Original Research Article

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Clinicopathological study and management of biliary stones

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ABSTRACT

Background: Biliary calculi are one of the most common problems affecting the digestive tract. Need for the study is to evaluate age, sex, incidence, most common etiopathological factors for the formation of biliary calculi and to illustrate varying clinical presentation with various modes of management adopted in the institution as well as to analyse biochemical types of stones prevalent in the region.

Methods: A prospective study of 50 patients with clinical diagnosis of biliary colic was conducted in a tertiary center for a period of one year. Clinical presentation, etiology, and management of biliary calculi were studied.

Results: Biliary calculi affect most commonly in fourth to the fifth decade with a higher preponderance in females (72%). Right hypochondriac pain is the commonest presentation (84%). Ultrasonography is sensitive and specific, and hence considered the investigation of choice. Open surgical procedures such as cholecystectomy, choledochotomy with T-tube drainage, choledochoduodenostomy were done in these subjects. Postoperative complications such as wound infection noted in 8% of the subjects. Most of the histopathological specimens (90%) revealed chronic cholecystitis.

Conclusions: Biliary calculus disease is multifactorial in origin with slight female preponderance. The most common presentation is a right hypochondriac pain. This can be diagnosed accurately with the aid of ultrasonography and Endoscopic Retrograde Cholangio-pancreatography. Biliary calculus is managed according to the location of the calculus, whether intrahepatic or extrahepatic. Most of the patients presented with chronic cholecystitis.

Keywords: Biliary calculi, Cholecystitis, Cholecystectomy

INTRODUCTION

Biliary calculi are one of the most common problems affecting the digestive tract and autopsy reports have shown a prevalence of Gallstones from 11 to 36%.^{1,2} Incidence of biliary calculus disease varies widely throughout the world which may be related to environmental and dietary considerations. The symptomatic biliary stone disease may progress to complications such as acute cholecystitis,

choledocholithiasis with or without cholangitis, gallstone pancreatitis, cholecysto-choledochal fistula, cholecysto-enteric fistula leading to gallstone ileus.³ Diagnostic methods for the imaging diagnosis of Biliary stone disease have been proliferating rapidly in recent years and the choice can be bewildering.⁴ Cholecystectomy is the treatment of choice for symptomatic gallstones because it removes the organ that contributes to both the formation of gallstones and the complications ensuing from them.¹

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One can only anticipate that a well-designed analysis will help clarify and define the most appropriate and a costeffective treatment for the biliary stone disease. Hence a study was conducted in a tertiary centre to evaluate the clinical presentation and management of biliary calculi.

METHODS

A prospective study was conducted in the Department of Surgery at tertiary center for a period of one year. All patients with clinical diagnosis of biliary calculi were included in the study. Patients who were below the age of 15 years and above 75 years, asymptomatic biliary stones found accidentally either at laparotomy or during sonography done for some other problem, and hepatobiliary malignancy was excluded. Patients were investigated and prepared for surgery. Open cholecystectomy was performed for gallbladder calculi. In case of Common Bile Duct (CBD) calculi, Open CBD exploration and drainage procedure was done either in form of T tube or biliary-enteric anastomosis. Those with diameter >1.5cm underwent biliary-enteric CBD anastomosis. Operative findings were recorded. Epidemiological factors relevant to age and gender distribution were noted. Bile aspirates were sent for culture and stones sent for its biochemical composition.

RESULTS

A total of 50 patients with clinical diagnosis of biliary calculi were studied. The most common age group affected was 46-55 years (32%) followed by the age group 36-45 (28%). The youngest patient was a 15-year-old girl and the oldest patient was 72 years old. The female to male ratio was approximately 3:1. Thirty-six (64%) patients were females.

The pain was the commonest symptom and was present in 46 (92%) patients, followed by nausea/vomiting 28 (56%) patients. Jaundice was present in five (10%) patients and all of them had common bile duct (CBD) stones. Tenderness in the right upper quadrant was the predominant sign and was present in 42 (94%) patients. Guarding was present in 14 (28%) patients while lump in the right upper quadrant of the abdomen was present in five (10%) patients.

Table 1: Type of operation.

Operation	No. of cases	%
Cholecystectomy alone	45	90
Cholecystectomy+ choledochotomy+T-tube drainage	3	6
Cholecysectomy+choledochotomy+ Choledochoduodenostomy	2	4
Cholecystectomy+appendicectomy	2	4
Cholecystectomy+umbilical hernia repair	1	2

Ultrasonography detected calculi in all the patients. Five (10%) patients had associated choledocholithiasis. Endoscopic Retrograde Cholangio-pancreatography (ERCP) was done in five (10%) patients who had CBD calculi.

Open cholecystectomy was done in all the 50 patients. Three (6%) patients with CBD calculi with dilated CBD underwent a choledochotomy and T-tube drainage along with open cholecystectomy and two (4%) patients with CBD calculi and dilated CBD >1.5cm underwent choledochoduodenostomy (Table 1).

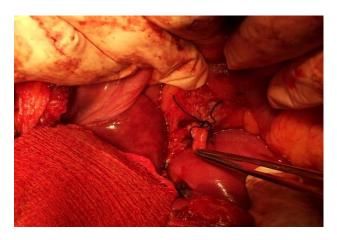


Figure 1: Open cholecystectomy. Can see the ligated cystic duct.

Four patients had wound infection. One patient had retained calculi. A patient developed bile leak, managed conservatively. There were no cases of postoperative hemorrhage (Table 2).

Table 2: Postoperative complications.

Postop complications	No. of cases	Percentage
Wound infection	4	8
Hemorrhage	0	0
Retained stones	1	2
Bile leak	1	2

Table 3: Biliary stone analysis.

Type of stone	Morphology	No. of cases	%
Cholesterol	Solitary, oval, large and yellow	1	2
Pigment	Multiple, small, jet black, mulberry	4	8
Mixed	Multiple, multifaceted	45	90

Out of 50 cases, 44 (88%) patients had chronic cholecystitis features on histopathological examination. Two (4%) patients had acute cholecystitis changes, two (4%) patients had a polyp, and one had gangrenous

gallbladder on histopathological examination. None had malignant changes. Bile culture was done in all cases, 46 (92%) amongst them were sterile, three (6%) grew *E. coli*, and one (2%) showed *Klebsiella* growth. Table 3 depicts the chemical analysis of biliary calculi.



Figure 2: Choledochoduodenostomy.

DISCUSSION

Gallstones are extremely common throughout the Western world and are found in approximately 10% of the adult population. Gallstones occur twice as common in females as in males, with the prevalence peaking in the sixth and seventh decade. Interestingly, several cultural and ethnic groups demonstrate an extremely high incidence of gallstones compared to other populations. In most of the series, 70-80% of patients undergo elective cholecystectomy for chronic cholecystitis or biliary colic in conjunction with ultrasonography evidence of gallstones. Only 10-30% of patients undergoing cholecystectomy due to complications of acute cholecystitis.

The peak incidence of cholelithiasis as per western literature is sixth to the seventh decade.^{5,6} But Indian studies such as Raza et al found peak incidence in the fourth decade.⁷ Author found the peak incidence of cholelithiasis in the age group 46-55 years (32%) followed by age group 36-45 (28%). Females were more commonly affected (72%) in this study which is supported by all other studies.⁸⁻¹⁰

Pain abdomen was the predominant (92%) symptom in this study. The commonest site of pain was in the right hypochondrium 42 (84%) patients. Four (8%) had epigastric pain. Ten (20%) patients had pain radiating to the back. The severity of pain ranged from colicky pain to dull aching pain. Studies by Ganey et al and Goswitz et al also found pain as the predominant symptom.^{5,9} Nausea/vomiting was present in 28 (56%) cases in this study. Ganey et al found vomiting in 56% of the study group.⁵ Jaundice was present in 10% patients. Dyspepsia was seen in ten (20%) patients. Fever was present in five (10%) patients. Most of the patients were having a mixed

diet. Tenderness in right upper quadrant of the abdomen was present in 92% of present study group. Guarding was present in 14 (28%) patients. A positive Murphy's sign was present in five (10%) patients. A lump was felt in five (10%) patients.

The serum bilirubin was above normal in eight (16%) cases. Those patients presented with jaundice and their bilirubin levels varied from 2 mg% to 5.6mg%. In these patients, common bile duct exploration was done which revealed stones in the CBD.

Ultrasonography was 100% sensitive in detecting gallstones. Common bile duct stones were present in 10% patients and common bile duct dilatation of more than >1.5cm was present in 4% cases. ERCP was done in all patients suspected to have common bile duct stones. ERCP diagnosed all five cases of CBD stone.

Two cases diagnosed as acute cholecystitis were managed conservatively and underwent interval cholecystectomy after six weeks. Cholecystectomy was done in all the cases. Three (6%) patients underwent an additional T-tube drainage. Bypass procedure i.e., choledochoduodenostomy was done in 2(4%) patients with CBD dilated more than 1.5cm. Raza MH also found the same finding, and they concluded that the choledochoduodenostomy was the safest procedure amongst the drainage procedures on the CBD.^{7,11} No anatomical abnormalities were found in any of the patients. Several studies have reported the success rates of removal of CBD stones as being between 88% to 96%. ^{12,13}

After satisfactory assessment of the distal patency, T-tube was clamped for increasing periods of time and on 12th day T-tube cholangiogram was performed, and T-tube removed. The success rate of complete stone removal by the radiologic method has been reported to be a high as 98%. ¹³ Four patients had wound infection.

Lygidakis et al in a study on 105 patients concluded that T-tube removal resulted in adverse reactions secondary to trauma to the CBD with resultant bacterial proliferation and bacteremia in the presence of bile infection. ¹⁴ But author didn't face any problem in this study. In a report of 100 consecutive CBD explorations, Pappas and associates needed to open the duodenum for extraction of difficult stones in two (2%) patients. ¹⁵

There was no postoperative mortality in this study. The overall mortality rate of cholecystectomy is now under 1%. Saxena et al found that the CBD exploration increases the mortality rate significantly.¹¹

Present study found that the 98% of calculi were of mixed variety. The size of the calculi ranged from 2mm to maximum size of 3cm. Four (8%) cases had pigmented stones which were not associated haemolysis unlike what is given in the literature. One (2%) patient had pure

cholesterol stone. Three cases reported growth of *E. coli* and one case of *Klebsiella* in bile culture. No growth was reported in the rest of the cases. The predominance of negative cultures correlates with the studies by Goswitz et al.⁹

CONCLUSION

Biliary calculus is one of the most common problems affecting the digestive tract. It is more common in the fifth decade. Females are the victims in the majority. Pain is the most common presentation. Obesity and changing lifestyle lead to increased incidence of biliary calculi. Early diagnosis with relevant investigations and timely treatment reduces the morbidity and mortality significantly. Variety of surgeries should be done for different presentation and for associated complications with minimal morbidity.

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Institutional Ethics Committee

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