

## BACTERIOLOGICAL PROFILE AND COMPOSITION OF GALL STONE

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### ABSTRACT

**Background:** For a very long period of time it was thought that bacteria inside gallstones were dead, as described in aphorism of Lord Moynihan: Tomb stone were made when organisms were lie dead in them. In previous studies it was proposed that bacterial infection may have significant role in the pathogenesis of gallstones. Some reports stated the association between bacterial infection and calcium bilirubinate or with pigment stones. **Material & Methods:** The present prospective study was conducted at department of general surgery of our tertiary care hospital. The study duration was of one year from February 2018 to January 2019. Patients of chronic calculous cholecystitis admitted for cholecystectomy were enrolled from outdoor and from ward by simple random sampling. Written informed consent was taken from each study participant. **Results:** In the present study, out of 19% patients who were culture positive, 11% patient who had E. coli infection among them 7% had pigment stone, 3% had cholesterol stone and 1% had mixed stones. Out of 3% patient who had Klebsiella, 2% had pigment stones and 1% had cholesterol stones. Out of 2% patient who had Citrobacter, 1% had mixed stones and 1% had cholesterol stones. Out of 1% patient who had enterococcus, had cholesterol stones. Out of 1% patient who had pseudomonas, had pigment stones. **Conclusion:** We concluded from the present study that the most common type of gall stone was cholesterol type of gallstones. E. coli was most common organism associated with gall stones and the most common type of gall stones associated with E. coli was pigment gall stones.

**Key words:** Gallstone, Chronic calculous cholecystitis, Bile culture.

### INTRODUCTION

For a very long period of time it was thought that bacteria inside gallstones were dead, as described in aphorism of Lord Moynihan: Tomb stone were made when organisms were lie dead in them (1). In previous studies it was proposed that bacterial infection may have significant role in the pathogenesis of gallstones. Some reports stated the association between bacterial infection and calcium bilirubinate or with pigment stones. However, it is still the matter of debate on which account gallstones are caused by bacteria (2).

The infective process which results in gallstones is independent from peritoneal cavity contamination with infected bile. Some reports stated that majority of infected pigment stones were brown pigment stones and cholesterol and black pigment were found with non-significantly associated with the presence of bacteria (3).

In previous studies it was reported that gallstone diseases were responsible for near about 95% of

biliary tract abnormalities. However, among developing countries, the prevalence of gall bladder stones varies from 15 to 25%. In India the prevalence of gall bladder stones varies from 5 to 10% (4). The high prevalence rate of gall stones was associated with the dietary habits and life style. The etio-pathogenesis of gallstones is multifactorial and depended up on type of gallstone. Most common gall stones are mixed gallstone and the common symptom associated is biliary colic (5). In previous studies it was found that bacteria play significant role in etio-pathogenesis of pigment and cholesterol gallstones. Some studies found association and isolates of E. coli, Klebsiella, Streptococcus, Actinomyces and Bacterium typhosum from the bile (6). We conducted present study to evaluate the bacteriological profile of gallstones.

## MATERIALS & METHODS

The present prospective study was conducted at department of general surgery of our tertiary care hospital. The study duration was of one year from February 2018 to January 2019. A sample size of 100 was calculated at 95% confidence interval at 10% acceptable margin of error. Dropouts were excluded from the study. Patients of chronic calculous cholecystitis admitted for cholecystectomy were enrolled from outdoor and from ward by simple random sampling. Clearance from Institutional Ethics Committee was taken before start of study. Written informed consent was taken from each study participant.

The data were collected by detailed history, general physical and clinical examination from each patient after taking the written consent. A total of 120 patients of chronic calculous were included in the study, out of them 20 patients were loss to follow up and did not participate in the study. Inclusion criteria was, patients with chronic calculous cholecystitis with more than 3 months or cases admitted for cholecystectomy at least 3 months back. Patients who had acute cholecystitis, acute pancreatitis, patients with carcinoma of gall bladder, patients with choledocholithiasis and patients with co-existent liver disease were excluded from the present study. Data analysis was carried out using SPSS v22. All tests were done at alpha (level significance) of 5%; means a significant association present if p value was less than 0.05.

## RESULTS

In the present study we enrolled 120 patients out of them 100 were included in the present study.

The age of study participants was ranged from 29 to 54 years with a mean age of  $42.27 \pm 4.8$  years. Out of the total study participants 64% were females and 36% were males. Out of the total study participants Normal BMI was seen in 56% patients, 33% patients were overweight and 11% cases were underweight. The most common presenting symptom was pain in upper abdomen. On the basis of history, the most common factor present was sedentary life style in 46% patients. Other common associated factors were dyslipidemia, high fat diet and use of

oral contraceptive pills. On the basis of comorbidity, it was observed that diabetes mellitus was the most common associated comorbidity among study participants which is followed by hypertension and hypothyroidism. On the basis of composition of gall stone, the most common type of gallstone was cholesterol stone 70% which is followed by pigment stones in 18% patients and mixed type gallstones in 12% patients. (Table 1)

**Table 1:** Distribution according to composition/type of gall stones.

| Gallstone composition | No. of patient (%) |
|-----------------------|--------------------|
| Cholesterol           | 70%                |
| Pigment               | 18%                |
| Mixed                 | 12%                |

In the present study, out of total study participant, bile culture was done in all participants. On the bile culture test report, it was found that 19% patient showed positive culture report and 81% patient showed negative culture report. Out of these 19% patients, 11% patient had positive culture report for E. coli which is followed by Klebsiella among 3% patients, Citrobacter was present in 2% cases and enterococcus and pseudomonas was found in 1% patient respectively. There was no significant association was found between composition of gallstone and isolated bacteria from bile ( $p > 0.05$ ). Postoperative wound infection was present in 6 patients. (Table 2)

**Table 2:** Microorganisms isolated from bile in chronic calculous cholelithiasis patients

| Microorganisms      | No. of patient (%) |
|---------------------|--------------------|
| <b>E. coli</b>      | 11%                |
| <b>Klebsiella</b>   | 3%                 |
| <b>Citrobacter</b>  | 2 %                |
| <b>Enterococcus</b> | 1%                 |
| <b>Pseudomonas</b>  | 1%                 |

In the present study, out of 19% patients who were culture positive, 11% patient who had E. coli infection among them 7% had pigment stone, 3% had cholesterol stone and 1% had mixed stones. Out of 3% patient who had Klebsiella, 2% had pigment stones and 1% had cholesterol stones. Out of 2% patient who had Citrobacter, 1% had mixed stones and 1% had cholesterol stones. Out of 1% patient who had enterococcus, had cholesterol stones. Out of 1% patient who had pseudomonas, had pigment stones. (Table 3)

**Table 3:** Association between composition of gallstone and different microorganism isolated from bile in study population.

| Composition of gallstones | Citrobacter | E. coli | Enterococcus | Klebsiella | Pseudomonas |
|---------------------------|-------------|---------|--------------|------------|-------------|
| <b>Cholesterol</b>        | 1%          | 3%      | 1%           | 1%         | 0           |
| <b>Pigment</b>            | 0           | 7%      | 0            | 2%         | 1%          |
| <b>Mixed</b>              | 1%          | 1%      | 0            | 0          | 0           |

## DISCUSSION

In the present study we enrolled 120 patients out of them 100 were included in the present study.

The age of study participants was ranged from 29 to 54 years with a mean age of 42.27±4.8 years. Out of the total study participants 64% were females and 36% were males. Out of the total study participants Normal BMI was seen in 56% patients, 33% patients were overweight and 11% cases were underweight. The most common presenting symptom was pain in upper abdomen. On the basis of history, the most common factor present was sedentary life style in 46% patients. Other common associated factors were dyslipidemia, high fat diet and use of

oral contraceptive pills. On the basis of comorbidity, it was observed that diabetes mellitus was the most common associated comorbidity among study

participants which is followed by hypertension and hypothyroidism. On the basis of composition of gall stone, the most common type of gallstone was cholesterol stone 70% which is followed by pigment stones in 18% patients and mixed type gallstones in 12% patients. Similar results were found in a study conducted by

Jayanthi V et al among patients of chronic calculous cholecystitis and found that incidence of gallstone is associated with increasing age, mainly due to decrease of cholesterol reductase activity and also with increase in HMG co-A reductase activity (7). Similar results were found in a study conducted by Dhar S et al among patients of chronic calculous cholecystitis and found that incidence of gallstone is associated with increasing age and female gender (8).

In the present study, out of total study participant, bile culture was done in all participants. On the bile culture test report, it was found that 19% patient showed positive culture report and 81% patient showed negative culture report. Out of these 19% patients, 11% patient had positive culture report for E. coli which is followed by Klebsiella among 3% patients, Citrobacter was present in 2% cases and enterococcus and pseudomonas was found in 1% patient respectively. There was no significant association was found between composition of gallstone and isolated bacteria from bile (p >0.05). Postoperative wound infection was present in 6 patients. Similar results were found in a study conducted by Tyagi S et al among patients of chronic calculous cholecystitis and found that incidence of gallstone is associated with increasing age and female gender. The most common presenting symptom was pain in upper abdomen (9). Similar results were found in a study conducted by Chowbey P et al among patients of chronic calculous cholecystitis and found that bacterial flora in bile culture and E. coli association is found significant (10).

In the present study, out of 19% patients who were culture positive, 11% patient who had E. coli infection among them 7% had pigment stone, 3% had cholesterol stone and 1% had mixed stones. Out of 3% patient who had Klebsiella, 2% had pigment stones and 1% had cholesterol stones. Out of 2% patient who had Citrobacter, 1% had mixed stones and 1% had

cholesterol stones. Out of 1% patient who had enterococcus, had cholesterol stones. Out of 1% patient who had pseudomonas, had pigment stones. Similar results were found in a study conducted by Csendes A et al among patients of chronic calculous cholecystitis and found that E. coli was most common organism associated with gall stones and the most common type of gall stones associated with E. coli was pigment gall stones (11). Similar results were found in a study conducted by Guo R et al among patients of chronic calculous cholecystitis and found that E. coli was most common organism associated with gall stones and the most common type of gall stones associated with E. coli was pigment gall stones (12).

## CONCLUSION

We concluded from the present study that the most common type of gall stone was cholesterol type of gallstones. E. coli was most common organism associated with gall stones and the most common type of gall stones associated with E. coli was pigment gall stones.

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