International Journal of Medical Science and Clinical Research Studies

ISSN(print): 2767-8326, ISSN(online): 2767-8342

Volume 03 Issue 10 October 2023

Page No: 2352-2354

DOI: https://doi.org/10.47191/ijmscrs/v3-i10-47, Impact Factor: 6.597

Current Surgical Treatment of Choledocholithiasis and use of T-tube drainage

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ABSTRACT

Choledocholithiasis has an incidence of 5-10%, 21-34% are secondary to stone migration. The incidence increases with age. The most frequent complications are biliary pancreatitis, cholangitis, or liver abscesses.[1]

For the diagnosis, the conjunction of clinical symptoms, laboratory and imaging is required; ultrasound has a sensitivity of 77 to 87%. [2,3]

The treatment is surgical, previously the two-stage approach was accepted, however, currently there has been an important change in the treatment, some surgical units perform ultrasound endoscopy with sphincterotomy preoperatively when choledocholithiasis is suspected, while others combine surgical extraction of stones with laparoscopic cholecystectomy in a single surgical event. [4,5]

Another change in the current surgical treatment is the controversial use of the T-tube, since the main indication for its placement is the suspicion of a residual stone, however, this recurrence appears in a minimum percentage and the complications that derive from the placement of this are greater than its benefit, which is why a primary choledochorrhaphy is currently preferred. [5,6]

Several studies that have compared these two approaches have concluded that the approach in a single surgical event is better, since hospital time is shorter, stone extraction is more successful, and postoperative complications are less frequent. [6,7]

KEYWORDS: treatment of choledocholithiasis, T-tube, Surgical technique

ARTICLE DETAILS

Published On:
20 October 2023

Available on:
https://ijmscr.org/

INTRODUCTION

In the West, choledocholithiasis has an incidence of 5-10% in patients undergoing laparoscopic cholecystectomy for symptomatic cholelithiasis; 21 to 34% of choledocholithiasis are secondary to stone migration. [1]

The incidence increases with age. The most common complications of choledocholithiasis are biliary pancreatitis, cholangitis, or liver abscesses. [1]

The initial evaluation includes ultrasound, which has a sensitivity of 77-87%, which seeks to detect dilation of the bile duct as well as liver function tests. Other imaging studies include CT with a sensitivity of 65-88%. and specificity of 73-97%, cholangioresonance with a sensitivity of 85%-92% and a specificity of 93-97%, however this sensitivity is reduced when there are stones smaller than 6 mm, endoscopic ultrasound has a sensitivity of 89-94 % and specificity of 94-99% and laparoscopic ultrasound sensitivity of 71-100% and specificity of 96 to 100%. [2]

For the diagnosis of these patients, the conjunction of clinical symptoms, laboratory and imaging is required. [1,2]

THEORETICAL FRAMEWORK

Currently there are two methods available for treatment: the two-stage approach using endoscopic retrograde cholangiopancreatography plus endoscopic sphincterotomy and delayed laparoscopic cholecystectomy and the single-stage approach that includes laparoscopic exploration of the main bile duct. [3]

The laparoscopic approach can be via a transcystic or transcholedochal approach. The success rate is greater than 90%, morbidity is 8-15% and mortality is 1%. Failure in this approach is managed by conversion to laparotomy with bile duct exploration or postoperative endoscopic retrograde cholangiopancreatography with sphincterotomy. The complications of this approach are bile leak, subhepatic abscesses, residual stone, infection of the surgical site,

complications of the T-tube if it occurs as accidental traction of the same, obstruction of the bile duct, cholangitis, infection, and electrolyte imbalance. [4]

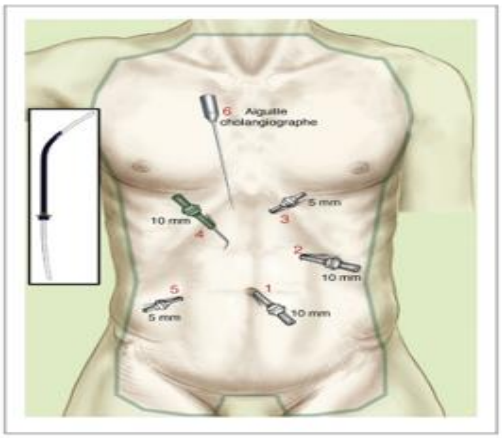

Image 1. Trocar positions.

The approach using endoscopic retrograde cholangiopancreatography with sphincterotomy has a sensitivity of 90% and specificity of 98%, success in stone extraction is 74 to 100%, morbidity of 5%, it can be preoperative, intraoperative, and postoperative. Complications include pancreatitis, hemorrhage, infection, and perforation. [5]

Twenty years ago, the accepted management was a two-stage approach consisting of initial laparoscopic cholecystectomy followed by endoscopic cholangiopancreatography (ERCP) with sphincterotomy and stone extraction. Currently, there has been an important change in treatment, since some surgical units perform ultrasound endoscopy with sphincterotomy preoperatively when choledocholithiasis is suspected, while others combine surgical stone extraction with laparoscopic cholecystectomy in a single surgical event, since it does not produce an increase in morbidity or mortality, but on the contrary, the patient benefits by avoiding a second general anesthesia and two hospitalizations. [3,4,5]

For the one-stage laparoscopic surgical strategy, the surgeon must fully master the techniques of a well-standardized procedure that has been enhanced by the support of recent technical innovations. First, the surgeon must have a thorough ability to interpret inter-operative cholangiography (IOC), which determines the need for common duct exploration. IOC is performed routinely for two reasons: to verify the presence of cholodocholithiasis and to identify abnormalities of ductal anatomy or bile duct injury. [3,4,5]

The procedure consists of dissecting the cystic duct until its junction with the common duct, confirming that the common duct is free of stones after exploration using 2 techniques: choledochoscopy and cholangiography, confirming the integrity of the common duct using cholangiography after the procedure, draining the common canal if necessary and drain the operative site. [3,4,5]

SURGICAL TECHNIQUE

Abdominal access is performed using 5 trocars (three 10 mm trocars and two 5 mm trocars) (image1). [3,4]

Exposure of the bile duct is achieved by cranial and lateral traction of the gallbladder. The cystic duct is milked into the gallbladder and divided at the beginning of the procedure to prevent stones from passing into the main bile duct during manipulation. The preferred method for exploration of the main bile duct is through a supraduodenal longitudinal choledochotomy. To extract the stones, a combination of irrigation with saline solution, Dormía basket or balloon catheter is used under direct vision with a flexible choledochoscope. (Image 2) [3,4]

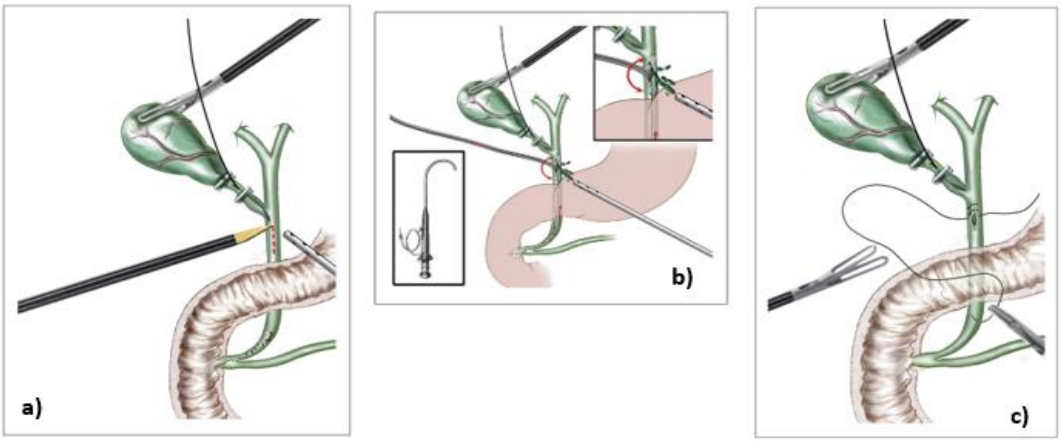

Image 2. a) Choledochotomy. b) Choledochoscopy and retrieval of common duct stones. C) Choledochorraphy

The absence of stones is confirmed by choledochoscope or cholangiography. In the first cases, a T-tube was left; from 2006 to 2013, antegrade stent placement was routinely performed for biliary decompression before bile duct closure. Since mid-2013, primary choledochorrhaphy without stenting has been performed. To finish the surgery, a cholecystectomy is performed in a standard manner. [3,4]

Traditionally, surgeons have used a T-tube through the common bile duct cut. The T-tube is shaped like the English letter "T", the upper part is placed inside the common bile duct, while the long lower part is placed outside the abdomen through a small cut and connected to a bag, this tube is inserted With the intention of preventing the buildup of bile in the common bile duct due to temporary edema, the buildup of bile along with the edema can potentially prevent healing of the bile duct, resulting in the loss of bile from the common bile duct into the abdomen, bile loss. uncontrolled in the abdominal cavity can be fatal if not detected and treated appropriately, in addition to acting as a bile drain, dye can be injected into the T-tube and an x-ray used to detect any residual stones. [6]

Several current publications mention that the use of T-tube has fallen into disuse, the percentage of complications due to its placement is 2.2%, the most common are external biliary fistula, biloma, biliary ascites, bacteremia, and biliary peritonitis.[6]

T-tube bile duct drainage results in significantly longer operative time and hospital stay compared with primary closure. Based on currently available evidence, there is no justification for the routine use of T-tube drainage after open common bile duct exploration in patients with choledocholithiasis. Long-term complications are biliary stricture and recurrence of common bile duct stones. [7]

Regardless of the method chosen in the management of choledocholithiasis, there are recurrences, the incidence of long-term recurrence is higher in the two-stage strategy 4-21% compared to 2-8% of the single-stage approach that includes laparoscopic exploration of the main bile duct. Risk factors for patients undergoing the two-stage strategy are the presence of dilation or angulation of the main bile duct, the existence of a periampullary diverticulum, and previous biliary surgery. [6,7]

CONCLUSION

According to current literature, new minimally invasive approaches have been sought for the treatment of choledocholithiasis. Treatment in a single surgical event has been superior since it does not produce increased morbidity or mortality, but on the contrary, the patient benefits by avoiding a second general anesthesia and two hospitalizations. Hospital time is shorter, as is surgical time, stone extraction is more successful, and postoperative complications are less frequent. The use of a T-tube is controversial due to the complications that arise from it, so currently primary choledochorrhaphy is preferred.

CONFLICT OF INTERESTS

The authors declare that they have no conflict of interest.

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