Int J Clin Exp Med 2017;10(3):5480-5485
www.ijcem.com /ISSN:1940-5901/IJCEM0033592

Case Report

Successful laparoscopic common bile duct exploration in a patient with previous Billroth II gastrectomy

Ming-Jie Zhang, Li-Ping Cao, Guo-Ping Ding

Department of Surgery, Sir Run Run Shaw Hospital, School of Medicine, ZheJiang University, Hangzhou 310020, China

Received June 12, 2016; Accepted October 19, 2016; Epub March 15, 2017; Published March 30, 2017

Abstract: Previous Gastrectomy can lead to an increased incidence of cholecystocholedocholithiasis and increased morbidity requiring surgery. For the reason of reconstruction of digestive tract (especially in patients with previous Billroth II gastrectomy or total gastrectomy with Roux-en-Y esophagojejunostomy), Endoscopic retrograde cholangiopancreatography (ERCP) tend to be difficult to be performed. Alternatively, with the advance of laparoscopic techniques, laparoscopic common bile duct exploration (LCBDE) has been attempted in patients with a history of gastrectomy. We performed LCBDE successfully in a patient with previous Billroth II gastrectomy in March 23rd, 2016 and reported our treatment experience.

Keywords: Subtotal gastrectomy, cholecystocholedocholithiasis, laparoscopic common bile duct exploration (LCBDE)

Introduction

It is widely accepted that the incidence of gallstones and common bile duct (CBD) stones formation after gastrectomy is much higher than the people without operation history [1, 2]. Endoscopic retrograde cholangiopancreatography (ERCP) tend to be difficult to be performed in these patients for the reason of rechannel of digestive tract [3]. With the development of surgical skill and operative equipment, Laparoscopic common bile duct exploration (LCBDE) has continued to gain widespread clinical acceptance [4-6]. We performed LCBDE successfully in a patient with previous Billroth II gastrectomy in March 23rd, 2016 and introduced the methods of preoperative evaluation and operative techniques on the basis of the treatment experience from this patient.

Case report

A 69-year-old female patient was admitted for complaints of pain in the right hyperchondrium, which was intermittent and colicky for duration of two years with intermittent fever. The patient has a history of distal subtotal gastrectomy for treatment of duodenal ulcer bleeding twenty years ago. Laboratory test showed: serum alanine aminotransferase 281.7 U/L; aspartate aminotransferase 613.0 U/L; total bilirubin 47.7 μmol/L; direct bilirubin 34.8 μmol/L. MRCP (**Figure 1**) showed multiple stones in the gallbladder and excessively dilated CBD. Duodenoscope result showed gastric stump mucosa is normal and perform Billroth II gastroenterostomy in the previous operation, camera lens entering the afferent loop is difficult and can not find the duodenal papilla.

Depending on these findings, we found endoscopic sphincterotomy (EST) tend to be difficult to be performed, so wedecided to perform LCBDE with laparoscopic cholecystectomy (LC). During the preoperative period, we adopted a preoperative evaluation procedure to anticipate the severity level of the intraabdominal adhesions. The factors in the evaluation procedure including: hyperplasia of original incision, postoperational intestinal obstruction, method of gastroenterostomy, abdominal infection [7], and preoperational ultrasonography test results. The preoperational ultrasonography test including: the adhesions at the original gastrectomy incision site (**Figure 2A**); the movement distance of intestine under the abdominal wall

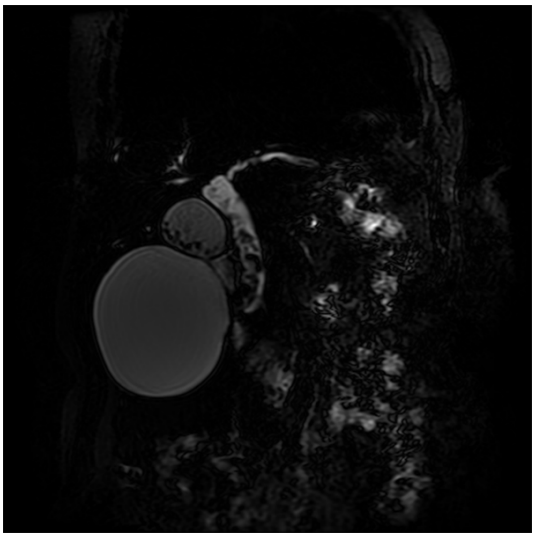

Figure 1. MRCP showed multiple stones in the gallbladder and excessively dilated common bile duct (CBD).

in smooth breath condition (**Figure 2B**); the distance from the position for insertion of the initial trocar to superior mesenteric vein(SMV) and aorta (AO) (**Figure 2C**, **2D**). The patient's score was 1 point, as shown in **Table 1**, and we anticipated that the intraabdominal adhesions were slight and Laparoscopic operation was possible.

We performed LCBDE with LC in March 23rd, 2016. The operation was performed under general anaesthesia. A carbon dioxide pneumoperitoneum of 12 mmHg was created via a 10-mm port inserted at the right side of the umbilicus (2 cm far from umbilicus) and a 30° laparoscope was used. The patient was positioned in a reverse Trendelenburg position tilted to the left. Three additional trocars were positioned at the epigastrium (10 mm) and two 5-mm ports in the right hypochondrium. The operation began with dissection at Calot's triangle. The cystic duct was ligated and used as retraction to expose the CBD. Two sutures were used to overhang the CBD (**Figure 3A**), a choledocotomy was made with a longitudinal incision using a micro-scissors (**Figure 3B**), using a combination of different techniques to remove the stones, such as using a stone forceps to extract the visible stones (**Figure 3C**); saline flushing with a catheter to remove multiple small stones (**Figure 3D**); dormia basket under choledochoscopic guidance to remove the stones in the distal CBD (**Figure 3E**, **3F**). After two to three consecutive proximal and distal choledochoscopies were performed to confirm duct clearance, T-tube was used for biliary decompression and the incision of choledocotomy was closed with intra-corporeal sutures interruptedly using laparoscopic needle holders (**Figure 3G-J**). Finally we cut the cystic duct and removed the cholecyst (**Figure 3K**) and a tubal drain was routinely inserted at Morrison's pouch to prevent collection secondary to any bile leak (**Figure 3L**). The operation went smoothly and the total operative time was about 90 minutes.

The patient had an uneventful postoperative course. No postoperative morbidity such as bleeding or bile leakage was documented. The peritoneal drainage was removed at the third day postoperatively. The cholangiogram via T-tube was performed at 1 week postoperatively and no residue stone was found (**Figure 4**). The patient was discharged after the cholangiogram and the T-tube was removed at 4 weeks after operation.

Discussion

It is widely accepted that the incidence of gallstones formation after gastrectomy is much higher than the people without operation history, about 13% to 22% [8]. Exact mechanisms for these observations are not yet clear. According to the literature, a complex interaction between sectioning of the nerve supply to the gallbladder and the change in cholecystokinin secretion played an important role. In gastrectomy operation, the damage to the hepatic branch of vagus nerve is unavoidable. The hepatic branch of vagus nerve is considered to play an important role in regulating the tonicity of the gallbladder. The absence or damage of the hepatic branch may cause troubles in regulation of gallbladder emptying, which potentially may contribute to gallstone formation [9]. In addition, gastric reconstruction may decrease passage of food through the duodenum, which would probably decrease cholecystokinin secretion and reduce gallbladder motility, in the end to aggregate gallstone formation [10].

Billroth II gastrectomy has long been considered a major challenge to the enthusiastic endoscopist. The overall success rate can be as low as 62.5% [11]. The difficulty is encountered not only in accessing the papilla, but also

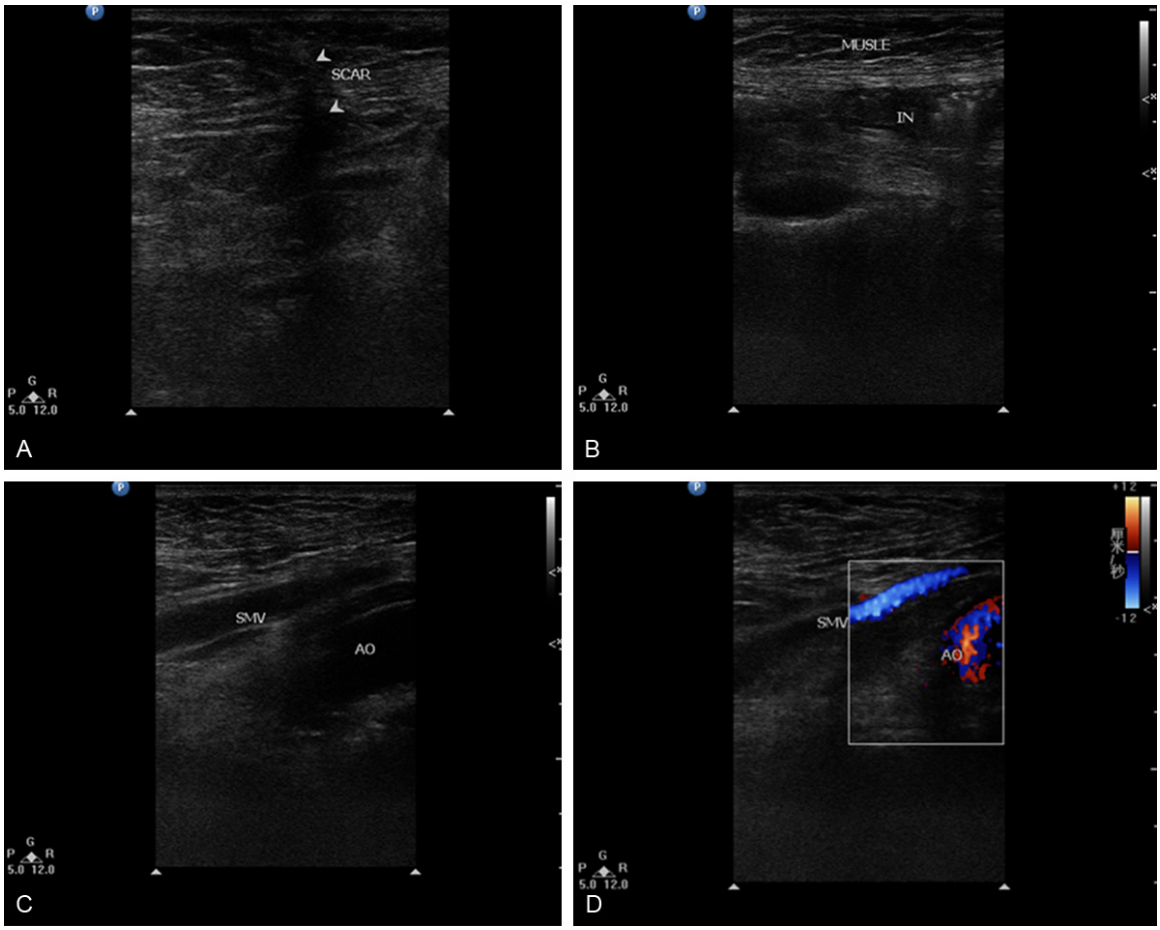

Figure 2. Evaluating the adhesions at the original gastrectomy incision site by preoperational ultrasonography (A); the movement distance of intestine under the abdominal wall in smooth breath condition (B); The distance from the position for insertion of the initial trocar to SMV and AO (C, D).

Table 1. The preoperativeevaluation table for anticipate severity level of the intraabdominal adhesions

			Score
Hyperplasia of original incision	No (0)	Yes (1)	0
Postoperational intestinal obstruction	No (0)	Yes (1)	0
Abdominal infection	No (0)	Yes (1)	0
Method of gastroenterostomy	Billroth I (0)	Billroth II or Roux-en-Y (1)	1
Preoperational ultrasonography test	lateral MD*>1 cm longitudinal MD*>3 cm (0)	lateral MD*<1 cm longitudinal MD*<3 cm (2)	0
Total			1

*MD means movement distance.

in achieving the correct axis of cannulation and sphincterotomy. The previous gastrectomy has been reported as a reason for failed endoscopic extraction using ERCP [3]. Meanwhile, ERCP is not a benign procedure, complications, such as bleeding, pancreatitis, duodenal perforation, and papillotomy stenosis, are not uncommon in patients with previous gastrectomy [12]. On the other hand, with the advance of laparoscopic techniques, LCBDE has been attempted and proved not only feasible, but also effective in different surgical units around the world,

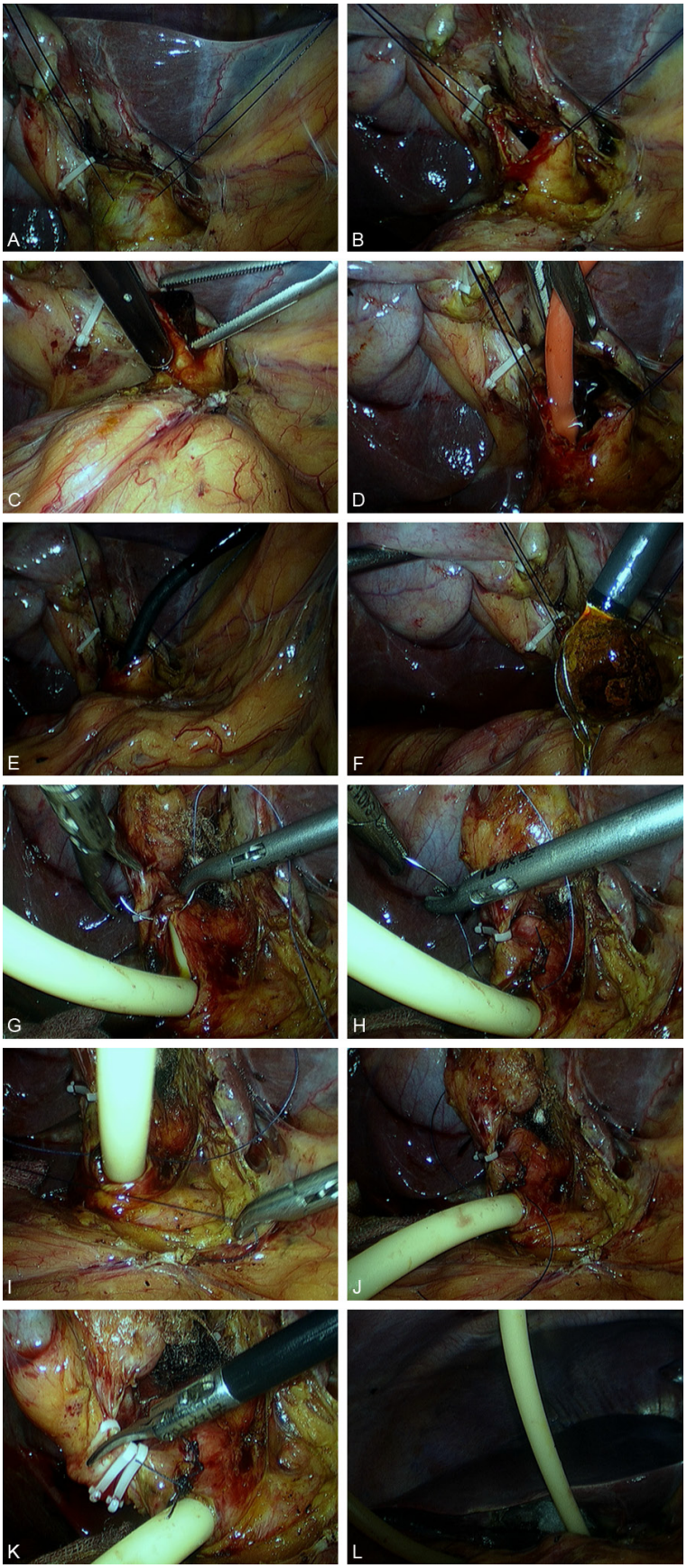

Figure 3. The cystic duct was ligated and two sutures were used to overhang the CBD (A); A choledocotomy was made with a longitudinal incision (B); Using stone forceps to extract the visible stones (C); Saline flushing with a catheter to remove multiple small stones (D); Dormia basket under choledochoscopic guidance to remove the stones in the distal CBD (E and F); T-tube was used for biliary decompression and the incision of choledocotomy was closed with intra-corporeal sutures interruptedly using laparoscopic needle holders (G-J); Cut the cystic duct and removed the cholecyst (K); Inserted a tubal drain at Morrison'spouch (L).

with success rates in the range of 93.3-100% [13]. Randomized studies comparing the two stage approach (ERCP and LC) and the one-stage LC with LCBDE showed that the one-stage operation resulted in a shorter hospital stay and a similar stone clearance rate in the patients without gastectomy [12, 14]. Based on abovementioned theories, a single-stage approach without attempting ERCP has been suggested. Several researches have proved the advantage of a single-stage approach for the management of CBD stones after gastrectomy and stated that laparoscopic exploration should be the initial approach for gastrectomy patients with CBD stones [15].

We performed LCBDE successfully in a patient with previous Billroth II gastrectomy in March 23rd, 2016. Our result also prove the advantage of LCBDE for treatment of CBD stones after gastrectomy, but the comprehensive preoperative evaluation and skilled technique of surgeon is necessary for this result.

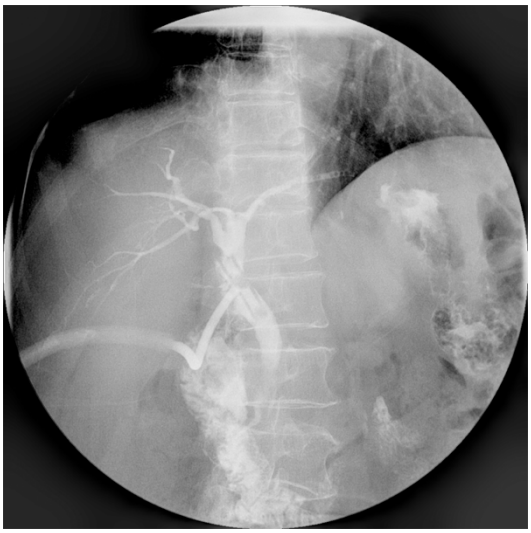

Figure 4. The cholangiogram via T-tube showed no residue stone was found.

Firstly, laparoscopic surgery failures in patients with previous gastectomy were attributable to adhesions, which include the adhesions to the anterior abdominal wall at the position for insertion of the initial trocar and the adhesions around the gallbladder and CBD [16]. So according to previous research results [7], we adopted a preoperative evaluation procedure to anticipate the severity level of the intraabdominal adhesions, as shown in **Table 1**. When the preoperational ultrasonography show in smooth breath condition, the lateral movement distance of intestine more than 1 cm, longitudinal movement distance more than 3 cm and the evaluation scores is less than or equal to 3 points, we anticipated the adhesions are slight and laparoscopic operation was possible.

Secondly, the position for insertion of the initial trocar is particularly important in these patients. Because of the adhesions at the original gastrectomy incision site, we had better chose the site just right of the umbilicus, 2 cm far from the original gastrectomy incision. If the preoperational ultrasonography show extensive intraabdominal adhesions are suspected or present, safe peritoneal access (open the peritoneum under direct vision through a small incision) is most recommended. Thirdly, duringdealing with the adhensions round the gallbladder and CBD, we suggest dissecting the serosa of the gallbladder to prevent injury to the organs adhered to the gallbladder [17]. Because the CBD may be displaced as a result of adhesions after gastrectomy, the cystic duct should not be divided until the common hepatic duct and CBD are clearly identified.

Finally, multiple techniques could be applied to retrieve the CBD stones, such as stone forceps, saline flushing, dormia basket, balloon catheter and electrohydraulic lithotripsy under choledochoscopic guidance. Primary closure or T-tube drainage could also be performed to deal with the CBD incision. If the patient is aged; with previous history of obstructive jaundice, acute biliary pancreatitis and cholangitis; with unidentified stone clearance; with suspected distal CBD obstruction; with raised levels of alkaline phosphatase, γ-glutamyltransferase, and serum bilirubin; combined with diabetes mellitus and other systemic diseases, then T-tube drainage is recommended [18].

Acknowledgements

The authors would like to thank Dr. Hua Shen from the Department of surgery of Sir Run Run Shaw Hospital affiliated to School of Medicine of ZheJiang University for taking photos during the operation procedure. This work was supported by the technological plan funds of Huzhou (2014GZB04) and the Medical and Health Platform Plan fund of Zhejiang Province (2015ZDA029), China.

Disclosure of conflict of interest

None.

Address correspondence to: Li-Ping Cao, Department of Surgery, Sir Run Run Shaw Hospital, School of Medicine, Zhejiang University, Hangzhou 310020, Zhejiang Province, China. Tel: 086 571 87315006; Fax: 086-21-0571 86090073; E-mail: caolipingzju@126.com

References

[1] Hauters P, de Neve de Roden A, Pourbaix A. Cholelithiasis: a serious complication after total gastrectomy. Br J Surg 1988; 75: 899-900.

[2] Lorusso D, Misciagna G, Noviello MR, Tarantino S. Cholelithiasis after Billroth II gastric resection. Surgery 1988; 103: 579-583.

[3] Karaliotas C, Sgourakis G, Goumas C, Papaioannou N, Lilis E, Learndros E. Laparoscopic common bile duct exploration after failed endoscopic stone extraction. Surg Endosc 2008; 22: 1826-1831.

[4] Lee HM, Min SK, Lee HK. Long-term results of laparoscopic common bile duct exploration by choledochotomy for choledocholithiasis: 15-year experience from a single center. Ann Surg Treat Res 2014; 86: 1-6.
[5] Mattila A, Luhtala J, Mrena J, Kautiainen H, Kellokumpu I. An audit of short- and long-term outcomes after laparoscopic removal of common bile duct stones in Finland. Surg Endosc 2014; 28: 3451-3454.
[6] Chan DS, Jain PA, Khalifa A, Hughes R, Baker AL. Laparoscopic common bile duct exploration. Br J Surg 2014; 101: 1448-1452.
[7] Hutchinson CH, Traverso LW, Lee FT. Laparoscopic cholecystectomy. Do preoperative factors predict the need to convert to open? Surg Endosc 1994; 8: 875-80.
[8] Kodama I, Yoshida C, Kofuji K, Ohta J, Aoyagi K, Takeda J. Gallstones and gallbladder disorder after gastrectomy for gastric cancer. Int Surg 1996; 81: 36-39.
[9] Rehnberg O, Haglund U. Gallstone disease following antrectomy and gastroduodenostomy with or without vagotomy. Ann Surg 1985; 201: 315-318.
[10] Sandhya B, Kate V, Koner BC. Effect on gallbladder function subsequent to truncalvagotomy and gastrojejunostomy for chronic duodenal ulcer. Trop Gastroentrol 2005; 26: 43-47.
[11] Lin LF, Siauw CP, Ho KS, Tung JC. ERCP in post-Billroth II gastrectomy patients: emphasis on technique. Am J Gastroenterol 1999; 94: 144-148.
[12] Rhodes M, Sussman L, Cohen L, Lewis M. Randomised trial of laparoscopic exploration of common bile duct versus postoperative endoscopic retrograde cholangiography for common bile duct stones. Lancet 1998; 351: 159-161.
[13] Berthou J, Drouard F, Charbonneau P, Moussalier K. Evaluation of laparoscopic management of common bile duct stones in 220 patients. Surg Endosc 1988; 12: 16-22.
[14] Cuschieri A, Lezoche E, Morino M, Crace E, Lacy A, Toouli J, Faqqioni A, Ribeiro VM, Jakimowicz J, Visa J, Hanna GB. EAES multicenter prospective randomized trial comparing two-stage vs single-stage management of patients with gallstone disease and ductal calculi. Surg Endosc 1999; 13: 952-957.
[15] Kim J, Cho JN, Joo SH, Kim BS, Lee SM. Multivariable analysis of cholecystectomy after gastrectomy: laparoscopy is a feasible initial approach even in the presence of common bile duct stones or acute cholecystitis. World J Surg 2012; 36: 638-644.
[16] Shannon A, Fraser HS. Conversion in laparoscopic cholecystectomy after gastric resection: a 15-year review. Can J Surg 2009; 52: 463-466.
[17] Akira S, Jun N, Hiroyuki N, Toru O, Shigeaski B, Go W. Laparoscopic Cholecystectomy in Patients with a History of Gastrectomy. Surg Today 2008; 38: 790-794.
[18] Dong ZT, Wu GZ, Luo KL, Li JM. Primary closure after laparoscopic common bile duct exploration versus T-tube. J Surg Res 2014; 189: 249-254.