Original Research Article

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Common bile duct stones: its different aspects of presentation and management

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ABSTRACT

Background: Common bile duct (CBD) stone management is a commonly occurring potential challenge for surgeons.

Methods: A total of 38 patients who was admitted in admitted in surgery Department of Sri Ram Institute of Medical Sciences, Bareilly UP during the period of March 2019 to September 2019 were studied. The diagnosis was made using USG MRCP, relevant blood investigations. Patients were managed based on radiological findings by the best possible way and expertise available.

Results: Out of the 38 patients, 14 (37.14%) were male and 24 (62.85%) were female. The mean age for male was 50.92 years and for female, it was 51.74 yrs. Most of the patients had pain abdomen and /or jaundice with a mean total bilirubin of 3 mg/dl. Patients are managed either by ERCP or by surgery (open/laparoscopic). Mortality is nil but morbidity is more for open procedures.

Conclusions: There can be no definite algorithm for the management of CBD stones as the patients' age, underlying general condition being the only standardizable factor with facilities for endoscopic, laparoscopic management being variably available from institution to institution and hence, necessitating tailoring the management of CBD stones depending upon the Institution's resources.

Keywords: CBD stones, Radiology, Bilirubin, Surgery

INTRODUCTION

Despite advances in surgery common bile duct stones (CBDS) is still a serious challenge to surgeon which is commonly performed in conjunction with cholecystectomy. The incidence of CBDS in patients with symptomatic cholelithiasis varies widely in the literature between 5% and 33% according to age. 1-5 CBDS are either primary (originating within the CBD) or secondary (originating in the gallbladder) and pass into the CBD. 6.7 Abdominal ultrasound and magnetic resonance cholangiopancreatography (MRCP) are the most common non-invasive pre-operative imaging modalities for detection of CBDS. 8

Common bile duct stones are present in approximately 5% of the patients undergoing elective cholecystectomy and 10% of patients with acute cholecystitis. No single blood test or combination of blood tests can predict whether or not a CBD stone is present. Intraoperative cholangiography is a gold standard for diagnosis.⁹

If CBD stones are diagnosed pre-operatively, several different treatment modalities can be utilized. The factors that determine the optimal approach include the patient's age and general condition. It is also important to consider the local expertise of the Surgeon and the gastroenterologist in managing CBD stones. Hence the algorithm for managing these patients will vary from one locale to another. There are specific indications that

mandate CBD open exploration and therefore, the practicing surgeon must be well versed in these techniques.

Although the stones in the CBD may be silent, the development of symptoms is potentially serious; obstructive jaundice, ascending cholangitis, acute pancreatitis are all associated with serious morbidity and at times, mortality which need immediate attention.

METHODS

The present study was carried out on patients retrospectively between March 2019 to September 2019, admitted in surgery Department of Sri Ram Institute of Medical Sciences, Bareilly. 38 patients were included in study. Detailed clinical history and examination were performed in all cases as per the proforma.

Diagnostic investigations including ultrasonography abdomen, LFT were done in all cases. MRCP was selectively used when USG was negative for CBD stones, but history and biochemical parameters were suggestive of CBD stones.

Procedural investigations like Hb%, coagulation profile, TLC, DLC, RBS, Blood urea, serum creatinine, chest X-ray and ECG were performed in all cases.

Inclusion criteria

Inclusion criteria were all the cases of common bile duct stones with the patient's age>12 years. Pre-operative USG diagnosis of ductal dilation with or without CBD stones. Multiple stones in gallbladder with dilated cystic duct. CBDS complicating as obstructive jaundice, cholangitis, and pancreatitis.

Exclusion criteria

Exclusion criteria were patient age≤12 years. CBD without stone on USG has very low predictive yield by even after MRCP.

Choice of treatment modality was Open CBD exploration because of our experience and facility to perform the same in our institution.

All patients received prophylactic antibiotics in the form of ceftriaxone and metronidazole to cover gram-negative and anaerobic organisms. All patients were screened for any coagulopathy and treated appropriately with vitamin K or fresh frozen plasma depending upon the severity and urgency of the procedure. All patients were adequately hydrated and flushed with mannitol to prevent hepatorenal syndrome.

For open surgery with T-tube closure; discharge was done after the 7th day. Patients with biliary enteric anastomosis were discharged when they were taking oral

diet, feeling symptomatically better and the suture wound had healed. Some patients with surgical site infection had extended stay till the surgical wound was dry and healing.

For laparoscopic CBD explorations protocol similar open CBD was followed. Abdominal drains were used in all open and laparoscopic CBD exploration cases. It was kept in subhepatic space and removed when become dry in cases on t-tube insertion and after starting oral feeds in choledochoduodenostomy.

All patients were followed up on outpatient basis with repeated assessment of patients' symptomatic status, physical exam, liver function tests and abdominal ultrasonography. The interval of follow was 1 week, 2 weeks, 1 month, 2 months.

Statistical analysis in the form of percentages, means, confidence intervals, standard deviations, sensitivity, specificity, positive predictive value were calculated to analyze the significance of the diagnostic investigations and the impact of the therapeutic procedures.

RESULTS

Age incidence

Age of the patients varied from 22 to 70 years. The mean age for male was 50.92 years and for female, it was 51.74 years (Figure 1).

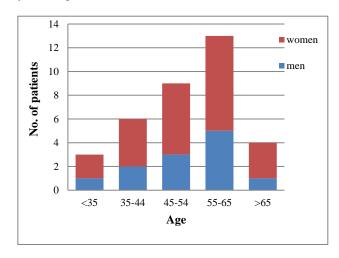


Figure 1: Age incidence.

Sex incidence

Out of the 38 patients, 14 (37.14%) were male and 24 (62.85%) were female.

Duration of hospital stay

25 patients (65.7%) stayed in the hospital for a duration ranging from 8 to 14 days. Whereas only 4 patients (11.5%) had a stay extending beyond 21 days, no patient was discharged prior to 7 days of admission.

Presenting symptoms

Most of the patients had pain abdomen and /or jaundice with a mean total bilirubin of 3 mg/dl (Table 1).

Table 1: Clinical features.

Presenting symptoms	Number (%)	
Pain	35 (94)	
Fever	13 (34)	
Jaundice	22 (57)	
Pancreatitis	2 (5.7)	

USG features

35 patients (91.4%) had thickened/contracted gall bladder suggestive of chronic cholecystitis. Similarly, either sludge or stones were present in 35 patients (91.4%).one patient had a sonologically normal gall bladder with CBD stones which was later confirmed to be primary CBD stones.

One patient had undergone cholecystectomy earlier and one patient did not have a gallbladder found during the surgery and not visualized during the radiological investigations as well. The mean CBD diameter was 14.32 mm with most patients having CBD diameter either between 10-12mm (23.5%) or greater that 20mm (23.5%). The highest recorded CBD diameter was 25mm (Table 2).

Table 2: USG findings.

Findings	Number	%
Thick wall	35	94
Stones	31	83
Sludge	8	17
Absent G.B.	1	3
Dilated biliary radicals	38	100

MRCP

MRCP was used in 3 cases with negative USG for CBD stones.

Treatment

Open surgery

28 patients (80%) were subjected to open CBD exploration which also include 2 failed cases of ERCP. 22 patients (80%) underwent CBDE with T-tube closure. 6 patients (21%) underwent choledochoduodenostomy when CBD was very dilated (Table 3).

Complications

4 patients (14.28%) developed infection of surgical wound as a result of contamination from the biliary tract.

Bile leak was seen in 1 patient (3.5%) due to T-tube dislodgement. 4 patients (14.28%) developed lower respiratory tract infection (LRTI).

Table 3: Surgical procedure.

Procedure	Number	%
CBDE and T-tube	22	79
CBDE and choledochoduodenostomy	6	21

Laparoscopic CBD exploration

2 cases (66.6%) had successful clearance of the laparoscopic clearance of the CBD following laparoscopic cholecystectomy. 1 case though underwent successful laparoscopic cholecystectomy, had to have open CBD exploration due to an unfavorable anatomy.

Follow up

68.57 % (24 patients) have been followed up till the time of submission of this study. 14.7% (5 cases) were lost from follow up after 2 months. While mortality is nil in both open and minimally invasive procedures the morbidity of open procedure was more accounting for 20.58% of the net morbidity of 32.35%.

DISCUSSION

Common bile duct stones are present in approximately 5% of patients undergoing elective cholecystectomy and 10% of patients with acute cholecystitis. No single blood investigation or combination of blood investigations can predict whether or not a common bile duct stone is present. Intraoperative cholangiography is the gold standard of diagnosis but CBD stone can be diagnosed preoperatively with ultrasound, ERCP, or magnetic resonance cholangiopancreatograph.¹

If choledocholithiasis is diagnosed preoperatively, several different modalities can be utilized. The factor that determine the optimal approach include patient's age and condition, the presence of jaundice or cholangitis and size of the duct and stone. It is also important to consider the local expertise of the surgeon and gastroenterologist in managing common duct stones. Hence, algorithm for managing these patients will vary from one locale to another.

The natural history of choledocholithiasis is unpredictable. Small stones may pass spontaneously into the duodenum without causing symptoms, or they may obstruct the pancreatic duct temporarily, induce an episode of pancreatitis, and pass into the duodenum with relief of symptoms. Stones that do not pass into the duodenum may reside in the bile duct for long, symptom free periods, then suddenly precipitate an episode of jaundice or cholangitis.¹⁸

According to Gerard, the overall incidence of CBD stones was 8% of the cases with cholelithiasis 61. The female to male ratio was 1.5. According to Girard, the female to male ratio was 1.72.¹¹

According to Wani et al, 94% had pain in the right upper abdomen. According to Acosta et al, gall stones are responsible for 50% of all cases of pancreatitis. Conversely, 4-8% of patients with gall stones develop pancreatitis. This was in accordance to our study of pancreatitis in 2 cases (5.8%).

Clinical jaundice was present in 16 patients (45.7%) with positive predictive value of 64%. This was roughly in accordance to meta-analysis by Abboud et al which showed jaundice having positive predictive value of 39% for choledocholithiasis.⁵ According to that study, the specificity of cholangitis in predicting CBD stones was 99%.

Mean serum total bilirubin was 3.022. The sensitivity of elevated bilirubin in predicting CBD stones in our study was 88.2%. This is more than study done by Abboud et al of 69% sensitivity probably due to advanced presentation of cases with prolonged and significant cholestasis. ¹³

The abdominal USG was able to detect gall stones in gall bladder in all cases (100%) which is in agreement with Zinner et al which states that the presence of associated gall bladder stone can be confirmed >98% of patient with gall stones and dilation of the intrahepatic biliary system can be identified in most. ¹⁴

The specificity of ERCP in confirming CBD stones was 100%, which compares with that of Frey et al of 98%. Sensitivity could not be determined as ERCP was only selectively used. All patients underwent ERCP with endoscopic sphincterotomy and stone extraction by either Dormia basket or Fogarty balloon.

The success of ERCP in clearing the CBD of stones was 5 out of 7 cases (71.4%), which is in agreement with Freeman et al, which states that complete clearance of all CBD stones is achieved endoscopically in 71-75% of the patients with the first procedure and 84-95% of the patients with multiple endoscopic procedures.¹⁶

Approximately 30% of the patients will require intraoperative cholangiogram at the time of cholecystectomy. Cholangiography was accurate in 100% of the cases in our studies compared to Girard et al, of 88%.¹³

Overall, as a part of biliary enteric drainage choledochoduodenostomy was chosen. This is in accordance with Schein and Gliedmann which states that choledochoduodenostomy is a safe and simple operation with low morbidity and mortality especially in elderly patients than trans duodenal sphincteroplasty.⁹

While mortality is nil in both open and minimally invasive procedures the overall morbidity of open procedure was more accounting for 20.0% (7 out of 35) than minimally invasive 11.42% (4 out of 35) and net morbidity was 31.42% (11 out of 35). Component morbidity have already been discussed. Zero mortality in open CBD exploration, Pappas et al and endoscopic, Shivak, laparoscopic CBD Petelin, have been recorded which is in agreement with our study. ¹⁸⁻²⁰

CONCLUSION

The management of CBD stones has been subject to much debate during the past several years, especially with the advent of new laparoscopic techniques and greater expertise of endoscopic procedures.

This study was undertaken to get a clinical perspective of CBD stones in the milieu of GB stones and to determine the optimal approach for the management with the age of the patient, general condition, complicating factors, availability of endoscopy and minimally invasive procedure, determining the algorithm of treatment. The end result of our study was the developing of a management protocol in our setting.

To conclude, there can be no definite algorithm for the management of CBD stones as the patients' age, underlying general condition being the only standardizable factor with facilities for endoscopic, laparoscopic management being variably available from institution to institution and hence, necessitating tailoring the management of CBD stones depending upon the Institution's resources.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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