

Side-to-Side Choledochoduodenostomy: A Reappraisal Based on a Study of 70 Patients

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Summary

We experienced a total of 70 side-to-side choledochoduodenostomy cases and 80% of them were indicated for gallstone disease patients. There were no early postoperative complications, but intrahepatic gallstones developed in 2 cases. The size of the stoma and the width of the common duct were reduced about 30% within 3 postoperative months. Although clinical cholangitis did not occur in the presence of an adequate stoma, histological cholangitis was constantly seen throughout 10-year-follow-up period. Strictness of operative indications, and periodical and long term follow-up study of postoperative patients are mandatory to obtain better clinical results.

Introduction

Side-to-side choledochoduodenostomy (CDS) has been a popular operative procedure in some countries and not in others³⁾. As stated by *Madden et al.*⁷⁾, the objections to its performance seem to be more theoretic than real although some problems including the risk of ascending infection have been posed and discussed in performing the procedure. The purpose of this paper is to evaluate the clinical results in 70 consecutive CDS patients whose follow-up period ranges from one to 15 years and clarify the usefulness of this surgical procedure.

Materials and Methods

1. CDS was performed in 70 patients during January, 1971 through December, 1985 at the Department of Gastroenterological Surgery, Wakayama Medical College. There were 30 men and 40 women and the mean age was 58.4 years. The indications for surgery in 70 patients were listed in Table 1.

Key words: Side-to-side Choledochoduodenostomy, Postoperative complication, Cholangitis, Gallstone disease, Ascending infection.

索引語: 総胆管十二指腸側側吻合術, 術後合併症, 胆管炎, 胆石症, 上行感染.

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Table 1. Indications for surgery in 70 patients.

Indication	No. of patients			Per cent
	M	F	Total	
Benign			65	
Gallstone	23	33	56	80.0
{ Hepatic	2	5	7	}
{ Common duct	10	16	26	
{ Gallbladder & Common duct	11	12	23	
Chronic cholecystitis		1	1	1.4
Chronic pancreatitis	1	2	3	4.3
Others	2	3	5	7.1
Malignant			5	
Common bile duct cancer	2	1	3	4.3
Pancreatic cancer	2		2	2.9
Total	30	40	70	100.0

2. After cholecystectomy, a CDS was performed in one layer. The duodenum was widely mobilized by Kocher maneuver, so that it could be approximated to the common bile duct without tension. A 3 cm longitudinal incision was made in distal common bile duct. The duodenum was opened longitudinally for a distance of 3 cm and one layer interrupted anastomosis with 3-0 Dexon® or coated Vicryl® was constructed.

3. The follow-up ranged from one month to 15 years with an average ($\pm$ SD) of 6.7 ± 3.6 years. The follow-up study was undertaken 1, 3, 6 and 12 months and thereafter once a year after operation. The patients were checked on their general condition from clinical course and laboratory tests (peripheral blood counts, liver function tests). Their anastomotic regions of CDS were observed with duodenofiberscopy and hypotonic duodenography. In the duodenofiberscopy, we observed a presence of food debris in the common bile duct, measured the size of the stoma and biopsied on the common duct wall to check existence and degree of cholangitis by staining the specimen with hematoxylin and eosin. In the hypotonic duodenography, we examined influx and efflux of the orally administered contrast media between the duodenum and biliary tree by the patients' postural change.

Results

1. Indication for surgery and operative mortality:

The most common indication was for gallstone disease (56/70, 80%). In 5 patients with malignant disease, the operations were carried out as a palliation for obstructive and nonresectable lesions in the pancreatic head region. There was no operative mortality which was defined as death from any cause within 30 days after the surgical procedure.

2. Laboratory test and clinical examination:

Peripheral blood count and liver function test including total protein, S-GOT, S-GPT, total bilirubin and alkaline phosphatase returned to normal within 1 to 3 months postoperatively. As indicated in Fig. 1, the size of the stoma and the width of the common duct were reduced about 30%

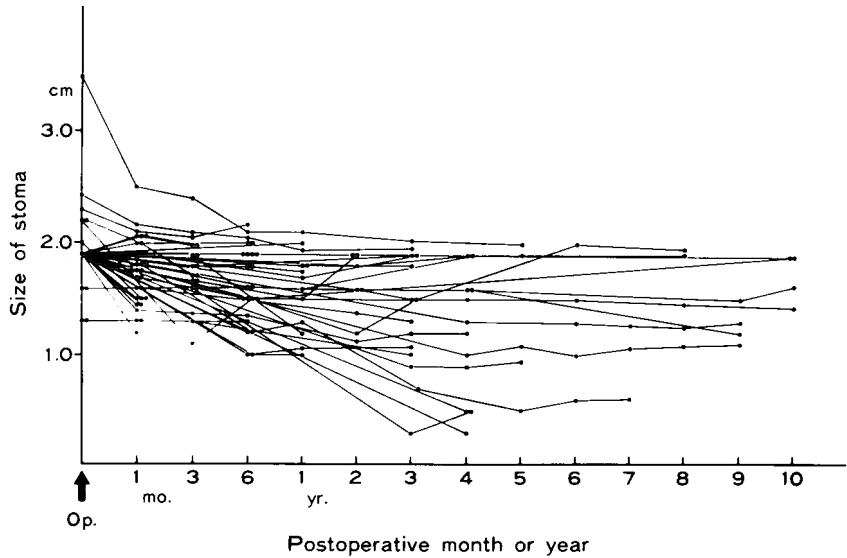


Fig. 1. Postoperative changes of the size of the stoma.

within 3 postoperative months, and since then, in many cases, the patients maintained their size and width for many years. However, in 2 cases, these parameters did not change compared with the immediate postoperative size or width. In one of them, an anomarous junction of the pancreatico-biliary ductal system was demonstrated by endoscopic retrograde cholangiopancreatography.

3. Postoperative complications:

There were no early complications such as wound infection, wound dehiscence, anastomotic leak or any complications which related to other organs. As late complications, we experienced 2 cases of the development of the intrahepatic gallstones. In the first case, it seemed to be caused by overlooking of the existence of biliary stenosis at the porta hepatis. The patient, 35-year-old man, was readmitted 4 years after CDS with a history of fever, abdominal pain and jaundice. Per-

Table 2. Histopathological findings of biopsied specimen.

Pathology	Postoperative month or year												
	1	3	6 ^{mo.}	1	2	3	4	5	6	7	8	9	10 ^{yr.}
Epithelium													
Inflammatory proliferation	-	-	+	+	+	-	-	-	-	-	-	-	-
Erosion	-	-	+	+	-	-	-	-	-	-	-	-	-
Atrophy	-	-	-	-	-	+	-	-	-	-	-	-	-
Cell infiltration	+	+	+	+	+	+	+	+	+	+	+	+	+
Intestinal metaplasia	-	-	-	-	-	-	-	-	-	-	-	-	-
Lamina propria													
Edema	-	-	+	-	-	-	-	-	-	-	-	-	-
Fibrosis	-	+	+	+	+	-	-	-	-	-	-	-	-
Cell infiltration	+	+	+	+	+	+	+	+	+	+	+	+	+
Vascular congestion	-	-	-	-	-	+	+	+	-	-	-	-	-

- ; not observed, + ; mild, + ; moderate, + ; severe

cutaneous transhepatic cholangiography showed the above mentioned stenosis and development of multiple small stones in the intrahepatic biliary tree. He was reoperated on and underwent hepaticojejunostomy with Roux-en-Y fashion. The second case, 52-year-old woman, consulted our department 12 year after CDS with a chief complaint of fever. Ultrasonography and CT scan demonstrated the development of a small stone in the posterior segment of the right hepatic lobe. The patient was administered antibiotics and then, her symptoms subsided well. She has been followed up periodically.

4. Blind pouch of the common bile duct:

The blind pouch was visualized in all the cases by the orally administered contrast media. It was only 2 cases that food debris was found in the pouch. Each of them was found out 6 and 7 years after operation, respectively and extracted endoscopically at the time of periodical follow-up study. There were no clinical symptoms even before extraction in both cases.

5. Histology of the common duct:

Histopathological findings of biopsied specimens obtained from the common duct are shown in Table 2. In most cases, inflammatory cell infiltration was seen in the mucosal epithelium and lamina propria of the mucosa. Erosion or hyperplasia in the mucosal epithelium, and edema or fibrous change in the lamina propria were observed in the early postoperative stage. The inflammatory cell infiltration became remarkable during postoperative 3 to 6 months, and were reduced in a few years later, however, this inflammatory change was maintained to some extent till at least postoperative 10 years. Although these histopathological changes were observed there were no such clinical symptoms as fever or abdominal pain suggesting cholangitis. There were no instances in which the specimen showed intestinal metaplasia of the surface epithelium.

6. Development of gastric cancer:

Gastric cancer developed in 3 cases (3/70, 4.3%). In the first case, the patient, 58-year-old man, his gastric cancer was found out 7 years after CDS and partial gastrectomy was undertaken. Histological specimen showed moderately differentiated tubular adenocarcinoma. He has been doing well 7 years after gastrectomy. In the second patient, 72-year-old man, cancer developed 10 years after CDS with symptoms of pyloric obstruction. He underwent partial gastrectomy, and histology revealed mucinous adenocarcinoma. He died from recurrence of gastric cancer 10 months after his second operation. In the third case, 42-year-old women, consulted our clinic with a chief complaint of loss of appetite 10 years after CDS. The lesion was judged to be too advanced to resect from the findings of physical examination and upper GI series. She has been treated conservatively.

Discussion

CDS has some accompanying problems including ascending infection and stomatal stricture although this is relatively simple in procedure and could be indicated for poor risk patients. As a rule, we have indicated this procedure for 1) aged patients over 40 years old or poor risk patients, 2) patients having diffusely dilated biliary tree, 3) patients with retained common duct stones or suspected of this condition and 4) patients having multiple calcium bilirubinate stones in the common duct.

Liver function test returned to normal within postoperative one to 3 months and was maintained normal level for 15 years. Many authors^{3,6,7,9)} also reported that abnormal results of liver function test were not recognized for long-term follow-up study. Almeida et al.²⁾ reported in his series of

70 patients that 2 patients had slightly elevated alkaline phosphatase values shortly after surgery which eventually returned to normal. From these facts, we consider that reflux of gastric or duodenal contents into the biliary way does not affect the liver function so far as the wide stoma exists.

Ascending infection and recurred intrahepatic gallstones developed in 2 patients (2/70, 2.9%). We must reflect on our oversight of the existence of biliary stricture in pre- and peroperative cholangiograms. Performed upon dilated common ducts only and an adequate size of the stoma, *Degenshein et al.*³⁾ found the operation complicated by cholangitis in less than 2% of 175 patients. Development of ascending infection is closely correlated with the size of the stoma. *Reuben et al.*⁸⁾ stated that cholangitis was provoked by reduction of the stoma. In our series, the size of the stoma reduced about 30% in a postoperative few months. Blind pouch of the common bile duct, inevitably created after this procedure, is considered to be serious as a cause of sump syndrome⁷⁾. However, this complication is believed to result from reduction or obstruction of the stoma and not from regurgitation of the duodenal contents into the biliary tract alone. In fact, *Madden et al.*⁷⁾ reported that in the collected series of CDS, only 5 patients out of 1,255 cases (0.4%) had ascending infection and cholangitis as a complication of the operation. Thus, the development of sump syndrome seems to be required reduction or obstruction of the stoma or other some factors as well as the existence of the blind pouch.

Though postoperative cholangitis was not observed except in 2 cases, histological cholangitis was constantly seen throughout a 10-year-follow-up period. Intestinal metaplasia of the mucosal epithelium, which is believed to have malignant potential, was not recognized in all the cases. However, such pathological changes as the above mentioned results suggest that patient and long-term follow-up study needs to be done for these postoperative patients.

*Akiyama et al.*¹⁾ observed endoscopically that 9 of 15 postoperative patients had reflux of bile into the stomach, five of whom had gastric lesions and that the duodenum was constantly exposed to bile in all the 15 patients. Among them, three had redness in the antrum, two had multiple erosions in the antrum, and one had gastric ulcer. *Almeida et al.*²⁾ also observed macroscopic and microscopic evidence of gastritis with abnormal duodenogastric reflux in 3 of 25 postoperative patients by endoscopic examination. An unregulated bile influx into the duodenum, lack of the gallbladder which acts as bile reservoir in normal subjects, and regulatory changes of the pyloric function resulting from CDS performed very close to the pyloric sphincter may lead to duodenogastric reflux of bile resulting in inflammation or intestinal metaplasia of the gastric mucosa. This suggests that the risk for the development of gastric cancer should be estimated in relation to bile reflux into the stomach^{4,5,10)}.

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和文抄録

総胆管十二指腸側側吻合術 —70例の検討—

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1971年以降の16年間に経験した総胆管十二指腸側側吻合術施行症例70例を対象に、主として長期予後に関し検討した。70例中56例、80%は総胆管結石、肝内結石に対し施行された。原則として術後 1, 3, 6, 12 ヵ月、その後は年に1度ずつ臨床経過、血液生化学検査により全身状態を、内視鏡検査、低緊張性十二指腸造影により吻合局所の変化を観察した。

術後早期合併症は皆無であったが、晚期合併症として2例に肝内結石の発生をみた。胆管径、ならびに総胆管・十二指腸間の吻合口径は、術後3ヵ月でと

もに約30%縮小したが、それ以後は、この大きさを維持する症例が大部分であった。臨床的に胆管炎の症状を示した症例はみられなかった。しかし定期的に内視鏡的に採取した吻合口近傍の胆管壁からの生検所見では、粘膜上皮、粘膜固有層への炎症性細胞浸潤は、程度の差はあれ術後10年にわたり継続して観察され、組織学的胆管炎は存在し続けることが判明した。

これらのことから、手術適応を厳格にし、術後に定期的、かつ長期の follow-up を行うことが、術後成績の向上につながるものと思われる。