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Original Research Article

Study of correlation between gallstones and bactibilia

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ABSTRACT

Background: Now a days Cholecystectomy is one of the commonly performed operations. Most common cause is Gallstones. So, we planned this study to determine to find out any association between gallstone and microbiological spectrum in bile in cholelithiasis patients undergoing laparoscopic or open cholecystectomy.
Methods: Total 140 patients of chronic calculous cholecystitis admitted in the department of general surgery, KPC medical college & hospital, Jadavpur, Kolkata, during August 2021 to July 2022 for cholecystectomy were included in this study. All patients underwent either laparoscopic or open cholecystectomy. During cholecystectomy bile was collected and sent to the department of microbiology for bacteriological profile of bile. Gallstone is classified based on morphology following gallstone retrieved from the gall bladder.
Results: Out of 140 cases 115 cases done laparoscopic cholecystectomy and 25 cases done open cholecystectomy. In this study bile culture test negative in 105 cases and positive in 35 of cases. *Escherichia coli* was the most common micro-organism found in 20 cases, *Enterococcus* species in 8 cases, in 5 cases *Staphylococcus aureus* and 2 mixed infections. In culture negative case mostly gallstones were larger, 2 to 3 in number and yellowish in colour. In culture positive cases mostly, gallstone was more than 3 in number, smaller, black and brown in colour.
Conclusions: In the light of above obtained results, the authors concluded that multiple, small, dark and brown in colour gallstone in cholelithiasis patients often show bactibilia. The low incidence of bacterbilia may suggest restriction of use of antibiotics in mild biliary pain.

Keywords: Bactibilia, Gall stones, Cholecystectomy

INTRODUCTION

Calculus biliary disease is one of the most common disorders affecting the gastrointestinal tract. The etiopathogenesis of gallstone is multifactorial. Cholecystectomy is currently a frequently performed surgery for gallstone disease.[1,2] But, the presence of gallstones within either the gallbladder or biliary tree is associated with the bacterial colonization of the bile. In patients without gallbladder stone disease, previous biliary intervention is also associated with high rates of bacteriobilia.[3-5] The present study to assess the bacteriological profile of bile in gallstone patients undergoing cholecystectomy and to limit the use of antibiotic in selected cases.

METHODS

Study design, location, duration and population

Current study was an institutional based observational descriptive study conducted at KPC medical college and hospital, for a period of 12 months from August 2021 to July 2022 on patients undergoing cholecystectomy with gall bladder disease in KPCMCH between 18-70 years of age.

Inclusion and exclusion criteria

All patients undergoing only cholecystectomy at KPCMCH between 18-70 years age were included. Patients below 18 years, patients above 70 years, patient not giving consent for study, patient undergoing ancillary surgery (Exploration of CBD, Appendicectomy, other concomitant abdominal problems etc.) along with cholecystectomy and patients declared unfit for surgery by anaesthesiologist due to comorbidities. A total of 140 patients scheduled to undergo laparoscopic/open cholecystectomy were included in the present study. Demographic and clinical profile of all the patients was obtained. Complete biochemical and hematological profile of all the patients was obtained. Bile samples were collected and were sent to the department of microbiology for further analysis. All the data were compiled in Microsoft excel sheet and were analyzed by SPSS software. Chi- square test was used for assessment of level of significance.

RESULTS

A total of 140 patients were included in the present study. Majority of the patients belonged to the age group of 41 to 50 years (Table 1).

Table1: Age-wise distribution of subjects.

Age group (years)	N
18-30	6
31-40	22
41-50	63
51-60	35
61-70	14

Table 2: Gender-wise distribution of patients.

Gender	N
Male	98
Female	42

Table 3: Distribution of patients according to type of stones.

Group	Type of Stones	N	Culture positive, N (%)	Culture negative, N (%)
1	Cholesterol stones	30	4 (13.3)	26 (86.7)
2	Mixed stones	104	30 (28.85)	74 (71.15)
3	Pigment stones	6	1 (16.67)	5 (83.33)

Mean age of the patients of the present study was 45.6 years. 70 percent of the patients of the present study were female while the remaining 30 percent were males (Table 2). In 75 percent of the cases, gall stones were of mixed type while in 4 and 21 percent of the cases, gall stones were of pigment and cholesterol type (Table 3). Micro-organisms were found to be present in 25 percent of the bile samples (Table 4). Escherichia coli were the most commonly observed micro-organism found to be present in 21 cases. Enterococcus spps. and Staphylococcus aureus were found to be present in 5 and 4 cases respectively (Table 5).

Table 4: Distribution of patients according to presence of microorganisms in bile samples.

Parameters	Cases	%
Culture positive	35	25
Culture negative	105	75

Table 5: Distribution of type of gall stones in patients divided according to presence of microorganisms in bile samples.

Type of organisms	Group 1	Group 2	Group 3	% of organisms
E. coli	1	19	0	57.14
Enterococcus spp.	2	5	1	22.86
Staphylococcus aureus	1	4	0	14.29
Mixed	0	2	0	5.71
Total	4	30	1	100

DISCUSSION

Gallstones occur due to imbalance in the chemical constituents of bile that result in precipitation of one or more of the components. Gallstone disease is a major problem in modern society.[6] Cholecystectomy is ideal for patients who are willing for surgery which results in a permanent cure for gallstones with no chance of recurrence (in the gall bladder) and requires no long term follow up or medication.[7] Laparoscopic cholecystectomy (LC) has become the accepted gold standard for operative management of gallstone disease worldwide which is a minimal access approach for the removal of the gall bladder together with its stones.[7,8] Prophylactic antibiotics prevent infections even though they do not reduce rates of bactibilia.[8] Mean age of the patients of our study was 45.6 years. The peak incidence of cholelithiasis in a study by Chuttani et al was between 31 to 60 years.[9] 70 percent of the patients of the present study were females, while the remaining were males. Our results were in correlation with the results obtained by previous authors who have also reported a female predominance has been observed by many workers. It has been suggested that endogenous estrogens and progesterone are responsible for the higher incidence in females, through an effect on bile saturation and smooth muscle function of gall bladder and intestine during the phases of menstrual cycle and pregnancy. This might also be due to decrease in activity of cholesterol reductase and increase in activity of HMG CoA reductase with age, resulting in increased cholesterol secretion and saturation of bile. Female's sex hormones and sedentary

habits of most women in India also leads to the formation of gall stones.[9-11] Often bile from patients with gallstone is sterile but organisms have been cultured from centre of gallstone. The radiolucent centre of many gallstones may represent mucus plugs originally formed around bacteria. Moynihan's aphorism states that "A gallstone is a tombstone erected to the memory of organism within it". The role of infection is unclear, whether infection causes gallstone or infection is sequelae of gallstone.[12] In Acharya Suri et al.; on gram staining, 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.[13] Escherichia coli were found to be present in majority of the cases. The reason for E. Coli being the commonest bacteria in bile is because it is the commonest bacteria found in GIT and infection to biliary system comes from the GIT.[14] Valazquez- Mendoza et al study; total 80 patients study, 40 patients with bile culture positive and 40 patients with wound culture positive and there was no statistically significant difference when comparing surgical site infection in both groups.[16] In developing countries like India, repeated, ineffective antibiotics from local practitioners is a common practice especially in chronic diseases like chronic gall bladder diseases and this might probably be a major cause of antibiotic resistance. These patients carrying community acquired strains, on admission to hospital exchange the genetic information with the prevailing nosocomial isolates, resulting in emergence of multidrug resistant strains and polymicrobial infections.[15,16]

Limitations

Limitations of current study were; the sample size was small. Only 140 cases are not sufficient for this kind of study, the study has been done in a single centre, the study was carried out in a tertiary care hospital, so hospital bias cannot be ruled out and ongoing COVID-19 pandemic and lockdown has further hampered the study.

CONCLUSION

Under the light of current study results the authors can conclude the antibiotic in biliary pain and in post op. cases should be used sparingly and judiciously.

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