Which Technique is better in the Management of Cholelithiasis with Choledocholithiasis: Endoscopic Retrograde Cholangiopancreatography or Common Bile Duct Exploration with Primary Closure or T-Tube Drainage? A Critical Review

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Abstract: There remains a conflict of opinion in approach to treatment of cholelithiasis with choledocholithiasis. Available options range from open surgery, endoscopic and laparoscopic exploration. Nowadays intravenous cholangiography has been replaced by magnetic resonance cholangiopancreatography (MRCP), endoscopic ultrasound (EUS) and ERCP. The most direct method of dealing with choledocholithiasis preoperatively is by endoscopic retrograde cholangiopancreatography (ERCP). Generally, in well-equipped centres of the world, ERCP followed by laparoscopic cholecystectomy is recommended as a safe and cost effective procedure. However, various centres advocate laparoscopic cholecystectomy with common bile duct (CBD) exploration or a Rendezvous technique where endoscopy and laparoscopy are performed simultaneously. The present article discusses the uses, advantages and disadvantages of ERCP against CBD exploration with primary closure or T-tube drainage.

Keywords: Endoscopic Retrograde Cholangio Pancreatography, Common Bile Duct Exploration, Cholelithiasis, Choledocholithiasis.

Introduction

Cholelithiasis and Choledocholithiasis have affected mankind since time immemorial. Archaeological excavation more than 2000 years ago has demonstrated the presence of gall stones in gall bladder and CBD. The first cholecystectomy was performed in 1882 by Carl Langenbuch.1

Endoscopic Retrograde Cholangiopancreatography

At present, preoperative ERCP followed by LC is the treatment policy frequently adopted. In 1968, William McCune, a surgeon and gastrointestinal endoscopist, along with his colleagues were credited with the first endoscopic cannulation of ampulla of vater in a living patient. He used an Eder fiberoptic duodenoscope which had both a forward and side lens and an endotracheal type cuff placed on the scope beyond the lens.2 The balloon was inflated and deflated to enable adequate focal length for mucosal visualization. He taped a small diameter plastic tube that served as a tract to the endoscope that could house a bendable cannula. The cannula was advanced to the major duodenal papilla under endoscopic guidance. McCune’s cannulation success rate was only 25% in his report of 50 patients. In March 1969 in Japan, Oi and colleagues in close collaboration with Machida were able to cannulate the papilla in 41 of 53 patients without significant morbidity. He performed the first Endoscopic Cholangiopancreatogram (ECPG).3 Since the introduction of endoscopic retrograde cholangiopancreatography (ERCP) in the 1970s and of endoscopic sphincterotomy (ES) in 1974, use of endoscopic techniques for the diagnosis and therapy of biliary stones has been increased.

Endoscopic retrograde cholangiography (ERC) with endoscopic sphincterotomy (ES) and extraction of stone was first described in 1974 and has been a first-line management strategy for choledocholithiasis for the past 2 decades.4 The diagnostic and therapeutic utility of ERCP has been well demonstrated for the management of choledocholithiasis. After 1980’s, the most direct method of dealing with choledocholithiasis preoperatively has been the ERCP.
Although the success rate for stone clearance in isolated ERCP treatment is up to 87% to 97%, up to 25% patients required two or more ERCP treatment. P. Navicharern et al., \(^5\) did a study between 1988 and 1993 in 56 patients in which management of large CBD calculi was done by ERCP and stent placement which carries a low morbidity and mortality. D J Bowrey et al., \(^6\) in year 1998 did a study in 204 patients between year January 1992 and November 1994 and found that ERCP stenting can be employed with an acceptable complication rate.

Lau et al., \(^7\) in 2006 conducted a study in Chinese patients above 60 years of age who underwent endoscopic sphincterotomy and removal of bile duct stones with the addition of cholecystectomy that reduced recurrent biliary events. In a study conducted in 2013, Kulbir Mann et al., \(^8\) proposed that late cholecystectomy after ERCP to be safe and associated with low peri-operative complications. Ramlah Ghazanfor et al., \(^9\) studied 200 cases of choledocholithiasis from Jan. 2015 to Dec. 2016. Successful ERCP followed by cholecystectomy was performed in 88.5% of cases. 11.5% patients had failed ERCP due to impacted stones. They underwent open surgical procedures, i.e., 43.48% (n=10) underwent choledochotomies, 47.82% (n=11) underwent choledocho-duodenostomies and 8.69% (n=2) underwent hepaticojejunostomies. In cases where ERCP fails, open surgical procedures still remain a relevant and a definitive option in resource-constrained setups.

Although very rare today given the success of stone removal by means of endoscopic or laparoscopic techniques, there are still several indications for proceeding with an open bile duct exploration. The most obvious example is those patients who are undergoing another open abdominal procedure or an open cholecystectomy because of concomitant problems or past surgeries, making a laparoscopic approach very difficult. In addition, some patients will undergo an open exploration because of conversion of a laparoscopic procedure to an open one. Finally, open common bile duct exploration still is considered the gold standard for the removal of common bile duct stones, if the surgical team does not have the experience or feels uncomfortable with the laparoscopic approach, or qualified endoscopists are not available. The first common bile duct exploration was done in London in 1889 by Knowsley Thornton and in 1890 by Ludwig Courvoisier in Basel who introduced the use of T-tube for safer closure of the common bile duct. 8 years after Langenbuch reported first cholecystectomy. \(^10\)

CBD Exploration with Primary Closure or T- Tube Drainage

R. H. Follis, Sr. in 1919 first performed operation on common duct for removal of a common duct stone and T-tube was inserted into the common bile duct of William S Halsted.\(^1\) Drainage of the common bile duct (CBD) using a T-tube has been standard practice following cholecodochotomy for choledocholithiasis. The T-tube serves to decompress the biliary tree and prevent extravasation of bile through the cholecodochotomy incision. It also facilitates postoperative cholangiography and removal of residual stones. T-tubes, used for about a century now, remain the preferred method of duct drainage following CBDE. They have the advantages of a route by which to perform cholangiography and the possible use of the tract for retrieval of residual stone.

Mohamed A. Abdel-Raheem et al., \(^12\) in year 2015 did cholecystectomy and common bile duct exploration in fifty patients. In 45 cases, CBD exploration was performed through a supraduodenal cholecodochotomy and primary closure was done; in five of these choledochoduodenostomy was performed. He concluded that open CBD exploration and primary closure has good perioperative patient outcome. Bilent AYDINLI et al., \(^13\) in year 2016 did a study in 282 patients with common bile duct stones who underwent open cholecystectomy with choledochotomy with primary closure in 48 (17.0%) patients, primary closure with T-tube drainage in 81 (28.7%) patients and choledochoduodenostomy in 153 (54.3%) patients. They concluded that Primary closure is a safe and feasible method in selected patients.

Rajkumar Sharma et al., \(^14\) in year 2017 did a study between April 2013-March 2016 in 14 patients all patients underwent open cholecystectomy with choledocholithotomy with T-tube drainage. Surgery resulted in complete duct clearance in 93% of patients. Asaduzzaman M et al., \(^15\) in year 2017 did a study in Tangail Medical College Hospital, Tangail, from January 2010 to December 2015, in 30 patients out of which 15 had primary closure of CBD after stone removal and T-tube drain was placed in remainder. Both the comparison groups were subjected to CBD exploration after cholecystectomy. They found that primary closure did not increase the risk of postoperative bile leakage. Primary closure of CBD is a safe and effective alternative measure and is associated with low complication rates when compared with repair over T-tube.

CONCLUSION

Since long, open CBD exploration has been the common traditional approach for the treatment of bile duct stones. ERCP started for extraction of CBD stones in mid 70's and quickly established itself as a preferred method for treatment of CBD stones.

REFERENCES


