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LATE COMPLICATIONS WITH GALLBLADDER CONDUIT BILIARY RECONSTRUCTION AFTER LIVER TRANSPLANTATION¹

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The preferred techniques for biliary tract reconstruction with liver transplantation are duct-to-duct anastomosis over a T-tube stent or anastomosis of the graft common duct to a defunctionalized Roux limb of jejunum (1–3). A more complex but occasionally useful procedure is the gallbladder conduit operation, which was recommended by Waddell and Grover (4) for use in liver transplantation and adapted by Calne (5) for this purpose.

In our own experience with almost 2000 liver transplantations, the Waddell-Calne option for biliary reconstruction has been exercised on only 10 occasions. In most of the 10 patients (Table 1), multiple previous operations had caused extensive scarring, and/or there had been the loss of a large portion of the small bowel, either from construction of multiple Roux limbs or because of extensive intestinal resections for other reasons. The use of the gallbladder conduit under these circumstances either obviated the need for extensive dissections, permitted the use of a short residual Roux limb, or allowed both advantages.

The biliary reconstructions were performed exactly as described by Calne (5). In essence, the donor common duct is anastomosed to the base of the donor gallbladder (Hartman's pouch) and the fundus of the gallbladder is anastomosed to the recipient bowel or to the recipient common bile duct. The proximal limb of a T-tube is passed through the choledocho-cholecystostomy anastomosis and the distal T-limb is passed through the anastomosis of the gallbladder fundus to the intestine or recipient common duct. The T-limb of the T-tube is brought through the gallbladder wall to the skin (Fig. 1).

Eight of the 10 patients survived chronically after operation and have been followed for 6 months to 6-½ years. The other two died after 3 and 4 weeks. The bile duct reconstruction was not a factor in their deaths. Of the 8 who are alive, 4 developed biliary tract stones, sludge, or strictures, and usually all 3 (Table 1).

A typical late complication is shown in Figure 2. The stricture occurred at the site of the anastomosis between the donor duct and the gallbladder. The stones were found in the donor duct, the gallbladder, or both places (Fig. 2). Reoperation was required in each instance with conversion to a choledochojejunostomy 0.3, 1, 3.5, and 5 years after the transplantation. The symptoms leading to operation were life-threatening in 3 patients with severe cholangitis. The fourth patient had silent obstructive jaundice. Reoperation was successful in all 4 cases.

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By 1974, the devastating effect of biliary tract complications after liver transplantation had been recognized and the need for improved techniques was obvious (6). The options settled upon in our program were either choledochojejunostomy or choledochocholedochostomy with a T-tube stent (1–3). The alternative technique of reconstruction with a donor gallbladder conduit has the advantages of providing a double passage of bile from the new liver via the common duct and cystic duct, as well as easy access for postoperative irrigation through a carefully placed T-tube. In addition, dangerous dissections and loss of additional jejunal length can be avoided in patients with multiple previous operations. With this method, the rate of complications in the Cambridge program was substantially reduced (7).

However, it has not been appreciated that sludge and stone formation would be a common late complication, particularly in pediatric recipients. In our small series of only 10 patients, reoperation became necessary as early as 3.5 months after transplantation, and as late as 5 years. The potential hazards as well as the inconvenience inherent in this method of biliary tract reconstruction should preclude its use except for those specific indications already mentioned.

In summary, the Waddell-Calne method of biliary tract reconstruction using a gallbladder conduit was associated with a 50% incidence of late biliary tract sludge or stone formation, with obstruction and frequent cholangitis. This procedure should not be used for the biliary tract reconstruction of liver transplantation except under extremely specific and very rare circumstances.

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FIGURE 1.

Biliary reconstruction with a gallbladder conduit. The T-tube passes through the proximal and distal anastomosis and out through the gallbladder wall to the skin.

FIGURE 2.
Transhepatic cholangiogram 5 years after transplantation and biliary reconstruction with
gallbladder conduit.

TABLE 1

Complications of gallbladder conduit biliary reconstruction

OT ^a No.	Age at transplantation	Date of transplantation	Multiple previous operations	Complication	Time to revision	Status
235	45	8/8/82	Yes	No complication	No revision	Alive and well
250	3	8/22/82	Yes	Gallstone/cholangitis	5 Years	Alive and well
768 ^b	22	10/5/88	Yes	No complication	No revision	Died 3 weeks postop.
1277	2	10/28/87	Yes	Gallstone/cholangitis	1 Years	Alive and well
1305	44	10/20/87	No	No complication	No revision	Alive and well
1321	20	12/8/87	Yes	No complication	No revision	Alive and well
1371	1½	1/17/88	Yes	No complication	No revision	Alive and well
1402	3	2/13/88	Yes	Sludge/cholangitis	6 Months	Alive and well
1601	54	7/6/88	Yes	Increased liver enzymes/gallstone	3.5 Months	Alive and well
1732	53	10/11/88	Yes	No complication	No revision	Died 9 weeks postop.

^aOT, orthotopic transplantation.

^bRetransplantation—first transplantation was 4/21/86.