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Comparison of emergent *versus* elective laparoscopic common bile duct exploration for patients with or without nonsevere acute cholangitis complicated with common bile duct stones

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ABSTRACT

Background: Laparoscopic common bile duct exploration (LCBDE) has already been established for the treatment of patients with common bile duct stones (CBDS) in elective situations. However, the effect of emergent LCBDE on those patients with nonsevere acute cholangitis has not been assessed. The aim of this study was to evaluate the effect of emergent LCBDE on patients with nonsevere acute cholangitis complicated with CBDS.

Methods: Seventy-two patients with CBDS admitted from January 2009 to December 2012 were included for this retrospective study. LCBDE of transductal approach for CBDS was performed to all patients. Thirty-seven patients underwent emergent LCBDE for nonsevere acute cholangitis and 35 patients underwent elective LCBDE. Duration of the procedure, complications, retained stone of bile duct, hospital stay, and total charges were compared between the two groups. In addition, the characteristics of patients underwent emergent LCBDE were also compared before and after surgery.

Results: There was no significant difference with regard to the diameter of common bile duct and number of CBDS from imaging and/or operative findings between the two groups. There was no conversion to open common bile duct exploration, no major bile duct injuries, and no mortality in both the group of patients. There was no significant difference in patients with or without acute or chronic cholecystitis, duration of surgery, overall hospital stay (16.41 ± 1.03 *versus* 14.54 ± 0.94, $P > 0.05$), and total charges ($18{,}603 \pm 1774.64$ *versus* $14{,}951 \pm 1257.09$ Yuan in renminbi, $P > 0.05$) between the two groups. Four cases with retained stones were found in patients with emergent LCBDE and two in elective LCBDE patients. There were four cases of biliary leak in patients with emergent LCBDE and three cases in elective LCBDE group, respectively. However, there was no statistical difference

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between the two groups. The biliary leak was cured postoperatively after drainage. Control of septic symptoms was achieved in all patients after emergent LCBDE.

Conclusions: Our data indicated that emergent LCBDE is as safe and effective as elective LCBDE for the treatment of patients with nonsevere acute cholangitis complicated with CBDS.

1. Introduction

The safety and efficiency of laparoscopic common bile duct exploration (LCBDE) has already been established for common bile duct stones (CBDS) in elective situations. However, the effect of emergent LCBDE on patients with acute cholangitis remains to be established. Recent guidelines do not make a positive recommendation for this approach. The current accepted guideline for the diagnosis of acute cholangitis, severity assessment, and treatment was "Tokyo Guidelines" [1]. Endoscopic retrograde cholangiopancreatography (ERCP) and percutaneous transhepatic cholangiography are the major approaches for biliary drainage of acute cholangitis [2]. When the patients present with nonsevere acute cholangitis caused by CBDS, it raises several important questions: What is the best modality of treatment under the giving conditions? Whether a one-stage emergent LCBDE is a safe and effective procedure as an initial and definite management, which saves the function of the sphincter and prevents unnecessary second hospitalizations or a delayed cholecystectomy? Whether the patients are able to tolerate general anesthesia and emergent LCBDE [2]? It is unlikely that one option will be appropriate for all clinical circumstances in all centers. The type and timing of biliary drainage should be based on the severity of the clinical presentation, availability and feasibility of drainage techniques. The aim of this study was to evaluate the safety and efficiency of emergent LCBDE, and to determine whether there is any clinical benefit from emergent LCBDE in the management of nonsevere acute cholangitis with CBDS.

2. Materials and methods

From January 2009 to December 2012, a retrospective clinical study was performed at the Laparoscopic Surgical Center, the Department of General Surgery of Beijing Shijitan Hospital in Capital Medical University. Seventy-two patients with CBDS and gallbladder stones underwent LCBDE of transductal approach and laparoscopic cholecystectomy (LC) were enrolled in this study. Patients with or without nonsevere acute cholangitis were given either an emergent or elective LCBDE. All patients had evidence of a dilated common bile duct ($\geq$8 mm in diameter) with choledocholithiasis and gallbladder stones in magnetic resonance cholangiopancreatography and/or sonography before LCBDE. The diagnosis of nonsevere acute cholangitis (mild and moderate severity) was based on a combination of clinical features, laboratory data, and imaging findings (Tokyo Guidelines). Organ dysfunction and severe acute cholangitis with septic shock were excluded [1].

Patients with previous upper abdominal surgery, body mass index $\geq$35 kg/m^2, acute pancreatitis or generalized peritonitis, serious cardiopulmonary diseases, advanced cirrhosis, or other comorbid conditions that preclude general anesthesia and operation were also excluded [2]. Patients treated by the transcystic approach, common bile duct $<$8 mm in diameter, suspected malignant or other nonstone obstruction, and primary closure of common bile duct after LCBDE were not included in this study.

Patients were divided into two groups according to predetermined criteria: (1) emergent LCBDE and (2) elective LCBDE. Outcomes in terms of patient demographics (age, sex), diameter of common bile duct, number of CBDS, pathologic type of cholecystitis, duration of surgical procedure, conversion rate, complication rate, retained stone of bile duct, length of hospital stay, and total charges were compared between the two groups. The characteristics of emergent LCBDE patients were also compared before and after surgery.

Broad-spectrum intravenous antibiotic therapy was administered to all emergent patients. A single dose of antibiotics was given to elective patients 1 h before surgery.

LCBDE was performed randomly by two specialists with more than 10 y of experience in hepatobiliary and laparoscopic surgery. They usually operated with comparable speed. The surgeons followed a protocol stating that emergent LCBDE and LC was performed on patients as soon as possible after the confirmation of the diagnosis with nonsevere acute cholangitis. As the surgeons were called based on predetermined criteria, they had no noticeable mandate to select patients.

The standard four-trocar operative technique was used for LCBDE and LC. The operation was started with dissection of Calot's triangle. The cystic duct and artery were clipped, and the cystic artery was divided. The gallbladder was left *in situ* and used for retraction until LCBDE was completed. An incision was made on the common bile duct longitudinally. The first technique used to remove stones was to flush the common bile duct with normal saline. If the stones remained after flushing, the basket was inserted through the instrument channel or operating port of the choledochoscope into the common bile duct. Baskets can also be used to capture the stones directly. After all stones were retrieved, clearance of the common bile duct was confirmed with choledochoscopic visualization. If the stone was large or impacted and the previously mentioned maneuvers for removing stones failed during elective LCBDE, the retained stone will be removed postoperatively by a T-tube. Choledochoscope and stones retrieved were not necessary during emergent LCBDE to shorten the operation time and lower the risk of the procedure. If it was done, choledochoscope will be finished within 30 min. No patient underwent intraoperative cholangiography. Closure over a T-tube for choledochotomy was required with