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Review Article

Overview on Current Trends in the Management of Gall stones with Concomitant Bile duct stones

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Abstract

Laparoscopic cholecystectomy is the standard treatment for symptomatic gall stones but opinions differ in managing concomitant bile duct stones. Pre- or post-operative ERCP, Laparoscopic or open CBD exploration and single stage laparoscopic cholecystectomy with intra operative ERCP are the various options to manage such situations. Single stage laparo-endoscopic management of gall stones with bile duct stones is gaining acceptance as feasible, safe and cost-effective modality provided required resources and expertise are available.

Keywords: Concomitant bile duct stones; ERCP; LCBDE; Laparo-endoscopic rendezvous; CBD exploration; Biliary sphincterotomy

Introduction

Symptomatic cholelithiasis merits laparoscopic cholecystectomy. Nearly 10-15% of patients waiting for laparoscopic cholecystectomy could harbor simultaneous bile duct stones [1,2]. Bile duct stones should be tackled swiftly in order to prevent potential life-threatening complications like cholangitis, biliary pancreatitis and obstructive jaundice. Clear guidelines are lacking for management of gall stones with concomitant bile duct stones. Various options are available namely open surgery, endoscopic intervention and laparoscopic approach. We aim to formulate practical guidelines for management of such cases after carefully considering the available current evidence, local resources and surgical expertise.

Patient with gall bladder stones could present with biliary colic or with complications like acute cholecysttis, Mucocele of GB and Empyema of GB. 10-15% % of such patients could also have common bile duct stones. Bile duct stones could be asymptomatic or can present with intermittnet jaunce, fever and pain (Charcot's triad). Past history of jaundice, pancratitis should also alert us to the possibility of bile duct stone [3,4].

Though raised direct bilirubin, raised alkaline phosphaste and marginally raised transaminases are often noted in cases of bile duct stones, there are occasions when liver function test could be totally normal [1-4].

Transabdominal ultrasound is usually very sensitive and specific to pick up gall stones. But abdominal ultrasound has only about 60% sensitivity in picking up bile duct stones. Dilated bile duct (more than 6 mm) could be the lone indirect indicator of distal CBD stone and hence one should be watchful.

Spiral CT abdomen is ideally suited to evaluate jaundiced patient with mass lesions.

MRCP (magnetic resonance cholangiopancreatography) is the MRI of biliary and pancreatic tree and it is very sensitive and specific to pick up bile duct stones up to 5mm in size. MRCP is considered as the investigation of choice nowadays to evaluate cases with combined gall stones with bile duct stones.

Endoscopic ultrasound is an invasive diagnostic modality with high specificity and sensitivity that is much better than MRCP. But it is highly operator dependent and available only in few centers hence EUS is seldom useful for routine practice.

ERCP (endoscopic retrograde cholangiopancreatography) is the treatment of choice for bile duct stones. Its benefits are obvious if we compare it with open and laparoscopic bile duct exploration. But one has to keep in mind the potential complications of ERCP like post ERCP pancreatitis, bleeding and perforation if not performed well.

Options for management of gallstones with concomitant bile duct stones

- Two session procedures:
- ERCP followed byLap cholecystectomy
- Urgent Pre-operative ERCP
- Elective Pre-operative ERCP
- Lap cholecystectomy followed by post op ERCP
- Single session procedures:
- Lap cholecystectomy with intra operative ERCP

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- Laparoscopic exploration of CBD
- Trans cystic exploration
- Transductal exploration

Role for Urgent Preoperative ERCP

Following situations warrant urgent pre-operative biliary decompression by ERCP prior to tackling gall stones 8.

1. Patient with acute cholangitis who fails to respond to antibiotic

therapy or who has signs of septic shock would require urgent biliary decompression. Endoscopic CBD stone extraction and/or biliary

stenting is recommended in this setting

2. Patient with pancreatitis of suspected or proven biliary origin

who has associated cholangitis or persistent biliary obstruction is recommended to undergo biliary sphincterotomy and endoscopic Stone extraction within 72 hours of presentation?

Role for elective pre-operative ERCP

(Sequential therapy or Twin session therapy)

In patient with combined gall stone and bile duct stones, the conventional treatment is elective pre-operative ERCP to clear the bile duct followed by lap cholecystectomy after few days. This method of sequential therapy entails prolonged hospital stay, 2 separate procedures by 2 different teams with associated expenses. Hence following method of single session procedure of laparoscopic cholecystectomy and intra operative ERCP has received the attention of surgical fraternity

Philosophy of Single Stage ERCP with Lap cholecystectomy [5-10]

(Simultaneous therapy, Single session therapy or Laparo-endoscopic rendezvous technique)

In patient with combined bile duct stones and gall stones, we can make a case for single session ERCP and lap cholecystectomy with obvious benefits,

Provided the following favorable findings are present

- Patient is stable and no evidence of significant sepsis
- Mild (Bilirubin < 5) or no jaundice
- CBD showed one or few small stones (<10mm) and no proximal stricture or abnormal anatomy
- Patient has no history of previous upper GI surgery
- Availability of expertise for single stage ERCP and Lap cholecystectomy

Type 1 Single session therapy: (ERCP followed by Lap cholecystectomy)

Patient is given GA. Do ERCP to confirm bile duct stones followed by Sphincterotomy and balloon sweep or Dormia basketing to remove all the stones. Perform balloon occlusion cholangiogram to confirm clearance of bile duct and place 7F biliary plastic stent. Insert nasogastric tube to deflate the gut that is followed by 4 ports conventional laparoscopic cholecystectomy and subhepatic drain placement.

Proponents for this approach prefer because of following reasons

- Bile duct stones are cleared prior to lap cholecystectomy
- If any difficulty with ERCP or inability to remove stone after ERCP, one could plan for either laparoscopic or open CBD exploration in the subsequent session

Type 2 Single session therapy: (Lap cholecystectomy followed by ERCP)

Patient is given GA. Perform 4 port lap cholecystectomy. Intra operative cholangiogram is done if patient had no recent MRCP to confirm the size of bile duct and size, site and number of bile duct stones. Following the extraction of GB, we routinely place a subhepatic drain in patients undergoing ERCP. Then we perform ERCP in the supine position (our preferred method) to confirm size and number of stones and exclude bile duct injury or any cystic stump leakage following cholecystectomy. Some centers prefer insertion of hydrophilic guidewire through cystic duct during laparoscopic procedure to enable the endoscopist to perform sphincterotomy with relative ease. Bile duct stones are usually removed by using biliary Fogarty balloon or Dormia basket. In selected cases of larger bile duct stones (10-15mm), one could consider CRE balloon sphincteroplasty to aid easy removal of stone or else one may have to consider mechanical lithotripsy. Following clearance of bile duct, a double pigtail plastic stent is placed which can be removed after 2-3 weeks.

We have reviewed our results during year 2015-18. Total of 79 patients had undergone treatment for gall stones with concomitant bile duct stones (Two session procedure in 41 patients and single session procedure in 38 patients). Results were comparable in both groups with shorter hospital stay in single session group (5.3 Vs 3.8 days)

We prefer this approach because of following reasons

- Lap cholecystectomy is relatively easy before ERCP. Gaseous distension of bowels makes post ERCP cholecystectomy technically demanding.
- ERCP following Lap cholecystectomy helps to assess for secure cystic duct clipping and for any bile duct injury or leakage

A case for Lap cholecystectomy with LCBDE [14-18]

It is recommended that, in patients undergoing laparoscopic cholecystectomy, trans cystic or transductal laparoscopic bile duct exploration (LBDE) is an appropriate technique for common bile duct stone removal. There is no evidence of difference in efficacy, mortality or morbidity when LCBDE is compared with perioperative ERCP. It is recommended that the two approaches are considered equally valid treatment options.

In experienced hands, laparoscopic CBD exploration has a success rate of over 90 percent. There are two different types of CBD exploration namely trans cystic and transductal exploration.

When a decision has been made to perform CBD exploration, Intraoperative cholangiography should be performed to confirm the diagnosis and outline the biliary anatomy before the formal exploration is undertaken

Contrast is then injected under continuous fluoroscopic visualization with 1:1 dilution of water-soluble contrast and water. The images should be evaluated for the length of the cystic duct and the junction with the CBD, the size of the CBD, free flow of contrast into the duodenum, the intra and extrahepatic biliary anatomy, and the presence of filling defects.

The following findings on cholangiography namely dilated bile ducts, filling defects, or failure of contrast flow into the duodenum suggest possible presence of bile duct stones.

Consider following factors to choose the appropriate type of CBD exploration

- Patient factor
- Age
- Co morbid illness
- Fitness for GA
- No, size & location of stones
- Size of bile duct
- Size and course of cystic duct
- Surgeon factor
- Expertise and Resource
- Cost, effectiveness & morbidity of the procedure

Transcystic exploration of CBD

Transcystic choledochoscopy may require dilatation of the cystic duct to accommodate the scope, although the cystic duct is usually enlarged due to the passage of stones. The choledochoscope is placed through a 5 mm port and manipulated into the cystic duct with atraumatic instruments. The choledochoscope can then be advanced through the CBD and into the duodenum. The choledochoscope should be connected to high-pressure saline for irrigation of the duct and to improve visualization. Adaptors for insertion of wire retrieval baskets are necessary. Additional video monitors, or screen-in-screen technology, are utilized for monitoring. If a stone is seen through the choledochoscope, wire basket retrieval can be performed through the working channel of the scope and offers the advantage of direct visualization of stone capture and withdrawal as compared with fluoroscopically-guided wire basket retrieval.

Laparoscopic ductal exploration

Laparoscopic ductal exploration is indicated for patients unsuitable for or failed after laparoscopic trans cystic exploration or preoperative endoscopic stone extraction. Following findings are favorable for performing LCBDE namely dilated CBD, large stones (>10 mm), multiple stones and stone location proximal to the cystic duct/CBD junction

Key steps:

- Expose and clear supra-duodenal CBD
- Perform 1cm vertical choledochotomy
- Removal of bile duct stones can be achieved by
- Squeeze technique using pair of non-traumatic forceps
- Flushing the common duct with saline
- Using a biliary Fogarty balloon catheter or Dormia basket
- Using a choledochoscope
- Ensure complete clearance of all biliary sludge and stone
- Place a plastic stent in the bile duct and ensure its pigtail has reached duodenum.
- Interrupted 3-0 PDS suture closure of incised bile duct
- Primary closure of choledochotomy with interrupted fine monofilament absorbable suture (3-0 PDS) is safer than closure around a T tube and this results in less operating time, less post-operative biliary complications and faster recovery 20,21
- Place a subhepatic drain

Rarely in case of large bile duct more than 15mm with distal stricture, might one consider choledocho duodenostomy.

In short, laparoscopic CBD exploration needs high level of expertise, team work and vast array of additional equipments

Bile duct stone following Lap cholecystectomy [18]

At times, patient will be presenting with pain abdomen, fever or jaundice few days to few months after cholecystectomy. Further biochemical and radiological investigation will help us to find the cause. Often it is due to overlooked and persistent stone in the bile duct. ERCP and sphincterotomy is obviously the best and only option for such situation. One has to consider post cholecystectomy biliary stricture as a differential diagnosis and be vigilant in tackling such cases.

Management of difficult bile duct stones

Most of the bile duct stones can be tackled by ERCP. At times it can be a tough task. Following situations make ERCP very challenging.

- Peri ampullary diverticulum with difficulty with cannulation
- Large, square shaped bile duct stones more than 15mm diameter each
- Bile duct stones along with distal stricture
- Intrahepatic stones
- Mirrizi's syndrome
- Altered Upper GI anatomy Eg: Billroth II Gastrectomy

Adequate training and expertise, use of additional accessories could help one to succeed in such difficult situation. Spyglass choledochoscopy and laser lithotripsy is ideally suited for patients with large stones and intrahepatic stones. Laparoscopic CBD exploration could be considered in cases of failed ERCP.

Conclusion

Gall stones with concomitant bile duct stones can be managed by single stage one step procedure of laparoscopic cholecystectomy along with intra operative ERCP. It is safe procedure with additional benefits like single anesthesia, shorter hospital stays and lesser expenses. Key pre requisites are the availability of expertise and resources at the time of this laparo-endoscopic rendezvous procedure. Surgeon with adequate training to perform ERCP would be a great asset.

Key Messages

- Gall stones with concomitant bile duct stone occur in 10-15% of cases coming for laparoscopic cholecystectomy.
- MRCP is the investigation of choice for evaluating bile duct stones
- Single stage Laparoscopic cholecystectomy with ERCP is feasible, cost effective and safe.
- Single stage laparoscopic cholecystectomy along with CBD exploration has comparable outcome and selection of either one of the modalities depends on surgeon's choice and availability of local resources and expertise.

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