



## Research Article

# Post-Cholecystectomy Bacterial Study of Gall Stones

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## Introduction

Infection has been known as a factor for mixed gall stone formation. Welch and Richardson<sup>1</sup> observed E.Coli and typhoid bacilli in gall stones. Schistosoma and Ascaris ova have also been frequently noted in centre of gall stones. Infection with E.Coli leads to hydrolysis of conjugated bilirubin to free bilirubin leading to precipitation of bilirubin and subsequent gall stone formation. Gall stone culture and bile culture is suitable method for demonstrating viable bacteria in patients undergoing cholecystectomy.

## Materials and Methods

From January 2015 to December 2016, 70 patients suffering from gall stone disease admitted in Nalanda Medical College Hospital Patna where cholecystectomy was done, were selected and studied. Age range was 20-62 years. Workup included a preoperative ultrasound. Blood investigations such as Complete blood count, liver function tests, serum electrolytes, viral markers

were routinely done; whereas chest x-ray, cardiac function tests were done in selected cases. Procedures were carried out after written and informed consent. 46 patients underwent laparoscopic cholecystectomy whereas in 24 patients, open cholecystectomy were done. 3 cc bile was aspirated from gall bladder of all patients before cholecystectomy. Collected bile and stones were sent separately for culture and sensitivity and chemical analysis of stone was also done. The specimen was evaluated to find out whether it was sterile or had any bacteria. The type of bacteria as well as their sensitivity to antibacterial agents was determined.

## Observation

This study included 70 patients, out of which 52 patients (74.29%) were female and 18 patients (25.71%) were male.

Culture of stone nuclei revealed 58.57% (41 patients) to be sterile, followed by E.Coli in 17.14% (12 patients), Staphylococcus in 12.85%

(9 patients), Klebsiella in 8.57 % (6 patients) and Candida in 2.85% (2 patients).

The chemical analysis of stone revealed 57 stones mixed, 9 stones cholesterol and 4 stones pigment in type. The nuclei of 3 pigment stones were sterile, while 1 had E.Coli on culture.

Samples of bile culture were sterile in 39 patients (56.71%), whereas E.Coli was isolated in 19 patients (27.14%), Staphylococcus in 5 patients (7.14%) and Klebsiella in 7 patients (10%). Bile from cholesterol stone patients were found infected in 46% cases, while bile from pigment stone patients in 54% cases.

**Table 1 : Frequency of gender**

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	18	25.71	25.71	25.71
Female	52	74.29	74.29	100.0
Total	70	100.0	100.0	

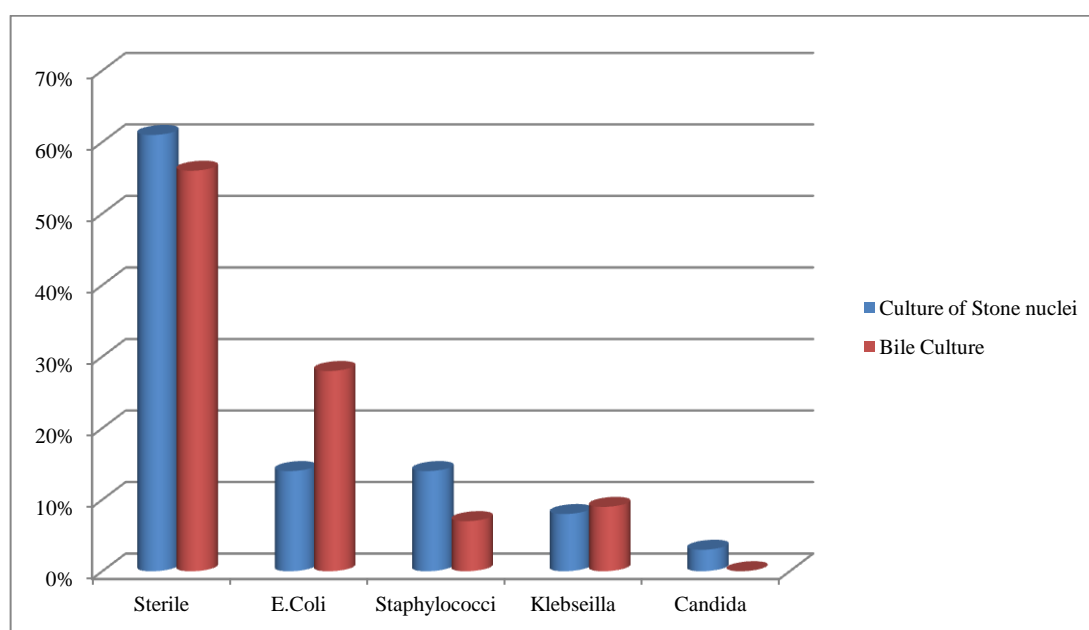
**Table 2: Type and Frequency of flora in stone nuclei**

	Frequency	Percent	Valid Percent	Cumulative Percent
E.Coli	12	17.14	17.14	17.14
Staph. aureus	9	12.85	12.85	29.99
Klebsiella	6	8.57	8.57	38.56
Candida	2	2.85	2.85	41.41
No Growth	41	58.57	58.57	100.0

**Table 3: Type and Frequency of flora in Bile**

	Frequency	Percent	Valid Percent	Cumulative Percent
E.Coli	19	27.14	27.14	27.14
Klebsiella	9	10.0	10.0	37.14
Staph. aureus	5	7.14	7.14	44.28
Candida	0	0.0	0.0	44.28
No Growth	39	55.72	55.72	100.0

**Photograph of Operated Gall bladder containing stones:**



**Organisms found on culture of Stone nuclei and Bile.**

## Discussion

Presence of infected bile is an important cause of gall stone formation. Production of beta-glucuronidase by the bacteria causes hydrolysis of conjugated bilirubin and precipitation of free bilirubin in bile to form pigment stone. Bacteria also produces phospholipase and lysophospholipase which causes hydrolysis of phospholipids resulting in cholesterol supersaturation and formation of cholesterol stones.

Bacteria and tissue also produce alkaline phosphatase which leads to precipitation of calcium salts in stone. Although the biliary tract of healthy individual is normally considered to be sterile, under normal conditions the sphincter of Oddi works as an effective barrier to ascending bacterial migration and free flowing bile also inhibits colonization<sup>2</sup>. Sung et al<sup>3,4</sup> have also shown migration of bacteria to the portal venous system.

Hasan SM, Baloch S et al<sup>5</sup> have also reported the infective potential of gall stones as they contain viable bacteria which may cause post operative complications.

In Acharya Suri et al<sup>6</sup> observation, no organism was found microscopically in the bile of 24 (82.6%) patients. Later on, it was confirmed that such bile was sterile because no growth appeared on culture plates, both aerobic and anaerobic. Parekh PM et al<sup>7</sup>, in a similar study revealed E.Coli (15.38%) as the most common organism isolated from bile cultures. Other organisms were Pseudomonas (3.85%), Klebsiella (2.56%), coagulase negative staphylococci (1.28%) and Staphylococcus viridians (1.28%). In our study, bile was found sterile in 39(56.71%) patients. E.Coli (27.14%) was one of the most common isolated bacteria followed by Klebsiella (10%) and Staphylococcus aureus (7%). These findings are more or less similar to as observed in other series.

## Conclusion

Around 50-60% of cases of gall stones have a positive bacterial culture and indicates role in stone formation. This also makes the basis of proper postoperative antibiotic therapy.

## References

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