

# Analysis of Bacteriological Profile of Bile in Cholecystectomy Patients

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## Abstract

**Introduction:** Cholecystectomy is currently a frequently performed operation. The presence of gallstones within either the gallbladder or biliary tree is associated with the bacterial colonization of the bile.

**Aim:** The aim of the study was to study analyzes the bacteriological profile of the bile collected from gallbladder in patients undergoing cholecystectomy.

**Materials and Methods:** About 5 ml bile was aspirated from all patients, this collected bile from gallbladder before cholecystectomy was transported to the laboratory in sterile test-tube. The specimen was evaluated to find out whether it is sterile or has any bacteria present.

**Results:** Gallstone disease is common in females than in the males, and the age group was 51–65 years. 21 cases showed organisms in bile culture of which 17 were females and 4 were males. The most common microorganism isolated from bile culture was *Klebsiella*.

**Conclusion:** 42% of patients shown positive bile culture. The most common microorganism isolated from bile culture was *Klebsiella*.

**Key words:** Bacteriology, Cholecystectomy, Surgery

## INTRODUCTION

Calculus disease of biliary is one of the most common disorders affecting the gastrointestinal tract constituting a major cause of morbidity. There has been a marked rise in the incidence of gallstone disease in the west during the past century. In the UK, USA, and Australia, the prevalence rates vary from 15 to 25%. In India, it is more common in North India than in South India. Similarly, the incidence in Eastern India is higher than in the west.<sup>[1-3]</sup>

Incidence of gallstone increases with age. It is more common in females than male (M:F = 1:4). About 50% of patients with gallstones are asymptomatic. 1–2% of asymptomatic patients will develop symptoms requiring cholecystectomy per year, making cholecystectomy one of the most common operations performed by surgeons.<sup>[4,5]</sup>

The etiopathogenesis of gallstone is multifactorial. It varies according to the type of gallstones. Primarily gallstones can be divided into two major groups. First is a pure gallstone contributing to 10% of gallstones. Second is a mixed and combined gallstone which accounts for 90% of gallstones. Mixed gallstones have increased preponderance of cholecystitis. Infection seems to be a major cause of gallstones.<sup>[6]</sup>

## Aim

The aim of the study was to study analyzes the bacteriological profile of the bile collected from gallbladder in patients undergoing cholecystectomy.

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## MATERIALS AND METHODS

This observational study was conducted in the Department of Surgery at Tirunelveli Medical College Hospital. Inclusion criteria were patients undergoing cholecystectomy and patient giving informed consent for study. Patients' age >12 years and <65 years, proven cases of gallstone disease for cholecystectomy both open and laparoscopic cholecystectomy. Exclusive criteria: Acute cholecystitis, acute a calculus cholecystitis emphysema gallbladder mucocele of the gallbladder, jaundice patients, and gallstones with multiple common bile duct stones (multiple CBD and intrahepatic stones). Patients were refused surgery. Patient's demographic data such as name, age, and sex noted. Detailed history was taken with physical examination and investigations were done.

Bile was aspirated from the gallbladder of the patient who underwent open cholecystectomy using a sterile syringe (5 ml). In case of laparoscopic cholecystectomy, bile was collected from the excised gallbladder. The sample was collected in a sterile bottle and was transferred to microbiology laboratory. In the laboratory the bile sample was inoculated in the basal media such as nutrient agar, MacConkey agar, and blood agar in the temperature of 37°C and the results were read after 18–24 h for the growth of organisms. Identification of species was done using biochemical tests such as indole test, citrate test, urease test, triple sugar iron test, oxidase test, gram staining, and motility test. Antibiotic sensitivity test was done with amikacin, gentamycin, ciprofloxacin, ceftazidime, cefotaxime, ceftriaxone, cotrimoxazole, and ceftazidime + clavulanic acid.

## RESULTS

In our study, the age group of 51–65 years was more commonly affected, 22 among 50 cases were found to belong to this group. Females were more commonly affected in the ratio of 3.2 Table 1.

The most common clinical presentation among the cases studied was abdominal pain; all the cases studied presented with abdominal pain. The second most common presentation was nausea/vomiting, which was the presenting symptom in 18 cases Table 2.

Culture reports of the bile revealed organism in 21 cases. *Klebsiella* was the most common organism followed by *Escherichia coli* Table 3.

In our study, most of the stones recovered from the gallbladder were black/pigment stones, which constituted 68% of the cases studied Table 4.

**Table 1: Distribution gender and age group**

Age	Male	Female	Total
13–20	0	0	0
21–30	2	5	7
31–40	4	8	12
41–50	1	8	9
51–65	12	10	22
Total	19	31	50

**Table 2: Clinical presentations of gallstone**

Presentation	Cases
Abdominal pain	50
Fever	11
Nausea/vomiting	18

**Table 3: Bacteriology of bile culture in gallstone distance**

Bacteria	Number of cases
<i>Klebsiella</i>	10
<i>E. coli</i>	4
Coagulase (-) <i>S. aureus</i>	3
<i>P. vulgaris</i>	2
<i>Pseudomonas</i>	2
No growth	29

*S. aureus*: *Staphylococcus aureus*, *E. coli*: *Escherichia coli*, *P. vulgaris*: *Proteus vulgaris*

**Table 4: Color of gallstones**

Color	Number of cases
Black/pigment stones	34
Yellow/cholesterol stones	16

**Table 5: Distribution of surgical treatment**

Procedure	Number of cases
Open cholecystectomy	28
Laparoscopy cholecystectomy	17
Laparoscopy converted to open	5

28 patients underwent open cholecystectomy, 17 patients were underwent laparoscopy cholecystectomy and 5 cases laparoscopy converted to open Table 5.

## DISCUSSION

Cholecystitis is an inflammatory condition of the gallbladder characterized by the inflammation of the gallbladder wall, which may be due to retention of bile in gallbladder or secondary to infection by microorganisms, predominantly *E. coli*, *Klebsiella*, *Enterobacter*, and *Bacteroides* species.<sup>[7,8]</sup>

The age and sex incidence of gallstone formation observed in our. The incidence was more in females (62%) 31 numbers

than in males (28%) 19 numbers among the total 50 cases. Similar observations were given by National Academy of Medical Sciences in Nepal.<sup>[9]</sup> The incidence of gallstone was highest in 51–65 years age group in both males and females followed by age group 31–40 years.<sup>[10]</sup> The clinical presentation of gallstone disease observed in our study was abdominal pain followed by nausea and vomiting. The intermittent nature of pain and vomiting of proximal gastrointestinal material, later becoming dark and feculent is due to the “tumbling” gallstone advancement.<sup>[11,12]</sup> The bacteriology of bile culture observed in our study revealed *Klebsiella* as the most common organism followed by *E. coli*. Hazrah *et al.* studied live bacteria in gallstones shown *Klebsiella* spp. to be the most common organisms isolated (18%) followed by *E. coli*.<sup>[13]</sup> Many studies shown *E. coli* was the most common organism isolated in gallstones.<sup>[14,15]</sup>

## CONCLUSION

Gallstone disease is common in females than in the males. All the cases presented with right hypochondriac pain. 42% of patients showed positive bile culture. The most common microorganism isolated from bile culture was *Klebsiella*.

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