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Corresponding Author
Kausheen Shail,
ANIIMS, Port Blair, India

Author Designation
[1]Associate professor
[2]Professor
[3,4]Intern

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Analysing the Change in Incidence and Profile of Gall Stone Disease During COVID-19 in a Tertiary Healthcare Centre at Andaman and Nicobar Islands

[1]P.P. Mohammed Mustafa, [2]G. Gajendraraja, [3]Heena Kaushar and [4]Kausheen Shail
[1,2]Department of surgery, ANIIMS, Port Blair, India
[3,4]ANIIMS, Port Blair

ABSTRACT
Cholelithiasis or gall stone disease is one of the most common gastroenterological disorders encountered in daily practice. There is a paucity of literature that discusses how the COVID epidemic affected the incidence and characteristics of gall stone disease. The goal of the current study was to examine changes in the profile and incidence of gall stone disease during COVID-19 in an advanced medical facility in the Andaman and Nicobar Islands. Present study was single-center, retrospective, cohort, analytical study, conducted patients in the age group of 15-90 years, either gender with symptomatic gall stone disease. In present study, medical records of 165 patients with gall stone disease before COVID-19 pandemic (Group 1) and 122 patients with gall stone disease during COVID-19 pandemic (Group 2) were studied. Mean Age (in years), mean BMI and length of stay was comparable in both groups (p-0.64). Genderwise, more incidence was noted in females in group 1 (76.36%) as well as in group 2 (71.3%). Mean duration of symptoms was less in group 1 (4.8±1.5 days) as compared to group 2 (6.1±2.05 days) and difference was statistically significant (p-0.32). Cholecystitis was more in covid era (81.15% vs 75.15%) while pancreatitis was more in pre-covid era (19.39% vs 14.75%). Mortality within 30 days was noted in 1 patient from each group. Management in precovid era was early Cholecystectomy (53.94%) as compared to non-operative management (24.8%), while in covid era majority patients managed by Non Operative Management (53.28%) as compared to Early Cholecystectomy (30.33%), difference was statistically significant (p-0.032). Reduced incidence of gall stone disease was noted in COVID era, while increased incidence of cholecystitis, preferrable mode of management as conservative management during COVID era was observed.

INTRODUCTION

Cholelithiasis or gall stone disease is one of the most common gastroenterological disorders encountered in daily practice. Gall stone disease is distributed differently over the world and among different ethnic groups. The prevalence of gallstone disease is as high as 60-70% in American Indians as compared to a mere 10-15% in Caucasians[1]. People with metabolic syndrome and older females[2] are substantially more likely to have the condition[3,4]. Multiple liver effects are linked to SARS-Cov2 infection, the virus that completely altered the global framework in all facets of life. The virus is hepatotropic in nature, and when it infects hypothecates, it causes endoplasmic reticulum expansion, mitochondrial enlargement and ultimately apoptosis. Different liver aminotransferases have been utilized as prognostic indicators to rank the COVID severity[5]. Numerous studies have also shown that COVID can have negative effects on the liver, including abnormal coagulation profiles, heightened inflammatory responses, a higher chance of developing severe COVID and higher mortality rates in patients with pre-existing liver disease[5,6].

There is a paucity of literature that discusses how the COVID epidemic affected the incidence and characteristics of gall stone disease. Given the aforementioned circumstances, it is crucial that the impact of COVID on the characteristics of gallstone disease be examined in order to improve the management and care options for patients with gallstones in their best interests. The goal of the current study was to examine changes in the profile and incidence of gall stone disease during COVID-19 in an advanced medical facility in the Andaman and Nicobar Islands.

MATERIAL AND METHODS

Present study was single-center, retrospective, cohort, analytical study, conducted in Department of Surgery, GB Pant Hospital, ANIIMS, Port-Blair, Andman and Nicobar Islands, India. Study duration was of 4 years (January 2018 to December 2021). Study approval was obtained from institutional ethical committee.

Inclusion Criteria:

- All patients in the age group of 15-90 years, either gender with symptomatic gall stone disease

Exclusion Criteria:

- Moribund patients who cannot withstand surgical stress
- Patients in whom surgery is a contraindication

Retrospective analysis of a prospectively maintained database was conducted including, Demographic data (Name, age, gender, occupation, residence), duration of symptoms, body mass index (BMI), comorbidities such as diabetes and hypertension and previous abdominal surgeries), preoperative data (form of presentation, time until consultation), CBC, body temperature, liver enzymes, jaundice, gall bladder size, wall thickness, empyema, dense adhesions in Calot's triangle, perforation, CBD dilation, CBD stones, gallstone pancreatitis. Sampling method used was convenience sampling. Using the baseline prevalence of gall stone disease as 20% with confidence level of 95% and margin of error 5%, the sample size is calculated as 246. For analysis patients were divided in 2 groups. Group 1-patients with gall stone disease before COVID-19 pandemic. Group 2-patients with gall stone disease during COVID-19 pandemic.

Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Frequency, percentage, means and standard deviations (SD) was calculated for the continuous variables, while ratios and proportions were calculated for the categorical variables. Difference of proportions between qualitative variables were tested using chi-square test or Fisher exact test as applicable. p-value less than 0.05 was considered as statistically significant.

RESULTS AND DISCUSSION

In present study, medical records of 165 patients with gall stone disease before COVID-19 pandemic (Group 1) and 122 patients with gall stone disease during COVID-19 pandemic (Group 2) were studied. Mean Age (in years), mean BMI and length of stay was comparable in both groups (p-0.64). Genderwise, more incidence was noted in females in group 1 (76.36%) as well as in group 2 (71.31%). Mean duration of symptoms was less in group 1 (4.8±1.5 days) as compared to group 2 (6.1±2.05 days) and difference was statistically significant (p-0.32). Common symptoms observed were right hypochondrial pain, epigastric pain, nausea, vomiting and jaundice. Cholecystitis was more in covid era (81.15% vs 75.15%) while pancreatitis was more in pre-covid era (19.39% vs 14.75%). Mortality within 30 days was noted in 1 patient from each group. Management in precovid era was early Cholecystectomy (53.94%) as compared to non-operative management (24.85%), while in covid era majority patients managed by Non Operative Management (53.28%) as compared to Early Cholecystectomy (30.33%), difference was statistically significant (p-0.032).

Common indications for surgery were acute cholecystitis (Group 1-61.29%, Group 2-50.88%), Uncomplicated biliary colic (Group 1-8.87%, Group

Table 1: General characteristics

Characteristics	Group 1 (n=165)No. of patients (%)	Group 2 (n=122)No. of patients (%)	p-value
Mean Age (in years)	51.78 ± 13.05	56.46 ± 12.47	0.64
Gender			0.02
Male	39 (23.64)	35 (28.69)	
Female	126 (76.36)	87 (71.31)	
Mean BMI	23.28 ± 2.42	24.02 ± 2.26	
Mean duration of symptoms	4.8 ± 1.5	6.1 ± 2.05	0.32
Symptoms			0.58
Right hypochondrial pain	134 (81.21)	103 (84.43)	
Epigastric pain	85 (51.52)	65 (53.28)	
Nausea	69 (41.82)	56 (45.9)	
Vomiting	54 (32.73)	39 (31.97)	
Jaundice	8 (4.85 %)	5 (4.1)	
Diagnosis			0.43
Cholecystitis	124 (75.15)	99 (81.15)	
Pancreatitis	32 (19.39)	18 (14.75)	
Biliary colic	9 (5.45)	5 (4.1)	
Length of Stay (in days)	5.8 ± 2.5	6.4 ± 2.7	0.67
Readmission			0.33
within 30 days	15 (9.09)	19 (15.57)	
>30 days	11 (6.67)	15 (12.3)	
Mortality within 30 days	1 (0.61)	1 (0.82)	0.75

Table 2: Management

Management	Group 1 (n=165)No. of patients (%)	Group 2 (n=122)No. of patients (%)	p-value
Early Cholecystectomy	89 (53.94)	37 (30.33)	0.032
Non Operative Management	41 (24.85)	65 (53.28)	
Interval Cholecystectomy	10 (6.06)	6 (4.92)	
ERCP	9 (5.45)	6 (4.92)	
Exploratory Laparotomy	9 (5.45)	4 (3.28)	
ERCP followed by Early Cholecystectomy	4 (2.42)	2 (1.64)	
ERCP followed by Interval Cholecystectomy	3 (1.82)	2 (1.64)	

Table 3: Indication for surgery

Indication for surgery	Group 1 (n=124)No. of patients (%)	Group 2 (n=57)No. of patients (%)	p-value
Acute cholecystitis	76 (61.29)	29 (50.88)	0.056
Uncomplicated biliary colic	11 (8.87)	5 (8.77)	
Endoscopic retrograde cholangiopancreatography (ERCP) performed for common bile duct stones	15 (12.1)	9 (15.79)	
Biliary pancreatitis	8 (6.45)	4 (7.02)	
Obstructive jaundice	6 (4.84)	5 (8.77)	
Findings of chronic cholecystitis	6 (4.84)	4 (7.02)	
Postoperative complications	2 (1.61)	1 (1.75)	

Table 4: Complications

Complications during hospital stay	Group 1 (n=124)No. of patients (%)	Group 2 (n=57)No. of patients (%)	p-value
Postoperative ileus	5 (4.03)	5 (8.77)	0.051
Wound infection	3 (2.42)	2 (3.51)	0.064
Bile duct injury	2 (1.61)	1 (1.75)	0.071
Intra operative bleeding	2 (1.61)	1 (1.75)	0.071
Wound dehiscence	1 (0.81)	2 (3.51)	0.071

2-8.77%) and Endoscopic retrograde cholangiopancreatography (ERCP) performed for common bile duct stones (Group 1-12.1%, Group 2 - 15.79%). Postoperative ileus, Wound infection, Bile duct injury, Intra operative bleeding and wound dehiscence were noted in post-surgical patients, comparable in both groups difference was not significant statistically.

Gallstones can form in the hepatic bile duct, common bile duct, or gallbladder as a result of gallstone disease, a chronic recurring hepatobiliary condition caused by the poor metabolism of cholesterol, bilirubin and bile acids[7]. In addition to age, gender and race, other factors that contribute to gallstone formation include obesity, fast weight loss, medicines, pregnancy and triglyceridemia. Biliary colic (sudden onset pain in the right upper quadrant of the abdomen or epigastric region), heartburn, nausea, vomiting, epigastric discomfort and sensitivity to fatty foods are all signs of gallstone disease[8,9]. There is a 1-3% annual risk of problems such acute pancreatitis, acute cholecystitis and cholangitis, which necessitate recurrent hospitalisation[10,11]. In a research by Veerabhadrappa *et al*[12]. Thirty eight (63.3% 20, 2024%) of the 60 cases were female and the remaining cases were male. Gallstone disease is most strongly associated with the female gender, particularly during the reproductive years. Stone formation is almost two times more common in women than in males, but, after menopause, men start to close the gap[13].

According to a study by Aftab *et al*[14]. women between the ages of 41-50 years had a maximal incidence of gall stone disease (28%), which is 4 times greater than in men. A total of 60% of patients were obese and 8% of patients had previously used oral contraceptives. Only 8% of patients had diabetes, while

10% had a family history of gallstone disease. According to Fernandez-Alberti J, *et al*[15]. study, 36 (45 %) of the 80 laparoscopic cholecystectomies (LC) performed in 2020 were caused by acute disease, compared to 45 (or 23.44%) of the 192 and 37 (15.81%) of the 234 LC performed in 2018 and 2019, respectively (p 0.01). The pandemic saw a greater interval between the beginning of symptoms and hospital consultation (2020: 3.8 days vs 2.87 days for 2018 and 2.26 days for 2019; p 0.05). Additionally, the mean operating time in minutes was longer for each year (78.56±31.6 for 2020, 57.69±26.5 for 2018 and 63.51±29.4 for 2019) (p<0.01).

In contrast to the 71 patients in 2019, Patel *et al*[16]. reported that 51 patients appeared during the first wave and 105 patients during the second wave. In comparison to pre-COVID patients in the second wave, the median age of patients during the first wave of COVID was much higher. When compared to 2019, there was no discernible difference between patients presenting with cholecystitis during either of the pandemic's waves (47 and 94 in the first and second wave, respectively, versus 60 in 2019, p-value 0.39). The utilization of radiological tests was comparable and the usage of cholecystostomies did not significantly rise. Recurrence and readmission showed no appreciable variation.

Acute calculus cholecystitis is often treated (initially) with bowel rest, intravenous hydration, correction of electrolyte imbalances, analgesics and intravenous antibiotics, followed by an open or laparoscopic cholecystectomy. There was unmistakable proof of significant mortality and morbidity among SARS-CoV-2 patients receiving surgery[17]. Cholelithiasis, hernias and other mild ailments were postponed during this crisis in order to prevent the nation from going into look-down and a pandemic being declared[18,19,20]. The retrospective nature of the study and the cohort's single-center origin may have hampered the study's capacity to generalise its findings. No such study has been done before. It will be essential for further research on the subject and will aid in the improved care of people with gall stone disease.

CONCLUSION

Reduced incidence of gall stone disease was noted in COVID era, while increased incidence of cholecystitis, preferrable mode of management as conservative management during COVID era was observed at a tertiary healthcare centre at Andaman and Nicobar Islands. This might be one of a kind study in the Indian subcontinent, much more detailed research is required in other areas to validate present study findings.

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