Original Research Article

Study of the factors associated with the gallbladder stones at tertiary health care center

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Abstract

Background: Gallstone disease is a chronic recurrent hepatobiliary disease, the basis for which is the impaired metabolism of cholesterol, bilirubin and bile acids, which is characterized by the formation of gallstones in the hepatic bile duct, common bile duct, or gallbladder. Present study was aimed to study factors associated with the Gall stones at tertiary health care center. **Material and Methods:** Present study was a hospital based, prospective, observational study, conducted in patients attending the outpatient department or emergency department, with confirmed diagnosis of gall stone disease. **Results:** During study period, 164 cases were studied with confirmed diagnosis of gallstones. Majority of patients were from age group 51-60 years (31.1 %) followed by age group 41-50 years (26.83 %). Females (65.85 %) outnumbered males (34.15 %), male to female ratio was 1:2. Diabetes mellitus (35.37 %), gastro-esophageal reflux disease (34.15 %), hypertension (27.44 %), ischemic heart disease (20.12 %) and renal calculus (10.37 %) were common comorbidities noted among patients with gall stone disease. Common clinical symptoms noted among patients with gall stone disease were right hypochondrial pain (74.39 %), nausea (49.39 %), epigastric pain (46.95 %), vomiting (35.37 %) and jaundice (9.15 %). USG findings in majority of patients multiple stones (46.95 %), other findings were two to three stones (19.51 %), biliary sludge (18.90 %), single stone (12.80 %), choledocholithiasis (2.44 %) and carcinoma gall bladder (1.22 %). Sedentary lifestyle (67.07 %), female gender (65.85 %), obesity (BMI > 25 kg/m^2) (57.93 %), age > 50 years (40.85 %), family history (38.41 %) were common risk factors noted in patients with gall stone disease. Less common risk factors were parity ≥ 3 (29.27 %), h/o rapid weight loss due to fasting, illness (27.44 %), alcohol drinking (23.17 %), smoking (20.73 %) and drugs like ceftriaxone, octreotide and thiazide diuretics. (6.10 %). **Conclusion:** Sedentary lifestyle, female gender, obesity (BMI > 25 kg/m^2), age > 50 years, family history were common risk factors noted in patients with gall stone disease.

Keywords: gallbladder stones, sedentary lifestyle, female gender, obesity

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INTRODUCTION

Gallstone disease is a chronic recurrent hepatobiliary disease, the basis for which is the impaired metabolism of cholesterol, bilirubin and bile acids, which is characterized by the formation of gallstones in the hepatic bile duct, common bile duct, or gallbladder.[1] Risk factors for GB disease can be categorized into two, namely, immutable factors, such as ethnicity, advanced age, female sex, and pregnancy, and modifiable factors. Age, obesity, weight loss, multiparity, hyperlipidemia, diabetes mellitus, a high-calorie diet, and the drugs used will reduce storage function and normal motility, causing the formation of cholesterol stones.[2] High low-density lipoprotein (LDL), low high-density lipoprotein (HDL), and high triglyceride levels are positively correlated with gallstone formation.[3,4] Incidence of gall stone disease is on a rise globally due to the vast changes in the dietary habits, life style changes associated with high junk diet consumption and increased sedentary life style.[5] Meanwhile, cirrhosis, ileal disease, hemolytic anemia, truncal vagotomy, hyperparathyroidism, and bile duct infection are risk factors for pigment stone formation.[6] Cholelithiasis can be easily diagnosed in ultrasonography of abdomen and early

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diagnosis may be beneficial for patients as this may be treated with conservative or operative management, prior to the development of complications. Present study was aimed to study factors associated with the Gall stones at tertiary health care center.

MATERIAL AND METHODS

Present study was a hospital based, prospective, observational study, conducted in Department of General Surgery, Mahavir Institute of Medical Sciences (MIMS), Vikarabad India. Study duration was of 2 years (January 2019 to December 2020). Study approval was taken from institutional ethical committee.

Inclusion criteria: All patients attending the outpatient department or emergency department, with confirmed diagnosis of gall stone disease., willing to participate in present

Exclusion criteria: Patients underwent cholecystectomy. Patients who did not give consent for participation.

Study was explained to patients and written informed consent. Data was collected from all the participants including demographic characteristics like age, gender, literacy, occupation, religion, complaints at present. Lifestyle variables and dietary pattern (vegetarian/non-vegetarian) were also recorded. Medical history of diabetes, coronary artery disease (CAD), cholecystitis was noted. In female patients menstrual and obstetric history was noted.

Body mass index (BMI) was calculated by dividing weight (kg) by square of height (m2). On clinical examination, significant findings were noted. The diagnosis of gall stone disease was confirmed by ultrasonography, number of gallstones (single/multiple) and other USG findings were noted. Patients underwent CBC, urine analysis, LFT, RFT, fasting BSL and fasting lipid profile. Data was collected in Microsoft excel sheet. Statistical analysis was done using descriptive statistics.

RESULTS

During study period, 164 cases were studied with confirmed diagnosis of gallstones. Majority of patients were from age group 51-60 years (31.1 %) followed by age group 41-50 years (26.83 %). Females (65.85 %) outnumbered males (34.15 %), male to female ratio was 1:2.

Table 1: General Characteristics.

Characteristics	No. of cases (n=164)	Percentage
Age group (years)		
≤ 20	3	1.83%
21-30	16	9.76%
31-40	34	20.73%
41-50	44	26.83%
51-60	51	31.10%
≥ 61	16	9.76%
Gender		
Male	56	34.15%
Female	108	65.85%

Diabetes mellitus (35.37 %), gastro-esophageal reflux disease (34.15 %), hypertension (27.44 %), ischemic heart disease (20.12 %) and renal calculus (10.37 %) were common comorbidities noted among patients with gall stone disease.

Table 2: Co-morbidities

Co-morbidities	No. of cases (n=164)	Percentage
Diabetes mellitus	58	35.37%
Gastro-esophageal reflux disease	56	34.15%
Hypertension	45	27.44%
Ischemic heart disease	33	20.12%
Renal calculus	17	10.37%

Common clinical symptoms noted among patients with gall stone disease were right hypochondrial pain (74.39 %), nausea (49.39 %), epigastric pain (46.95 %), vomiting (35.37 %) and jaundice (9.15 %).

Table 3: Clinical symptoms

Clinical symptoms	No. of cases (n=164)	Percentage
Right hypochondrial pain	122	74.39%
Nausea	81	49.39%
Epigastric pain	77	46.95%
Vomiting	58	35.37%
Jaundice	15	9.15%

USG findings in majority of patients multiple stones (46.95 %), other findings were two to three stones (19.51 %), biliary sludge (18.90 %), single stone (12.80 %), choledocholithiasis (2.44 %) and carcinoma gall bladder (1.22 %).

Table 4: USG findings.

Findings	No. of patients	%
Multiple stones	77	46.95%
Two to three stones	32	19.51%
Biliary sludge	31	18.90%
Single stone	21	12.80%
Choledocholithiasis	4	2.44%
Carcinoma gall bladder	2	1.22%

Sedentary lifestyle (67.07 %), female gender (65.85 %), obesity (BMI > 25 kg/m^2) (57.93 %), age > 50 years (40.85 %), family history (38.41 %) were common risk factors noted in patients with gall stone disease. Less common risk factors were parity ≥ 3 (29.27 %), h/o rapid weight loss due to fasting, illness (27.44 %), alcohol drinking (23.17 %), smoking (20.73 %) and drugs like ceftriaxone, octreotide and thiazide diuretics. (6.10 %).

Table 5: Risk Factors

Risk Factors	Number of patients	Percentage
Sedentary lifestyle	110	67.07%
Female gender	108	65.85%
Obesity (BMI > 25 kg/m^2)	95	57.93%
Age > 50 years	67	40.85%
Family history	63	38.41%
Parity ≥ 3	48	29.27%
H/o Rapid weight loss due to Fasting, illness	45	27.44%
Alcohol drinking	38	23.17%
Smoking	34	20.73%
Drugs like ceftriaxone, octreotide and thiazide diuretics.	10	6.10%

DISCUSSION

Gallstone disease (GSD) represents a significant burden for health-care systems worldwide and is one of the most common disorders among patients presenting to emergency rooms with abdominal discomfort.[7] Personal risk factors such as sedentary lifestyle, overweight or obesity, and high W/H ratio were significantly associated with the development of GSD, reason for such finding may be because obesity increases cholesterol synthesis, biliary cholesterol secretion, and cholesterol supersaturation; similar results were seen in other studies,[8] whereas in few studies, no significant association was seen between these personal risk factors and GSD.[9] In study by Veerabhadrappa PS *et al.*,[10] majority (26.6%) of cases was in the age group of 51-60 years followed by 21.6% cases in the age group of 41-50 years. Sex wise 63.3% were females. Most (71.7%) patients presented with the complaints of pain in the region of hypochondrial region followed by nausea in 46.6%. Jaundice was the least common presenting feature shown by 6.6% patients. Saxena P. *et al.*,[11] noted that majority of patients of cholelithiasis (59.6%) belongs to the middle age group of 41-60 years. The male to female ratio was 1:1.7 with female preponderance. Patients with middle socioeconomic status were most commonly affected group (45.0%). Most of the patients were symptomatic in past with history of symptoms of cholecystitis (78.9%). Risk factors commonly associated with cholelithiasis are increasing age, female gender, family history or genetics, obesity, rapid weight loss, sedentary lifestyle, pregnancy, drugs like ceftriaxone, octreotide and thiazide diuretics, total parenteral nutrition or fasting, diseases like cirrhosis, chronic hemolysis and ileal Crohn's disease.[11] In study by Sayeed Unisa *et al.*, ultrasonography was performed in 5100 and 1448 people with and without symptoms, respectively. and revealed a prevalence of GBD of 6.20%. GBD was more common in 5100 persons with symptoms (7.12%) compared with 1448 without (2.99%) (P < 0.05). Adjusted odds ratio (ORs) [95%confidence interval (CI)] revealed a significantly increased risk of GBD in females >50, 1.703 (CI 1.292–2.245); multiparity 1.862 (CI 1.306–2.655) and a genetic history 1.564 (CI 1.049–2.334). An increased risk noted in males with diabetes was 4.271 (CI 2.130–8.566), chickpea consumption 2.546 (CI 1.563–4.146) and drinking unsafe water 3.835 (CI 2.368–6.209). Prevalence of gallstones was 4.15%; more in females 5.59% than males 1.99% (P < 0.05). In study by Dhamnetiya D *et al.*, high parity, high w/h ratio, physical inactivity, current smoking, smokeless tobacco and high BMI were found to be risk factors for the development of gallstone disease.[13] Biochemical parameters such as plasma total cholesterol, triglycerides, and LDL

cholesterol level were independently associated with GSD.[14] Pimpale R *et al.*,[15] studied 92 patients, of which 62 (68.89%) were female, with mean age of 45.03yrs ± 13.59. Fifty four patients (58.69%) were having BMI >25. Pain was most common complaint seen in all patients. Jaundice was observed in 13 patients (14.13%) who had associated CBD calculus. Sickling was positive in 8.69% of patients. Lap cholecystectomy was done in 71 (77.17%) patients with a conversion rate of 6.57%. Nineteen (20.65%) were open cholecystectomy with or without CBD exploration and 2 underwent Lap cholecystostomy. Post operatively, surgical site infection was seen in 3 patients (4.22%) of laparoscopic cholecystectomy, 5 patients (26.31%) of open cholecystectomy and biliary leak was seen in 3 patients (15.78%) of open cholecystectomy. Histopathology of gallbladder was chronic cholecystitis in 70 patients (77.77%), malignancy was detected in 5 patients (5.55%) and Xanthogranulomatous cholecystitis in 2 patients (2.22%). In a study by Jane C. Figueiredo *et al.*,[16] after a median 10.7 years of follow-up, there were 13,437 GBD cases. BMI over 25 kg/m2, diabetes, past and current smoking, red meat consumption, saturated fat and cholesterol were significant risk factors across ethnic/racial populations (p-trends < 0.01). Protective factors included vigorous physical activity, alcohol use, fruits, vegetables and foods rich in dietary fiber (p-trends < 0.01). Parity was a significant risk factor among women; postmenopausal hormones use was only associated with an increased risk among White women (estrogen-only: HR = 1.24; 95% CI = 1.07–1.43 and estrogen + progesterone: HR = 1.23; 95% CI = 1.06–1.42). Gallstones injure the mucosal columnar epithelium of gallbladder and thus result in various changes like metaplasia, dysplasia and neoplasia in gall bladder epithelium.[17] Higher number of stones, as well as larger and heavier stones have been associated with an increased risk for cancer causation. Large and heavy gallbladder stones causes mechanical trauma to mucosa and thus has been linked to the causation of dysplasia and progression to carcinoma. Higher number of stones, as well as larger and heavier stones have been associated with an increased risk for cancer causation. [18] Due to the anatomical position of the gallbladder and the non-specificity of the symptoms, diagnosis of gallbladder cancers often occurs in late stages with a poor prognosis of less than 10% so that 5-year survival in many studies is less than 5%.[19,20] Laparoscopic cholecystectomy (LC) is the gold standard technique for treatment of gallbladder disease in both elective and emergency surgery.[21] The treatment options for gallstone disease varies from bile salts dissolution, laser fragmentation, extracorporeal shock wave lithotripsy, endoscopic extraction and classical surgery. Bile acid therapy is only effective in some cholesterol gallstones and ineffective in treating calcium bilirubinate or calcium carbonate/phosphate stones. It is therefore ideal that the composition of the stones be determined to select the treatment of choice.

CONCLUSION

Gallstone disease is one of the most common disorders among patients presenting to emergency rooms with abdominal discomfort. Sedentary lifestyle, female gender, obesity (BMI > 25 kg/m^2), age > 50 years, family history were common risk factors noted in patients with gall stone disease.

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