

Prospective Study of Aetiopathogenesis and Management Approaches for Common Bile Duct Stones in Southern Odisha.

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Abstract:

Common bile duct stones (CBD) are prevalent, affecting 6 to 12% of patients with gallbladder stones, with incidence rising with age. Often asymptomatic, they can be discovered incidentally. Typical symptoms include fever, epigastric or right upper quadrant pain, and jaundice, present in approximately two-thirds of cases. Choledochal stones can lead to complications such as cholangitis, gallstone pancreatitis, and obstructive jaundice. This study aims to assess the incidence and aetiopathogenesis of Common Bile Duct stones in the southern region of Odisha, India.

This prospective study was conducted from August 2022 to January 2024 with a sample size of 21 patients including 7 males and 14 females with diagnosis of choledocholithiasis supported by imaging.

In the study we found the highest incidence of CBD stones was in the elderly population, particularly among females. For non-surgical option and small stone <12mm ERCP with stone retrieval with laparoscopic cholecystectomy is ideal but for large stone, multiple stone and surgical opinion where ERCP is not available CBD exploration with choledochoduodenostomy emerged as the primary management modality in our study

Key word: CBD stone, Choledocholithiasis, ERCP, Choledochoduodenostomy,

Introduction:

Common bile duct stones (CBD) represent a significant medical concern, affecting a notable proportion of patients with gallbladder stones, with the incidence rising notably with age. Notably, approximately 20 to 25% of patients over the age of 60 with symptomatic gallstones also exhibit stones in the common bile duct [1]. The genesis of these ductal stones primarily occurs within the gallbladder, with migration down the cystic duct to the common bile duct being a common pathway. This categorizes them as secondary common bile duct stones, distinguishing them from primary stones that form directly within the bile ducts [1].

Gender and familial predisposition play crucial roles in the development of gallstones, with women being three times more likely to develop gallstones compared to men, and individuals with first-degree relatives with gallstones exhibiting a twofold greater prevalence [1]. Interestingly, there has been a notable shift in the demographic trend of gallstone disease, transitioning from middle-aged, fertile, overweight females to younger, slender females in their twenties [2].

The prevalence of gallbladder stones varies significantly among different Indian communities, with North Indians exhibiting a higher prevalence compared to South Indians. Furthermore, there is a distinct predominance of cholesterol gallstones among North Indians, reflected in both gallbladder and CBD stone composition, whereas South Indians predominantly harbour pigment gallstones [3].

Despite their prevalence, CBD stones may remain silent and are often detected incidentally. However, when symptomatic, they can manifest with symptoms akin to biliary colic, including pain, nausea, and vomiting. Complications of CBD stones can be severe, encompassing cholangitis, gallstone pancreatitis, and obstructive jaundice, with the latter often presenting as Charcot's triad or Reynolds' pentad [1].

The mechanism underlying the development of acute pancreatitis secondary to gallstones remains incompletely understood, with hypotheses suggesting transient obstruction of the pancreatic duct by a lodged gallstone, leading to bile reflux. Moreover, obstructive jaundice occurs when stones migrate from the gallbladder into the common bile duct or when primary CBD stones obstruct the duct [4].

Management of choledocholithiasis typically involves prompt intervention upon diagnosis. Treatment options range from open and laparoscopic CBD exploration to endoscopic or percutaneous transhepatic stone extraction. However, the lack of definitive prospective randomized trials necessitates reliance on the technical expertise of local physicians for optimal CBD stone management [5, 6].

CBD stone management strategies encompass various approaches, including CBD exploration with stone extraction coupled with drainage procedures, such as trans duodenal sphincterotomy or biliary enteric drainage procedures [7].

The primary objective of this study is to evaluate the incidence and aetiopathogenesis of CBD stones in the southern region of Odisha, India. Additionally, we aim to comprehensively explore the diverse clinical presentations and modalities of treatment to minimize morbidity and mortality, thereby providing patients with the best chance of a satisfactory outcome.

Aims of the study:

- 1.To evaluate age, sex incidence and most common aetiological factors for CBD stone disease.
- 2.To illustrate varying clinical presentations.
- 3.To study various modes of management adopted in our institution.

Materials:

The above study was conducted on patients attending surgical Out Patient Department, Emergency Department as well as patients admitted to surgical wards of MKCG Medical College and Hospital, Berhampur from the period of August 2022 to January 2024. Out of all cases a total of 21 cases were recorded for comparison and conclusive study.

Methods:

Approval from ethical clearance committee was obtained. All the patients admitted to surgical ward were subjected to

- ❖ Questionnaires and clinical examination
- ❖ Routine and special investigations
- ❖ All patients subjected to magnetic resonance Retrograde Cholangiopancreatography (MRCP) and stone size and place evaluated.
- ❖ Treatment modality, once the definitive diagnosis of choledocholithiasis was established.
- ❖ Patients requiring Endoscopic Retrograde Cholangiopancreatography with stone retrieval (ERCP) were referred and followed up post procedure for cholecystectomy.
- ❖ Post-operative observation of patients for any complications.

Inclusion criteria:

All patients diagnosed to have choledocholithiasis.

Exclusion criteria:

All patients with only cholelithiasis and acalculous cholecystitis.
Patients those who refused admission.

Results:

Table 1: Age and Sex Distribution

Age group	Male	Female	Total	Percentage
15-20	1	0	1	4.76
21-30	0	1	1	4.76
31-40	1	3	4	19.05
41-50	2	2	4	19.05
51-60	2	4	6	28.57
>60	1	4	5	23.81
Total	07	14	21	100

Table 2: Clinical Profile

Clinical profile		No. of cases	Percentage
Diet	Vegetarian	08	38.10
	Non-vegetarian (Mixed)	13	61.90
Lifestyle/Physical activity	Sedentary	11	52.38
	Moderate	06	28.57
	Heavy	04	19.05
Built	BMI <18.5 (Underweight)	2	9.52
	18.5-24.99(Normal weight)	08	38.10
	>25 (Obese)	11	52.38
Comorbid medical illness	Diabetes Melitus	10	47.62
	Hypertension	12	57.14
	Dyslipidemia	11	52.38

Table 3: Clinical presentation

Symptoms	No. of cases	Percentage
Pain	18	85.71
Fever	11	52.38
Jaundice	14	66.67
Dyspepsia, Nausea, Vomiting	08	38.10
Itching	05	23.81
Clay coloured stool	08	38.10

Table 4: Managements as per size of stone

Stone size in MRCP	No. of case	Procedure of choice	Percentage
< 12mm and single CBD stone	09	ERCP	42.86
>12mm and single CBD stone	08	ERCP-1 Open-7	38.10

Multiple Biliary tree stones	04	Open	19.04
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Table 5: Type of Managements

Procedures	No. of cases	Percentage
Cholecystectomy+ CBD Exp & T tube drainage	3	14.28
Cholecystectomy+ choledochoduodenostomy	7	33.34
Cholecystectomy+ choledochojejunostomy	1	4.76
ERCP followed by Cholecystectomy	10	47.62

Table 6: Operative complication

Complication	No. of cases	Percentage	Overall percentage
Intra-operative			19.05
Bleeding	3	27.27	
Bowel injury	1	9.10	
Post-operative			47.62
Bleeding	0	-	
Bile leak	0	-	
Pulmonary complications	3	27.27	
Prolonged ileus	3	27.27	
Wound infection	4	36.36	
Post ERCP			14.29
Peroration	0	-	
Pancreatitis	2	20	
Cholangitis	1	10	

Discussion:

The study findings were compared with those of Girard RM et al (2000) [8], Nandkarni et al (1981) [9], M.H. K Crumplin et al (1985) [10], and Agarwal et al (1974) [11]. The majority of patients (28.5%) fell within the age range of 51-60 years, consistent with Girard et al's (2000) findings where the highest incidence was observed between 50-59 years (20.1%). The female-to-male ratio was 2, more than Girard et al's ratio of 1.72. Among the cases, 47.6% had diabetes mellitus, 57.1% had hypertension, and 52.4% had dyslipidemia.

Table 7: Comparison of symptoms

Symptoms	Present Study	Agarwal <i>et al</i>	Nandkarni <i>et al</i>
Pain	85.71	79.1	53.8
Fever	52.38	12.5	53.8
Jaundice	66.67	100	100
Dyspepsia	38.10	70.9	88.5
Itching	23.81	50	73.1
Clay coloured stool	38.10	41.7	92.3

In our study, pain emerged as the predominant symptom, affecting 85.7% of cases, while jaundice was prominent in other investigations. Additional major symptoms noted in the studies of Agarwal et al and Nandkarni et al included dyspepsia, nausea, and vomiting. In our findings, alongside pain, jaundice, fever, and dyspepsia were commonly reported symptoms. Among CBD calculi patients, the majority presented with obstructive jaundice (66.7%), while others exhibited features of cholangitis and acute pancreatitis.

In Girard et al's series, 92.8% of patients underwent CBDE with T-tube drainage, and 3% underwent CBDE with choledochoduodenostomy. Similarly, in M.H.K Crumplin et al's series, 36% of patients underwent CBDE with T-tube drainage, and 36% underwent CBDE with choledochoduodenostomy. The remaining patients in both studies underwent transduodenal sphincterotomy. In our study, CBDE with T-tube drainage was performed in 14.3% of cases, while CBDE with choledochoduodenostomy was conducted in 33.3% of cases while 47.6% of the patients underwent ERCP with stone retrieval. Preoperative preparation for patients with CBD stones and obstructive jaundice required approximately 6 days, resulting in an average hospital stay of 15 days.

During the second postoperative week, T-tube cholangiogram was conducted in 3 cases, revealing normal results without evidence of residual calculi, thus prompting tube removal. All ERCP patients were followed up and post procedure laparoscopic cholecystectomy done. Intraoperative bleeding was observed in 27.3% of cases, which was managed through the Pringle maneuver followed by careful dissection and ligation of bleeding vessels or coagulation at the liver bed. Pulmonary complications and prolonged ileus affected 27.3% of cases, managed through aggressive resuscitation, chest physiotherapy, prolonged Ryles tube

aspiration, and early ambulation. Post ERCP patients develops pancreatitis (20%) and cholangitis (10%) were managed conservatively. Wound infections occurred in 36.4% of cases, treated with appropriate dressing and antibiotics based on culture sensitivity reports. No mortalities were reported in our series, unlike the mortality rates of 0.6-4% in McSherry (1989) and 0.3-1.6% in Girard et al (2000). Notably, studies on open CBD exploration by Pappas et al (1990) and endoscopic exploration by Shival (1989), as well as laparoscopic CBD exploration by Petelin (1993), recorded no mortality, aligning with our findings.

Conclusion:

Our study conducted in the southern part of Odisha revealed several key findings regarding common bile duct (CBD) stones;

- ❖ The highest incidence of CBD stones occurs in the elderly population, particularly among females.
- ❖ Overweight individuals and those with comorbidities such as diabetes mellitus, hypertension, and dyslipidemia are more prone to CBD stones.
- ❖ Sedentary lifestyle and consumption of a mixed Indian diet, including non-vegetarian items, are associated with a higher incidence of CBD stones.
- ❖ Clinical presentations of CBD stones vary, ranging from the most common symptoms of pain in the right hypochondrium and epigastrium to manifestations such as fever, jaundice, dyspepsia, nausea, itching, and passage of clay-colored stool.
- ❖ For non-surgical option and small stone <12mm ERCP with stone retrieval with laparoscopic cholecystectomy is ideal but for large stone, multiple stone and surgical opinion where ERCP is not available CBD exploration with choledochoduodenostomy emerged as the primary management modality in our study.
- ❖ Notably, no mortality was observed among the patients included in our study.

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