

## Clinical Experience of Choledochoduodenostomy for Elderly Patients with Biliary Obstruction

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### ABSTRACT

**Background :** Biliary obstruction can have a severe clinical outcome in elderly patients. The first choice of treatment is endoscopic retrograde cholangiopancreatography, which can be consistently performed by a limited number of facilities. A simple method of reducing jaundice is choledochoduodenostomy. We investigated the usefulness of choledochoduodenostomy as a rapid and reliable method for treating biliary obstruction.

**Methods :** We reviewed 14 patients 75 years or older who had undergone choledochoduodenostomy for biliary obstruction at AOI Universal Hospital from January 2021 through December 2022. Choledochoduodenostomy was indicated if endoscopic retrograde cholangiopancreatography was not possible or if emergency drainage was required for treating acute obstructive suppurative cholangitis.

**Result :** The 14 patients had a median age of 83 years and 5 were women. The causes of biliary obstruction were common bile duct stone disease in 12 patients and malignant jaundice in 2 patients. For all 14 patients, choledochoduodenostomy was performed. The median operation time was 118.5 minutes, the median blood loss was 138 ml, and the median postoperative hospital stay was 20.5 days. For a patient who had generalized peritonitis, dialysis was required due to acute kidney injury. Another patient had postoperative liver subcapsular bleeding. Two patients died owing to the progression of malignant disease.

**Conclusion :** Choledochoduodenostomy to treat biliary obstruction in elderly patients had few postoperative complications and might be a useful procedure. (Jikeikai Med J 2023 ; 70 : 73-7)

**Key words :** choledochoduodenostomy, biliary obstruction, elderly patients

### INTRODUCTION

Acute obstructive suppurative cholangitis (AOSC) due to biliary obstruction frequently causes severe conditions, such as sepsis, especially in elderly patients<sup>1</sup>. To treat severe cholangitis, endoscopic retrograde cholangiopancreatography (ERCP) is often recommended<sup>1</sup>. However, if endo-

scopic treatment is selected but ERCP cannot be performed owing to the absence of a qualified specialist, the transfer of the patient to a more advanced institution is desirable<sup>2</sup>. Despite early drainage being recommended to treat biliary obstruction<sup>2</sup>, transferring patients can be difficult if they are elderly or have septic shock. Therefore, in semiemergency situations we often select a biliary bypass operation. Cho-

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ledochoduodenostomy is a simple surgical procedure that does not require intestinal anastomosis. However, reported as postoperative complications due to reflux or insufficient drainage are cholangitis and sump syndrome<sup>3-8</sup>. Therefore, in the present study we investigated the usefulness of choledochoduodenostomy as a rapid and reliable treatment for biliary obstruction.

## METHODS

### Patients

We reviewed 14 patients 75 years or older who had undergone choledochoduodenostomy as a semiemergency procedure for biliary obstruction at AOI Universal Hospital from January 2021 through December 2022. All patients met the diagnostic criteria of septic shock<sup>9</sup> and received the diagnosis of biliary obstruction. Choledochoduodenostomy was indicated if ERCP was not possible and if emergency drainage was required to treat AOSC.

The treatment results of the patients were investigated for systemic inflammatory response syndrome<sup>10</sup> operation time, operative blood loss, postoperative hospital stay, complications, and preoperative and postoperative activities of daily living (ADL). This study was approved by the Ethics Committee of the AOI Universal Hospital.

### Surgical procedure

All patients underwent laparotomy, and if biliary obstruction had been caused by gallbladder stones, cholecys-

tectomy was performed without removal of bile duct stones. Choledochoduodenostomy was performed with a side-to-side anastomosis. The anastomosis of the common bile duct and the duodenum must be performed proximally. A 15-mm-long incision was made axially at the postbulbus of the duodenum, and a 15-mm-long longitudinal incision was made in the anterior wall of the common bile duct proximal to the duodenum (Fig. 1a). The anastomosis was performed with 5-0 monofilament absorbable sutures at both ends and at the midpoint of the posterior wall (Fig. 1b) with supporting sutures and 12 single ligature sutures from the posterior wall to all layers (Fig. 1c).

## RESULT

The 14 patients were 9 men and 5 women with a median age of 83 years (Table 1). The primary disease were common bile duct stone in 12 patients, cancer of the pancreatic head in 1 patient, and distal biliary tract cancer in 1 patient. Median preoperative vital signs and laboratory data when surgery was chosen included a white blood cell count of 11,400/ $\mu$ L, a hemoglobin level of 12.8 g/dL, a platelet count of 17.8  $10^3$ / $\mu$ L, a aspartate aminotransferase level of 198 U/L, a alanine aminotransferase level of 199 U/L, a total bilirubin level of 2.9 mg/dL, and a C-reactive protein level of 5.32 mg/dL. All patients met the diagnostic criteria for systemic inflammatory response syndrome.

The median values of surgical variables were an operation time of 118.5 minutes, blood loss of 138 ml, and a post-

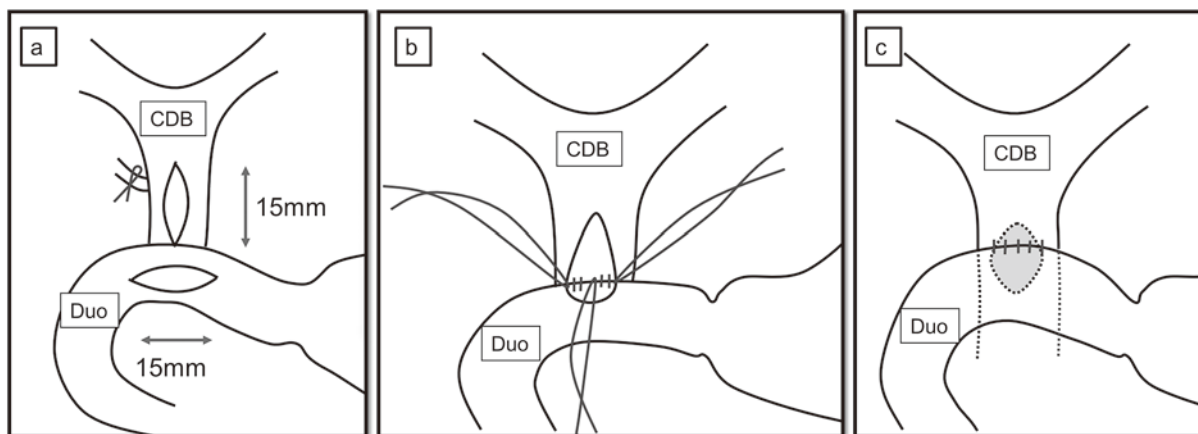


Fig. 1. surgical procedure.

The anastomotic diameter is approximately 15 mm.

Fig. 1a shows incisions of the common bile duct (CDB) and the duodenum (Duo), Fig. 1b shows a sutured posterior wall, and Fig. 1c shows a finished anastomosis.

Table 1. patients' characteristics at admission and preoperative and postoperative factors

Patient	Age (years)	Sex	Primary disease	BT (°C)	HR (/min)	RR (/min)	WBC (μL)	Hb (g/dL)	Plt (10 <sup>9</sup> /μL)	AST (U/L)	ALT (U/L)	T-Bil (mg/dL)	CRP (mg/dL)	Operation length (min)	Intraoperative blood loss (g)	Postoperative hospital stay (days)	Outcome (after surgery)
1	90	F	common bile duct stone	39.7	112	30	14,700	10.9	7.3	441	224	3.1	5.63	103	5	20	Survival
2	84	F	pancreatic cancer	39.5	81	16	13,600	10.2	21.5	196	146	23.1	4.03	65	5	13	Death (3 months)
3	79	F	common bile duct stone	37.5	121	20	28,400	12.5	10.9	46	110	5.8	17.78	80	120	12	Survival
4	87	M	common bile duct stone	38.5	102	36	16,300	11.3	12.9	88	137	1.8	20.41	92	156	45	Survival
5	80	M	common bile duct stone	38.0	70	23	15,600	12.3	17.7	18	15	1.2	13.93	93	80	7	Survival
6	79	M	common bile duct stone	38.4	104	18	10,100	13.1	21.1	200	307	5.3	9.43	144	236	28	Survival
7	83	M	cholangiocarcinoma	38.0	120	18	10,500	16.0	26.2	237	283	11.2	10.90	116	5	7	Death (18 months)
8	81	M	common bile duct stone	40.5	79	32	9,900	14.0	15.2	180	125	3.4	2.20	206	600	8	Survival
9	76	M	common bile duct stone	37.1	80	25	13,000	14.4	22.8	1,525	513	2.3	5.01	144	226	16	Survival
10	83	M	common bile duct stone	39.5	117	16	7,400	15.4	17.6	681	510	2.6	0.77	134	170	46	Survival
11	83	F	common bile duct stone	37.0	105	23	7,400	12.8	17.9	275	239	2.1	1.55	137	955	135	Survival
12	78	M	common bile duct stone	38.0	109	20	12,300	14.7	21.3	400	322	2.4	4.86	103	96	26	Survival
13	85	M	common bile duct stone	37.0	102	24	5,000	12.8	15.9	57	174	4.5	7.50	121	40	21	Survival
14	85	F	common bile duct stone	39.2	98	25	10,500	12.7	20.4	52	20	0.9	0.05	144	220	26	Survival

Abbreviations : BT, body temperature ; HR, heart rate ; RR, respiration rate ; WBC, white blood cell ; Hb, hemoglobin ; Plt, platelet ; AST, aspartate aminotransferase ; ALT, alanine aminotransferase ; T-Bil, total bilirubin ; CRP, C-reactive protein

operative hospital stay of 20.5 days. Patient 4 had an acute kidney injury due to septic shock caused by generalized peritonitis; a biliary rupture had been found during surgery. Owing to the acute kidney injury, the patient required hemodialysis. In patient 11, transarterial embolization was performed, owing to postoperative liver subcapsular bleeding, and resulted in an extended hospital stay. This complication was given a Clavien-Dindo classification of IIIa<sup>11,12</sup>. In other patients, complications were not observed, and hepatobiliary enzymes were improving quickly after surgery. Only 1 patient required outpatient visits frequently and inpatient treatment 1 month after discharge, and 2 patients died of multiple organ failure due to the progression of malignant disease. Patient 3 was the only patient to show a postoperative decrease in ADL. There were no changes in ADL between prehospitalization and discharge destinations.

## DISCUSSION

The treatment of AOSC consists of conservative treatment and biliary drainage. For both moderate and severe cases of AOSC, early biliary drainage can be considered. Methods of drainage can be percutaneous transhepatic, endoscopic, and surgical. Surgical drainage has a high mortality rate and is not the first choice. Endoscopic treatment is often the first-line treatment for common bile duct stones<sup>13</sup>; however, endoscopic drainage cannot be performed at all facilities. A high mortality rate has been reported for severe cholangitis, especially in elderly patients<sup>1</sup>, and early drainage is recommended<sup>14</sup>. The present study showed the usefulness of choledochoduodenostomy as a reliable and rapid technique for treating AOSC in elderly patients.

For the treatment of common bile duct stone disease, meta-analysis has shown that endoscopic treatment and surgical treatment<sup>15</sup> do not differ significantly in the rates of stone removal, mortality, and complications. In addition, a subgroup analysis has shown no significant difference<sup>15</sup> between open surgery and laparoscopic surgery. Choledochoduodenostomy is effective for treating biliary obstruction even after cholecystectomy<sup>5</sup>. In the present study, clinical outcomes of choledochoduodenostomy were good for 12 patients who had biliary obstruction due to common bile duct stones.

For patients with AOSC the treatment is biliary drain-

age, even if the cause is malignancy. A randomized controlled trial that compared ERCP and surgical treatment with bile duct anastomosis for treating obstructive jaundice caused by malignant stenosis showed no significant difference in survival time, complication rate, and quality of life<sup>16,17</sup>. In the present study choledochoduodenostomy was performed for 2 patients with malignant biliary obstruction.

Biliary bypass can be performed in 2 ways: choledochojejunostomy and choledochoduodenostomy. These 2 procedures shown no significant difference in the rates of mortality or morbidity<sup>18</sup>. On the other hand, choledochoduodenostomy is reportedly simpler than choledochojejunostomy, with less cholangitis and stenosis at the anastomosis site<sup>3,18</sup>. The bile duct was dilated due to its obstruction. The anastomotic diameter was easily secured. Therefore, as a drainage method choledochoduodenostomy is believed to have advantages.

The short-term and long-term results of side-to-side choledochoduodenostomy have often been reported<sup>3-5,7,8,19</sup>. After this type of surgery, the rate of cholangitis is 0% to 9.4% and that of sump syndrome is 0% to 5.2%. Although sump syndrome is a theoretically possible complication, including retrograde cholangitis, it would not be a major problem if the anastomosis orifice is sufficiently secured. In patients of the present study, anastomotic complications did not occur. Although 2 patients died, both deaths were due to the progression of malignant disease.

Even in a hospital where endoscopic treatment cannot be performed immediately, AOSC requires early drainage, especially in elderly patients. In such a limited situation, choledochoduodenostomy might be an effective, simple, and rapid drainage method.

Authors have no conflict of interest.

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