



CHOLEDOCHOLITHIASIS – OUR EXPERIENCE

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ABSTRACT

Gall stone disease is widely prevalent disease in Northern India. Stones formed in the gall bladder can migrate into the common bile duct (CBD) and can cause obstructive jaundice or pancreatitis. Various pre operative investigations like deranged liver function test (LFT), ultrasound, MRCP and ERCP can raise doubt to the presence of stones in CBD. Treatment options for CBD stones include open surgical management, ERCP extraction of CBD stone followed by Lap cholecystectomy or Lap Cholecystectomy with Lap choledocholithotomy.

KEYWORDS : Choledocholithiasis, CBD stones, T tube drainage, ante grade stenting, ERCP

Introduction:

Stones in the biliary tree are one of the more common conditions affecting humans since a long time.

Majority of the stones form in the gall bladder, where they may remain asymptomatic, or cause recurrent attacks of colic, cholecystitis or migrate to the common bile duct (CBD), generally referred to as Choledocholithiasis and cause obstructive jaundice and in some cases cause biliary pancreatitis. (1) Upto one fifth of patients of cholelithiasis can also have a stone in CBD. (2,3) Gall stone disease is known to progress from the state of lithogenic phase, where there are conditions which can favour formation of gall stones to formation of gall stones which may or may not be symptomatic and can progress to a complicated gall stone disease in the form of CBD stones and biliary pancreatitis.

Although the indications for intervention in asymptomatic gall stones vary, but presence of complicated gall stone disease usually requires an intervention to prevent or lessen the morbidity associated with it. Presence of stones in CBD can cause obstructive jaundice and ascending cholangitis with associated morbidity and mortality. Various scoring systems have also been described to stratify the risk of carrying a CBD stone. (4-7) CBD Stones (CBDS) are generally divided into two types:

Primary CBD stones, which form within the CBD, are less frequent and are seen in the setting of bile stasis, like cystic fibrosis or in the Eastern countries in the setting of Recurrent Pyogenic Cholangitis.

Secondary CBD stones are the stones which form within the gall bladder and later migrate to the CBD. Secondary CBD stones are more commonly seen and widely studied. Up to 20 % of gall stones are associated with CBD stones. Not only the optimal treatment, but also the most effective and cost effective diagnostic test to diagnose CBD stones remains controversial. CBD stones can be diagnosed on Trans abdominal ultrasound. Advanced investigations for diagnosis include ERCP, MRCP, Endoscopic Ultrasound and intra operative diagnosis. (8,9,10) Indications for diagnostic ERCP are shrinking day by day, and are generally reserved for therapeutic purposes now. MRCP and EUS are probably safer alternatives than ERCP to diagnose choledocholithiasis. Once the CBD stones are diagnosed, the next controversy starts about how to deal with them.

Three options those are available currently:

1. Open cholecystectomy with choledocholithotomy
2. ERCP for removal of CBD stones followed by a Laparoscopic Cholecystectomy
3. Laparoscopic Cholecystectomy and Lap CBD Exploration (LCBDE)

The choice among these three depends of the facilities and skills available at the treating centre.

Choledocholithiasis was traditionally considered a surgical disease, however with advances in medicine and endoscopic procedures, more and more number of cases are managed with ERCP. However, Choledocholithotomy still remains an essential tool in the management of CBD stone. CBD exploration, removal of CBD stones and closure of CBD over a T tube was the only procedure available for a long time.

Use of intra-operative cholangiography or choledochoscopy can further help the operating surgeon in CBD clearance and decrease the incidence of retained stones in CBD. (11,12,13) T Tube insertion allows the high pressure biliary system to remain decompressed while the CBD repair matures and heals. T tube also allows for carrying out T tube cholangiogram prior to its removal which can diagnose retained CBD stones. But since T tube is kept for around 10 to 14 days, it leads to controlled external biliary fistula, which adds to the morbidity of the procedure.

Other options for managing the CBD after choledochotomy include primary closure with or without internal stent and biliary enteric anastomosis.

Materials and Methods:

The study was done retrospectively from October 2014 to September 2017 at IIMSR, Lucknow.

All patients who were treated for choledocholithiasis were studied. Diagnosis of choledocholithiasis was made either pre-operatively or intra operatively.

Pre-operative diagnosis of choledocholithiasis was made based on Liver function tests (LFT), trans abdominal ultrasound, MRCP or ERCP.

Intra-operatively diagnosis of CBD stones was made on direct palpation of CBD per operatively.

Intra-op choledochoscopy whenever employed was done with the help of 5.9 mm flexible endoscope which helped in direct visualisation of CBD and confirmation of stone extraction. Passage of endoscope into duodenum with this calibre of endoscope is difficult unless a sphincterotomy has already been done pre operatively. A thinner pediatric flexible endoscope may be easy to pass into the duodenum.

Patients who underwent CBD closure over a T tube underwent T tube cholangiogram on POD 10 or 11 to look for any retained stone and T tube removal on POD 14.

Results:

A total of 68 patients were found to have CBD stones during the study period and of these, 4 were lost for follow up and were not

treated at our centre and 6 patients underwent ERCP and stone removal and only cholecystectomy and were not included in the study.

A total 58 patients were treated for choledocholithiasis surgically, based on either pre operative or intra operative diagnosis.

Of these, 54 patients were diagnosed pre operatively based on combination of LFT and trans abdominal ultrasound/MRCP/ERCP. LFT and trans abdominal ultrasound was done in all the patients. ERCP was done in 4 patients and failed to extract stone and were managed by surgical intervention. MRCP was utilised in 4 patients.

4 patients were found to have CBD stones intra-operatively.

6 patients had documented cholangitis, which was treated on in hospital basis during previous admissions and planned for elective surgery at a later date.

4 patients had failed ERCP, who underwent ERCP with sphincterotomy and CBD stenting.

Trans abdominal ultrasound in combination with LFT was the most commonly used investigation and was done in all cases. In patients with deranged LFT with suspicion of extra hepatic biliary obstruction were subjected to MRCP to further delineate the cause of obstruction and was employed in 4 cases.

A total of 10 patients opted for pre operative ERCP for removal of stones and was successful in 6 patients.

As for management part, out of these 58 patients 55 patients underwent open cholecystectomy with choledocholithotomy, 2 patients underwent lap converted open cholecystectomy with choledocholithotomy and 1 patient underwent Lap cholecystectomy with Lap CBD Exploration with closure over T tube. In 23 patients, after stone extraction from CBD, direct palpation of CBD was done till the lower end after mobilisation of duodenum to confirm complete removal and passage of infant feeding tube till the duodenum. 1 patient in this group had retained stone on T tube cholangiogram and was then subjected to ERCP for removal of stone. In this patient the T tube was removed only after ERCP cleared the stone.



Fig 1. Figure showing intra operative choledochoscopy.

In 35 patients intra-op choledochoscopy was done with the help of 5.9 mm flexible endoscope for confirmation of stone clearance. In this group, 19 patients had CBD closure over a T tube while the remaining 16 had antegrade CBD stent placement and closure.

Discussion:

Management of CBD stones has changed drastically over the decades. What was essentially treated with only surgical intervention in the form of choledocholithotomy and T tube drainage has seen many other treatment options. With advances in endoscopic facilities and minimal access techniques, various treatment options are available to the treating physicians and surgeons.

Even diagnosis of choledocholithiasis has seen dramatic changes with time. Apart from Trans abdominal ultrasound, endoscopic ultrasound (EUS), ERCP, MRCP and Intra-operative ultrasound are

used to diagnose CBD stones. (8,10) Currently, the most common treatment used for CBD stones is ERCP clearance with or without the use of stent. However, ERCP cannot always clear the CBD effectively in 100 % of cases and is subject to availability of the equipment and skilled person, which can sometimes be a challenge in developing countries. The other issue that remains with ERCP is, it only treats the CBD stones and gall stones would still remain untouched to be treated by surgical means. This is a two step approach for a single disease. People all over the world focussed on evolving Lap CBD exploration so that both gall bladder and CBD stones can be tackled in a single sitting. However, Lap CBD exploration (LCBDE) remains a technically advanced procedure and sometimes time consuming and hence the facility is not as popular as it deserves to be.

Open CBD exploration still remains a viable option in the setting of failed ERCP and non availability of expertise for Lap CBDE. Open choledocholithotomy with use of intra-operative cholangiogram (IOC) or intra-operative choledochoscopy has the highest CBD clearance rate.

Intra-operative cholangiogram sometimes increases the overall operative time and also sometimes has difficulties in interpretation to leak of dye from CBD or presence of air bubbles within the biliary tree. (11) Use of flexible endoscope for confirmation of CBD clearance was first used in 1941 and is very satisfactory procedure. (12, 13) Once the CBD is deemed to be cleared of stones, the next question that arises is of CBD closure.

For this, 4 options are available.

1. Primary closure
2. Primary closure of CBD with antegrade internal stent
3. Closure of CBD over T tube
4. Biliary enteric anastomosis.

Primary closure of CBD without any internal stent carries two risks. The first being formation of a CBD stricture especially in undilated systems. The second risk is chances of bile leak and biloma formation, due to high pressure system owing to presence of CBD sphincter and should be done in carefully selected patients or with patients who have undergone endoscopic sphincterotomy during previous ERCP.

Biliary enteric anastomosis is sometimes indicated in patients with a large impacted stone in lower CBD and is also done with minimal access techniques.

Closure of CBD over either a T tube or antegrade CBD stent, both provide similar results.

Use of T tube for 10 to 14 days can lead to a prolonged hospital stay and morbidity due to bile loss but can provide an access to CBD in the rare case of a retained stone. Intra-operative cholangiogram or choledochoscopy greatly reduces the chances of retained stones.

Closure of CBD over antegrade CBD stent avoids the problem of T tube drainage and loss of bile. However, stent would need to be removed via endoscopy at a later date. Also, in case of a retained stone, patient would require an ERCP for CBD clearance. (14) The optimum treatment for managing CBD stones should be made according to local facilities and expertise available.

Conclusion:

Both diagnosis and treatment of choledocholithiasis have improved by leaps and bounds over the decades. Trans abdominal ultrasound, Endoscopic Ultrasound, MRCP, ERCP and Intra operative Ultrasound help in the diagnosis of CBD stones. ERCP serves as both diagnostic and therapeutic modality. Treatment options include ERCP clearance, Lap CBD Exploration and open surgery with the use of T Tube or internal stent. Intra operative cholangiogram and choledochoscopy help in achieving CBD clearance with confidence. Treatment should be customised according to the given patient and local expertise available.

References:

1. Renato Costi, Alessandro Gnocchi, Francesco Di Mario, Leopoldo Sarli. *World J Gastroenterol* 2014 October 7;20(37): 13382-401.
2. Borzellino G, Rodella L, Saladino E, Catalano F, Politi L, Minicozzi A, Cordiano C. Treatment for retained [corrected] common bile duct stones during laparoscopic cholecystectomy: the rendezvous technique. *Arch Surg* 2010; 145:1145-9.
3. Menezes N, Marson LP, debeaux AC, Muir IM, Auld CD. Prospective analysis of a scoring system to predict choledocholithiasis. *Br J Surg* 2000;87: 1176-81.
4. Prat F, Meduri B, Ducot B, Chiche R, Salimbeni-Bartolini R, Pelletier G. Prediction of common bile duct stones by noninvasive tests. *Ann Surg* 1999; 229:362-8.
5. Tse F, Barkun JS, Barkun AN. The elective evaluation of patients with suspected choledocholithiasis undergoing laparoscopic cholecystectomy. *Gastrointest Endosc* 2004; 60: 437-48.
6. Huguier M, Bornet P, Charpak Y, Houry S, Chastang C. Selective contraindications based on multivariate analysis for operative cholangiography in biliary lithiasis. *Surg Gynecol Obstet* 1991; 172:470-4.
7. Sarli L, Costi R, Gobbi S, Iusco D, Sgobba G, Roncoroni L. Scoring system to predict asymptomatic choledocholithiasis before laparoscopic cholecystectomy. A matched case-control study. *Surg Endosc* 2003; 17: 1396-403.
8. Verma D, Kapadia A, Eisen GM, Adler DG. EUS vs MRCP for detection of choledocholithiasis. *Gastrointest Endosc* 2006; 64: 248-54.
9. Polkowski M, Regula J, Tilszer A, Butruk E. Endoscopic ultrasound versus endoscopic retrograde cholangiography for patients with intermediate probability of bile duct stones: a randomized trial comparing two management strategies. *Endoscopy* 2007; 39:296-303.
10. Karakan T, Cindoruk M, Alagozlu H, Ergun M, Dumlu S, Unal S. EUS versus endoscopic retrograde cholangiography for patients with intermediate probability of bile duct stones: a prospective randomized trial. *Gastrointest Endosc* 2009; 69:244-52.
11. Catheline J, Rizk N, Champault G. A comparison of laparoscopic ultrasound versus cholangiography in the evaluation of the biliary tree during laparoscopic cholecystectomy. *Eur J Ultrasound* 1999; 10: 1-9.
12. Longland CJ. Choledochoscopy in choledocholithiasis. *Br J Surg* 1973; 60:626-8.
13. Yamakawa T, Komaki F, Shikata J. Biliary tract endoscopy with an improved choledochoscope. *Gastrointest Endosc*. 1978; 24: 110-3.
14. Bandyopadhyay SK, Khanna S, Sen B, Tantia O. Antegrade common bile duct (CBD) stenting after laparoscopic CBD exploration. *Journal of Minimal Access Surgery*. 2007;3(1):19-25.