Accidental Lesions of the Common Bile Duct at Cholecystectomy

II. Results of Treatment

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Sixty-five cases of accidental lesion of the choledochus at cholecystectomy reported from 51 Swedish hospitals to the Patients' Insurance Syndicate in Stockholm 1975–1981 were studied. The results were evaluated as to the time of detection and the primary surgical repair done. Fifty-five of the 65 lesions were detected and repaired at the cholecystectomy and ten were detected and repaired the first 10 days after the primary operation. In 38 of 55 lesions detected before surgery, an end-to-end choledochostomy was performed. Good results without further surgical intervention were achieved in 22%. The 17 other preoperatively detected lesions were treated with choledocho/hepaticoenterostomy, and good results were achieved without further surgical intervention in 54%. Of the ten patients in whom the lesions were detected after surgery, three were reconstructed with an end-to-end choledochostomy; all of these developed obstruction that led into further reoperations. In the remaining seven patients the lesions were repaired within 10 days with a choledocho/hepaticoenterostomy; three of them did not require further surgical intervention and four had to be reoperated. There was no mortality at the first repair, but two cases of hospital mortality at reoperations. However, the morbidity have been substantial for patients with as well as without obvious further surgical complications. The results indicate that in this selected group choledocho/hepaticoenterostomy should be the procedure of choice. However, the accumulated rate of biliary strictures increased with time, which requires a considerably longer follow-up to know the end results of this of avoidable complication to "a straightforward cholecystectomy."

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THE REPORTED INCIDENCE of reoperation for common duct injury at cholecystectomy is low: in early reports from Scandinavia, the frequency has been between 1 in 327 and 1 in 508.[1-3] White and Harrison[4] found 47 operations reported for biliary tract disease of a total of 22,255 (0.2%). Borgström[5] reported 5 operations for benign gallbladder disease of a total of 5656 (a frequency of 0.09%) for the years 1940–1958. Only Lord Smith of Marlow has reported on a large personal experience on this subject, in a review of 1554 reoperations.[6] With this single exception, the low incidence of this serious complication gives each surgeon only a very limited personal experience in biliary reoperations. The discussion of the best method of repair is usually based on a small number of cases.[7-9] We have investigated 65 cases of accidental lesions of the choledochus reported to the Patient's Insurance Syndicate in Sweden during 6 years, with a reported rate of injury of about 0.07% of all cholecystectomies in Sweden.

This study evaluates the different types of primary treatment, especially end-to-end anastomosis of the common duct *versus* hepaticoenterostomy, of accidental lesions of the common duct at cholecystectomy.

Material and Methods

Sixty-five reports of accidental lesions of the choledochus at cholecystectomy from 51 different hospitals (*i.e.*, about one half of Swedish hospitals) were found in the records of the Patient's Insurance Syndicate (PIS) in Stockholm in June 1982; all lesions had occurred in 1975–1981. It is probable that some of the successful cases of primary repair were never reported to PIS. In a previous paper,[10] we discussed pre- and peroperative factors important in avoiding accidental injury. This material is representative of materials of unexpected lesions in cases without significant anomalies or severe inflammation.

All of the patients were traced and records from the hospitals where the first operations were performed were studied. Follow-up information through 1983 was added to records if necessary.

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The term "bile leakage" was used if bile was found intraabdominally in substantial amount (at least 100 ml) at reoperation or after percutaneous drainage (two cases). The term "obstruction of the bile passage" was used if the patient was clinically jaundiced or if had recurrent cholangitis where no other obvious pathology (*e.g.*, bile duct stones or liver cirrhosis) could explain the hyperbilirubinemi. Most obstructions were morphologically verified at operation or with x-ray.

A complete transection was done in 43 cases (66%), a portion of the duct was excised in 13 cases (20%), and a transection of more than 50% of the circumference was done in the remaining 22 cases (34%).

Unfortunately, the written report from the operation is often not complete and concentrates more on the lesion done than on the primary repair. For example, it is usually stated whether kocherization was done but rarely whether tension remained in the suture line following the repair.

Results

Fifty-five of 65 lesions of choledochus were detected perioperatively and 10 postoperatively (7 within 24 hours, 2 in 24–48 hours, and the remaining one 8 days postoperatively). We have attempted to evaluate the results as to time of detection and the primary surgical repair done.

In 38 of 55 peroperatively detected lesions an end-to-end choldochostomy was done. In all cases the lesion was sutured over a stent. This was a regular T-drain in 32 of 38 cases, a transduodenal drain in 5, and a transhepatic drain in 1. Major complications leading to a new reoperation occurred in 12 patients (32%), all due to problems with the choledochostomy. Thus, bile leakage led to intra-abdominal bile accumulation or peritonitis in eight of 12, total anastomosis disruption and intraabdominal bile accumulation in three, and total obstruction of the choledochus in one. All three of the patients with total disruption and the patient with total obstruction plus two of the remaining patients with only bile leakage later developed a stricture. Fourteen of 26 of the patients without early complications later developed a stricture and were reoperated. This occurred 3–63 months (25% in 4 months, 50% in 8 months, and 75% in 16 months) after the primary operation. A new reoperation was required in 12 of these, in six cases due to bile leakage and in six due to a new obstruction.

Of the 38 patients, 18 had at least two reoperations of the biliary tract: eight had three reoperations, eight had four, one had five, and one had seven. Of those 18 patients, almost all presented with complications early and had septic complications (*i.e.*, abscess, pneumonia, etc.) at reoperation in spite of prophylactic antibiotics. Of these, five still have (in August 1982) symptoms that may require further operations. In summary, good results without further surgical intervention were achieved in 22% of the 38 patients primarily operated on with an end-to-end choledochostomy.

Of the 17 patients treated with primary choledocho/hepaticoenterostomy (hepatojejunostomy Roux-en-Y end-to-side in 13 cases, hepatojejunostomy to a double jejunalloop end-to-side in three, and choledochoduodenostomy end-to-side in one case), there were early complications with bile leakage and abscess formation in five (29%). All of these were reoperated, three with only drainage (2 of whom later developed obstruction requiring a second reoperation) and two with a new jejunostomy Roux-en-Y (both of whom were well after 16 and 28 months, respectively). Only two of the 12 patients without early complications later developed obstruction, after 5 and 51 months, respectively, leading to resection of the stricture and a new hepaticoenterostomy, Roux-en-Y, successful after 18 and 24 months, respectively.

In summary, good results were achieved without further surgical intervention in 54% of the 17 patients primarily operated on with a choledocho- or hepaticoenterostomy.

Of the ten patients in whom the lesions were detected postoperatively but within 24 hours after the operation, three were reconstructed with an end-to-end choledochostomy. All developed bile accumulation postoperatively, leading to surgical drainage, and all later developed obstruction leading to further reoperations. None of them, after 3, 4, and 5 years, are without symptoms, although all three now have Roux-en-Y hepaticojejunostomy at 1, 1.5, and 3 years, respectively. In the remaining seven cases the lesion was repaired within 10 days with a choledocho hepaticoenterostomy (hepatojejunostomy Roux-en-Y in six cases and choledochojejunostomy end-to-side in one), four developed early complications: two bile leakage, one obstruction, and one bile leakage and obstruction. Both patients with obstruction and one of the other (diagnosed 8 days after surgery) later developed a new stricture. All three were reoperated with resection of the stricture and a hepaticojejunostomy Roux-en-Y. Two still have symptoms 2 and 6 years after reoperation.

One of the patients without early complication later developed an obstruction that has been reoperated twice, but she is still not free from symptoms 4 years after the last reoperation.

In ten of 13 patients with a defect 1–4 cm long in the choledochus, the defect was found at the primary operation and reoperated on with a choledocho/hepaticoenterostomy. In the remaining three cases, the defects were found within 48 hours after the primary operation

TABLE 1. *Review of Some Reports on Operation of Benign Biliary Strictures*

Author and Year	No. of Patients	Operative Procedure	Time of Follow-up (Months)	Good Result (%)	Operative Mortality (%)
Warren et al., 1971[12]	493	End-to-end anastomosis	?	52	5
	477	Hepaticojejunostomy	?	66	8
Wexler and Smith, 1975[9]	50	Jejunal mucosal graft Roux-en-Y	At least 6, majority > 18	80	6
Bismuth et al., 1978[11]	123	Hepaticojejunostomy Roux-en-Y	Mean 54	82	0
Cameron et al., 1978[13]	25	Silactic transhepatic stent, Hepaticojejunostomy Roux-en-Y	Mean 12 (1–108)	88	4
Moreno–Gonzales et al., 1980[7]	17	Biliary-duodenal interposition of a defunctionalized jejunal limb	6–48	94	0
Way et al., 1981[14]	28	End-to-end anastomosis	Mean 45	75	0
Castrini and Pappalardi, 1981[15]	66	Hepaticojejunostomy Roux-en-Y, Y- or O-tubes	Mean 90	67	2
Braasch et al., 1981[16]	44	Hepaticojejunostomy	Mean 51	74	0
Kalman et al., 1982[17]	63	Hepaticojejunostomy Roux-en-Y	Median 24	79	0

and treated the same way. The course for these patients did not seem to differ from the other patients.

There was no early mortality (*i.e.*, during the hospital stay for the first repair in this material) in spite of a long and complicated illness with care for more than 30 days in the intensive care unit in at least six patients. There were, however, two deaths at reoperation (primary end-to-end choledochostomy reformed to hepaticojejunostomy). Both of these patients had severe cholangitis repeatedly and were jaundiced at the time of the reoperation. They were both operated on at University Hospitals Unit with special interest in hepatobiliary surgery. There are still patients in a poor general condition, with repeated cholangitis and poor liver function.

The morbidity have been substantial for patients with reoperations. Even those without obvious complications have had long periods of sick leaves at their only operation and have had to attend outpatient departments frequently for follow-up.

All lesions were repaired by a consultant, and several of the reoperations were done at specialty centers. However, our data are not sufficient to draw conclusions on the experience of the surgeon in this field.

Discussion

We earlier found[10] that these patients did not differ from other Swedish patients undergoing cholecystectomy in regard to sex, height, and weight, although there was a tendency for these patients to have a somewhat lower weight. They were significantly younger than the control material. The facts that these patients are young, not obese, and without concomitant cardiovascular disease may be of significance to explain the absence of early mortality and low late mortality when this lesion occurs. However, it also means that the patients ought to have a long life expectancy and that complications to the disease and its treatment that might occur many years after the operations also must be taken in account. For example, no conclusion can be drawn as to the rate of biliary cirrhosis since follow-up in our material is much too short.

Our results regarding end-to-end anastomosis *vs.* bilidigestive anastomosis must be considered with caution since the surgeon obviously did not choose an operative approach at random. It could well be, although we have no other reasons to believe so, that the patients treated with end-to-end anastomosis differed in some way from the remaining patients and that such a difference is important for the outcome. The overall result is less favorable than others recently reported (Table 1). This might be explained by the fact that the material is collected from an insurance's syndicate, to which the favorable cases might not be reported.

It seems obvious from our material that the end-to-end choledochostomy is not a good alternative, at least not in delayed cases or cases where a portion of the common duct is lost, when Roux-en-Y hepaticojejunostomy might be a better alternative. Bismuth et al.[11] evaluated this operation and found early complications in only 18 of 123 cases and late symptoms in 12 of 101. However, they evaluated only patients in whom the anastomosis was done in apparently healthy tissue. If the tissues were fibrotic or inflamed, the patients were

excluded, making the results difficult to generalize to the clinical situation. Also, from recent reports (Table 1), it seems as if end-to-end anastomosis gives less favorable results overall compared with biliodigestive anastomosis. However, results of the former operation have been reported less often.

It seems as if an early repair has certain advantages, not least because there will always be an inflammatory process secondary to the bile accumulation/bile fistula or obstruction of the duct.[4] Today there are means to deviate the bile from the lesion by the PTC technique. This had not been attempted on the patients in our study when the primary anastomosis was done, but may be tried in certain cases in the future.

There were only 13 patients with a part of the choledochus missing; the treatment in those cases with a choledochoenterostomy seems uncontroversial. In no case was a noncircumferential bile duct defect reported, which is in keeping with Ruthledge's statement that this type of defect is rare.[8]

It is of considerable interest that in the experience of Pitt et al.,[18] choledocho- and hepaticojejunostomy gave significantly better results than other procedures in a review of 138 cases from a 25-year period. They also found that 68% of all patients with recurrent stricture were reoperated in 3 years and 80% in 5 years; it can be concluded that a long follow-up (10–15 years?) is needed for a reliable conclusion of the best treatment. They found excellent or good results in 68% of their patients from 1970–1979, which might indicate that their lesions were less complicated or that they have learned from their experiences.

The exact technique used by the surgeon is difficult to learn from the written reports. However, 12 of 55 patients were without complications after choledochostomy *versus* ten of 17 after choledochoenterostomy, even though the latter procedure was probably used in more complicated cases. This indicates that choledochoenterostomy should be the procedure of choice if freedom from complications during the first years is given highest priority. Our investigation also indicates that there is still not a good treatment available for this group of patients and that we need more basic information on the pathophysiology of stricture formation and healing of wounds in the biliary tract before this difficult problem can be solved.

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