne, Switzerland): I wish to stress the importance of differentiating between absolute indications and relative indications in biliointestinal shunts because of the incidence of cholangitis.

Several years ago, I studied the matter clinically and experimentally. In about 800 cases of shunts between the biliary and the digestive tract, the incidence of frank cholangitis was about 20% provided that the patients were followed for at least 10 years. Authors who have followed their patients 5 years or less will give a far smaller percent of cholangitis.

Experimentally, there is no way of avoiding chyme getting into the biliary tract after shunt operation. When you have bypassed the sphincter or Oddi, chyme will always enter, even if you do very long jejunal Roux-en-Y and plicate it.

It is true that you get frank cholangitis only when you get strictures, and the point is to avoid getting strictures, but this is hard, as Dr. Dunphy pointed out. There are parts of the human body that tend so much to stricturing as anastomoses in the biliary tract.

I would say I could find about 20 instances in which, in autopsies many years after shunt operations, all showed cholangitis, even if only four or five patients had had clinical signs of frank cholangitis. The others had it without symptoms, but several had multiple small liver abscesses, and had been going downhill for a year or two. A patient can be pretty ill with liver disease without having frank cholangitis after a shunt operation.

Furthermore, we have four patients with biliary cirrhosis after biliary shunt operations, who had to undergo portacaval shunts for exsanguinating hemorrhage.

I think there must be strict indications for those shunt operations, just as in the material that was presented here. I was very impressed with the results, and congratulate the authors. I just wanted to warn those who perform those shunt operations on relative indications. A circumstance that saves so many of those patients is that if the normal outflow tract remains open, even somewhat restricted, the new anastomosis will shut down in a year or two.

DR. WILLIAM S. McCUNE (Washington, D. C.): I, too, would like to congratulate Dr. Riddell and the co-authors of this excellent paper on the good results which they have had in a very difficult situation. Dr. Frederick Coller used to say: If anyone has a stricture of the common bile duct and lives long enough, he will die of his disease, due to another stricture; and if he dies, he will have had an average of seven operations before death.

It seems to me that strictures are less common than they used to be. I think perhaps we are being a little more careful about the technic of simple gallbladder removal, and I hope that it is having an effect.

It is difficult to follow such distinguished discussors, but I would like to say a word about the 23% of patients who had failures after Roux-Y choledochojejunostomy. These patients often have had several operative procedures, and often the situation has become desperate.

A 45-year-old woman was operated upon in 1955 in southern Illinois, had her gallbladder removed, developed a stricture which was repaired unsuccessfully, and was referred to Dr. Warren Cole in Chicago. Dr. Cole did a Roux-en-Y, direct anastomosis with the duct, put catheters up into the hepatic ducts, and, as happens to almost everyone eventually, she moved to Washington.

When she came to Washington, I took care of her for Dr. Cole for a while, and finally removed the catheters. The operation was successful until about 1967. At that time she began to have recurring attacks of chills, fever, and jaundice—obvious cholangitis; obvious recurrence of the stricture. So we operated upon her, [slide] and we performed a percutaneous cholangiogram, first described, I think, by Dr. Glenn.

It is not a very good picture, but I think you will see that this

is the Roux-en-Y; these are the ducts in the liver; and there is about an inch and a half in which, directly in the liver, there is no communication at all with the Roux-en-Y except a tiny sinus tract.

She underwent operation in which there was no duct visible at all. We placed a size 18 catheter through the Roux-Y, up into the hepatic ducts in the liver, since the other ducts were not large enough for a Longmire procedure.

We left the catheter in place for 6 months, and then removed it. In 1969 the whole picture recurred again. We operated on her again and found exactly the same situation. We finally decided upon a makeshift procure which has been useful in her care and may be useful to someone else in this situation.

[Slide] We decided to put another catheter up into the duct, since there was no connection between the ducts high in the liver and the Roux-Y. This is a size 18 latex catheter, and extending up into it is a polyethylene tube which enters the tube here, [indicating] but extends all the way up to the top. This tube was sutured in place, and the polyethylene tube was brought around under the skin in the right lower quadrant.

[Slide] In 1970 she again developed chills and fever, and by a simple procedure under local anesthesia the polyethylene tube was brought out, was irrigated, and a cholangiogram was performed.

[Slide] This shows the picture in 1972, when she again developed the same symptoms of cholangitis, elevated alkaline phosphatase, and so forth; and we again irrigated the polyethylene tube with success.

It seems to me this method may have some value in keeping stints open; and may be improved by the use of good polyethylene tubing with a vitalium catheter.

We had a great misfortune, in that the catheter slipped out, and finally came into the colon, where it was removed; but I think that was because of our own error in not suturing it more firmly in place. Each time we approached the tube, it was completely blocked. Each time, by irrigation under simple local anesthesia, we were able to get it open again. She has no cirrhosis, and at the present time is doing well.

DR. GILBERT S. CAMPBELL (Little Rock): I did not realize what a sense of humor Dr. John Sawyers had. I shook hands with him, and he handed me his manuscript, and asked me to discuss his paper. Obviously, this is not my field. Some people will wonder whether I have one; but to follow Dr. Dunphy, Dr. Waltman Walters, and so forth—I am going to change my discussion a bit. It is going to be sort of a meringue, very light and fluffy and not a whole lot of substance.

[Slide] This is the best we could do on this slide. This is a graphic illustration of an operative procedure that was committed on a lady in Arkansas. He used a 9 iron, I think, because ultimately, when we saw her, the gallbladder was gone. That he did do. The common duct was gone, and both hepatic ducts were cut off flush with the liver, and he took off the lateral wall of the second portion of the duodenum. It's hard to get it all out any easier than he did. He just took what he could, you see. That is why I think this slide shows it better than anything.

Then she went to a surgeon who did a feeding jejunostomy and put in sumps, and ultimately, when her physical status changed—I think her wallet was empty—she came to us. This was quite a problem in reconstruction.

But having two smart friends, Tom Shire and Alan Thal, [slide] here is what we did. I was unaware of Dr. Kirtley's work. We used what I thought was a live sucker, an isoperistaltic jejunal limb, and we said this was like a catfish mouth sucking on a hepatic duct. This was used as an onlay patch graft, as Thal

has recommended in the esophagus, to reconstruct the duodenum.

This was done 4½ years ago, and she has responded quite well; it just shows that if there is a will there is a way.

DR. R. K. GILCHRIST (Chicago): I only wish to speak briefly because no one has talked about the acute problem.

The first time a young man is seen who was operated upon 50-odd days ago with bile pouring out of a 2-inch-wide sub-costal incision that is Staph positive, having chills, almost ready to be buried without embalming, the first thing to do, of course, is to divert the bile. There is a very simple procedure, at least it has worked for us, under local, if needed. With such a wound you can often reach the liver without any trouble. If you will simply run your finger over it, you can feel where these dilated bile ducts are; simply inject a 20 needle; when you get the duct, enlarge it and put in a catheter; and if you think you need it on the other side, try the same.

This will allow the bile to be diverted, because as all of these instances have shown, most are almost completely obstructed distally. This procedure allows the patient to get back in shape and get rid of his infection; in this one case it took over 2 months.

Reconstruction can be done as described by Dr. Riddell, and I agree with everything he said.

Ten years later, after operation, this patient developed the usual stones in his liver, and it's a very simple thing, as Dr. Dunphy says, to simply go down on this. That is one of the real tough operations you do easily, because you just open the front of the Roux-Y loop, and you are right on the stricture. You cut out a V, or whatever you wish, to be sure you do not have the same stricture recur. Eight years later it may recur, but again you can do it very easily.

My point is that in the acute infection that looks like an impossible mess, this little maneuver will get you out of trouble, so you can come back and fight when you are in better shape.

DR. CARL E. LANE (Closing): The difficulty of this problem is attested to by the great variety of ways in which this problem has been approached.

Dr. Dunphy, we certainly appreciate hearing about your approach to biliary strictures and support of hepaticojejunostomy. I think that it is of interest that you have seen some late strictures; up to 15 years from the time of the initial procedure. The Lahey Clinic has reported that 90% of their strictures occurred within 3 years of repair. Although most of the strictures we have followed occurred fairly soon after repair, a few became clinically evident a long time postoperatively. This serves to emphasize that long-term follow-up of these patients is essential.

We also appreciate Dr. Walter's comments and wisdom in regard to this problem. We agree that cholangitis is always an ominous sign of recurrent obstruction and that subsequent reoperation is usually indicated. However, we have had two patients who developed chills and fever suggestive of cholangitis after stricture repair but rapidly responded to conservative management without further episodes of cholangitis. Because they have continued to do well they have not undergone reoperation. Such patients need to be followed very closely for evidence of further episodes of cholangitis as this would strongly indicate that significant stenosis exists.

Dr. Sandblom, we would also like to express an appreciation for sharing your vast experience with us.

In general, we feel that this operative procedure is a useful tool in the armamentarium of the surgeon when faced with the difficult problem of high hepatic duct stricture, and when a mucosa to mucosa anastomosis is not feasible.