



A PROSPECTIVE CLINICAL STUDY OF COMMON BILE DUCT STONES AND THEIR MANAGEMENT IN TERTIARY CARE HOSPITAL

Surgery

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ABSTRACT

Background and objective: CBD stones require intervention from two separate specialties: gastroenterologist and surgical team. Preferred methods for treatment are pre- or postoperative ERCP with endoscopic biliary sphincterotomy (EST), laparoscopic or open surgical bile duct clearance. It is unlikely that one option will be universally acceptable for all clinical circumstances in all centres. Disease status, patient demographics, availability of endoscopic, radiological and surgical expertise, and healthcare economics are the variables that will have significant influence on practice. Purpose of this study was to assess prevalence of CBD stones with their clinical profile and to evaluate management protocol and its complications. **Methods:** 50 patients aged >18 years having Radiologically diagnosed CBD stones are included in our study. According to study selection criteria, patient information sheet, blood tests, imaging studies, postop factors and an informed consent taken in their own language, Patients underwent one of procedures such as ERCP followed by Laparoscopic cholecystectomy or Laparoscopic CBD exploration with Laparoscopic cholecystectomy or Open exploration of CBD with Cholecystectomy. **Results:** A total of 50 patients were taken for ERCP in our study. All patients who underwent ERCP with endoscopic sphincterotomy and stone removal used either a Dormia basket or a Fogarty balloon. The rate of success of endoscopic retrograde cholangiopancreatography in removing CBD Stones was 46 out of 50 cases (92 percent). **Conclusion:** To summarize, no definite algorithm can be applied for management of common bile duct stones because patients' age, underlying general condition, and facilities for endoscopic, laparoscopic management are the only standardizable factors. The management differs from institution to institution, so the management of CBD stones must be tailored to the institution's resources.

KEYWORDS

Cholelithiasis, ERCP, Laparoscopic cholecystectomy

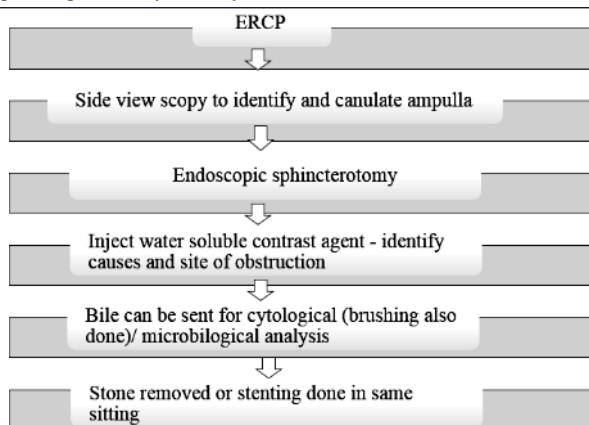
INTRODUCTION

Cholelithiasis is medical term for bile duct stones, which are most common cause of obstructive jaundice and cholangitis. It affects people from every society, race, gender and age group. Prevalence of gallbladder stones varies widely in different communities in India, with North Indians having a 2-4-fold higher prevalence than South Indians. Primary CBD stones are surgically relevant since they are consequence of two problems that must be corrected in order for illness to be treated. Stasis occurs with conditions that obstruct bile flow into the duodenum, such as sphincter fibrosis, peri-ampullary tumors, chronic pancreatitis and perivaterian duodenal diverticula.

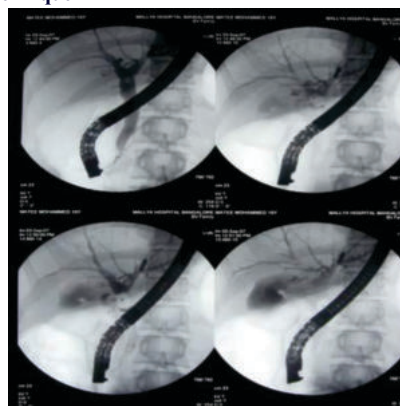
Bacterial infection of biliary system occurs in approximately two-thirds of patients with CBD stones. Common bile duct stone (CBDS) is caused by hydrolysis of conjugated bilirubin with consequent precipitation of insoluble calcium bilirubinate. It is caused by bacterial infection of biliary system, internalized clips and non-absorbable suture material, and parasitic infestation. CBD stones are non-crumbly concretions larger than 2mm in diameter, while biliary microlithiasis are particles 2mm or less in diameter. CBD stones treated in a variety of ways, but most suitable therapy is decided by criteria such as patient's satisfaction, quantity and size of crystals, and surgeon's laparoscopic expertise. This study aims to examine diagnosis of CBD stones, as well as assess different treatment techniques, with a focus on surgical modalities. Severe complications, such as pancreatitis and cholangitis, are usually associated with this condition. Open surgery has been replaced by Endoscopic retrograde cholangiopancreatography (ERCP) followed by laparoscopic cholecystectomy for CBDS.



A side viewing scope



ERCP Technique



ERCP C-arm image demonstrating successful clearance of CBD calculi

ERCP has become gold standard in treatment of common bile duct

stones, but there are drawbacks such as procedure-related issues and an error rate of 10% to 25%. Endoscopic treatment has limitations due to difficulties in performing a precise ampulla of Vater cannulation and crystal extraction. Identifying the characteristics of CBD stones is critical for preventing ERCP failure and lowering the morbidity associated with this procedure. The 1-step approach is preferred over 2-step approach in terms of costs and hospital stay.

METHODOLOGY:

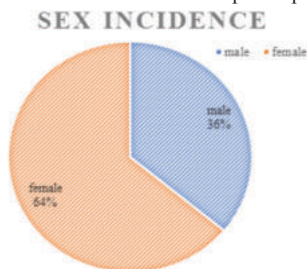
From January 2020 to June 2021, first 50 patients with CB stones were involved in a prospective, observational trial that took place at a tertiary care centre. For complicated biliary stone disease, these patient underwent ERCP and laparoscopic or open bile duct exploration. Vast majority of patients were referred by Department of Medical Gastroenterology and Surgical Gastroenterology, or other tertiary/secondary care centres in southern Rajasthan. "CBD diameter," which was assessed pre-operatively using Magnetic Resonance Cholangiopancreatography and determined conclusively intraoperatively, was most crucial of them. Before choosing on ERCP, laparoscopic, or open care of condition, a variety of variables were examined after a full conversation with the patient and family. Demographics, comorbid conditions, presenting symptoms, blood tests, imaging studies, operating data, postoperative factors such as complications were all looked into. Patients underwent one of procedures such as ERCP followed by Laparoscopic cholecystectomy or Laparoscopic CBD exploration with Laparoscopic cholecystectomy or Open exploration of CBD with Cholecystectomy.

Routine hemograms, liver functions, and an ultrasound abdomen were all part of patients' preoperative workup. On a few cases, MRCP was conducted. For quantity of CBD stone its location, and common bile duct diameter, the MRCP findings were judged.

RESULTS:

For categorical variables, frequency analysis and percentile analysis were used to describe descriptive statistical frequency, while mean and standard deviation were used for continuous variables. Probability value of 0.05 is considered significant. Chi-Square test was used, to find significance in categorical data. IBM's SPSS statistical software version 23.0 was used to analyse.

Out of total 50 patients enrolled in study, we documented how many patients underwent ERCP Stone removal and Open/Lap surgery.



Graph 1: Male female ratio

Table 1: Symptoms presented

Presenting symptoms	Out of Number = 50	Total %
Pain	27	54 %
Jaundice	17	34 %
Fever	4	8 %
Vomiting	24	4 %

Table 2: Past history

PAST HISTORY	OUT OF NUMBER N =50	Total %
JAUNDICE	5	10%
FEVER	6	12%
DM	12	24%
HTM	9	18%

Table 3: Findings of USG abdomen

Findings	Out of Number = 50	Total %
Normal GB	2	4
Wall thickening	42	84
Stones	45	90
Sludge	2	4
Dilatation of IHBR	34	68

Table 4: Result of ERCP

Result	Out Of Number N=50	Total %
Stone Visualisation	50	100%
Successful Clearance	46	92%
Incomplete Clearance When Stent In Situ	4	8%
Post ERCP Pancreatitis	3	6%

Table 5: Complications of ERCP

Complication	Out of Number = 46	Total %
Pancreatitis	3	6.5%
Cholangitis	2	4.3%
Duodenal perforation	0	0
Retained stone	4	8.7%

Table 6: complications of laparoscopic and open procedure

Complication	Laparoscopic procedure (Number = 3)	Open procedure (Number = 1)
SSI	1	0
Bile leak	0	0
Lower respiratory tract infection	1	0
Retained stone	0	0

DISCUSSION:

Franklin and Balli are credited for replicating surgery in 1991 using a minimally invasive method (Laparoscopic). This procedure has evolved significantly in past 25 years. Because of expanding role of successful endoscopic stone removal, spectrum of patients arriving at surgeon's door has shifted, with increasingly complicated gallstones accounting for bulk of referrals among those who have undergone CBD Exploration or laparoscopic surgery. CBD Stones are present in around 5% of individuals having elective cholecystectomy and 10% of patients with acute cholecystitis. Although intraoperative cholangiography is gold standard for identifying CBD stones, alternatives such as ultrasonography, ERCP, or MRCP can also be employed in preoperative identification of CBD stones.

If choledocholithiasis is diagnosed preoperatively, a number of different modalities can be utilized for its treatment. The factors considered for identifying best technique include patient's age and health, existence of jaundice or cholangitis, and size of duct and stone. As a result, treatment technique for these individuals will change from one location to next. Practicing surgeon must be skilled enough in CBD open exploration that may be demanded by certain cases.

ERCP is frequently used before or after laparoscopic cholecystectomy in patients with suspected (jaundiced patient, history of pancreatitis, with raised liver function tests or dilated common bile duct on radiographic imaging) or confirmed CBD Stones on radiological investigations. It is quite effective at removing stones from biliary tree. Although rare, short-term risks include pancreatitis, bleeding, perforation, and cholangitis. Physiological barrier is removed on division of sphincter of Oddi which can lead to canal stenosis, duodenal reflux, and recurrent stone formation in long term. Technological and equipment developments have provided highly trained endoscopic surgeons with tools they need to properly treat choledocholithiasis in a one-step laparoscopic surgery.

In our study female to male ratio is 1.6 compared to 2.08 in a study conducted by Samanta PK et al. May 2020. Most common presenting symptom is Pain and Wani et al, found that 94% of patients experienced right upper quadrant discomfort. Before being included in study 12% patients had history of jaundice that was temporary relieved by biliary stenting. Jaundice had positive predictive value of 39% for CBD stones in study conducted by Abboud PA et al (1996). DM commonly associated comorbid illness followed by hypertension.

Most patients in our study had mean CBD diameter of 13.27 ± 3.276 mm comparing to 15-20 mm in study conducted by Sharma SS et al. in January 2008. Rate of success of ERCP in CBD stone removal is 92% which agrees with study of Bertrand Suc, MD et al. in 1998. Cholangitis occurred in 4 % patients on comparing to study conducted by Nicholas M et al. in August 2013. Higher rate of Bile leakage after Laparoscopic CBD exploration were reported in Nathanson LK et al. in 2005 compared to no cases in our study

CONCLUSION:

Previously published trials have demonstrated that two-stage (ERCP + LC) and single-stage (LC + LCBDE) management are equivalent with respect to stone clearance from CBD, morbidity and mortality. In our study, two stage (ERCP + LC) is primary approach to remove CBD stones but where ERCP fails, laparoscopic CBD exploration with primary repair should be done, still open approach remains final management. Management differs from institution to institution, so it must be tailored to the institution's resources.

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