|| ISSN(online): 2589-8698 || ISSN(print): 2589-868X ||
International Journal of Medical and Biomedical Studies
Available Online at www.ijmbs.info
NLM (National Library of Medicine ID: 101738825)
Index Copernicus Value 2019: 79.34
Volume 5, Issue 4; April: 2021; Page No. 154-158

Original Research Article

FACTORS ASSOCIATED WITH THE GALL-BLADDER CALCULUS AT TERTIARY HEALTH CARE CENTER: A CROSS SECTIONAL RESEARCH FROM CENTRAL INDIA

Dr. Gulshan Kumar

Assistant Professor Dept. of General Surgery K.D. Medical College Hospital and Research Centre, Mathura UP

Article Info: Received 01 February 2021; Accepted 25 March 2021
DOI: https://doi.org/10.32553/ijmbs.v5i4.1906
Corresponding author: Dr. Gulshan Kumar
Conflict of interest: No conflict of interest.

Abstract

Background: Gall-calculus disease is a chronic recurring hepatobiliary illness characterised by the production of gall-calculus in the hepatic bile duct, common bile duct, or gall-bladder as a result of poor cholesterol, bilirubin, and bile acid metabolism.

Aims & objectives: Present research was aimed to research factors associated with the Gall calculus at tertiary health care center.

Material and Methods: Present research was a hospital based, prospective, observational research, conducted in subjects attending the outpatient department or emergency department, with confirmed diagnosis of gall calculus disease.

Results: During research period, 328 cases were studied with confirmed diagnosis of gall-calculus. Majority of subjects were from age group 51-60 years (31.1 %) followed by age group 41-50 years (26.8 %). Females (65.9 %) outnumbered males (34.15 %), male to female ratio was 1:2. Diabetes mellitus (35.4 %), gastro-esophageal reflux disease (34.15 %), hypertension (27.44 %), ischemic heart disease (20.12 %) and renal calculus (10.4 %) were common comorbidities noted among subjects with gall calculus disease. Common clinical symptoms noted among subjects with gall calculus disease were right hypochondrial pain (74.4 %), nausea (49.4 %), epigastric pain (47 %), vomiting (35.4 %) and jaundice (9.15 %). USG findings in majority of subjects multiple calculus (47 %), other findings were two to three calculus (19.5 %), biliary sludge (18.90 %), single calculus (12.80 %), choledocholithiasis (2.44 %) and carcinoma gall bladder (1.22 %). Sedentary lifestyle (67.1 %), female gender (65.9 %), obesity (BMI > 25 kg/m2) (57.93 %), age > 50 years (40.9 %), family history (38.41 %) was common risk factors noted in subjects with gall calculus 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/m2), age > 50 years, family history were common risk factors noted in subjects with gall calculus disease.

Keywords: gall-bladder calculus, sedentary lifestyle, female gender, obesity

Introduction

Gall-calculus disease is a chronic recurring hepatobiliary illness characterised by the production of gall-calculus in the hepatic bile duct, common bile duct, or gall-bladder as a result of poor cholesterol, bilirubin, and bile acid metabolism[1]. There are two categories of risk factors for GB disease: immutable and modifiable factors. Immutable factors include ethnicity, advanced age, female gender, and pregnancy. Age, obesity, weight loss, multiparity, hyperlipidemia, diabetes mellitus, a raised-calorie diet, and the medications used all diminish storage function and normal motility, resulting in cholesterol calculus[2,3]. Gall-calculus development is linked to raised levels of low-density lipoprotein (LDL), low raised-density lipoprotein (HDL), and raised triglyceride levels. Gall-calculus disease is becoming more common around the world as a result of massive changes in dietary choices, lifestyle changes associated with raised junk food consumption, and an increase in sedentary behaviour[4]. Cirrhosis, ileal illness, hemolytic anaemia, truncal vagotomy, hyperparathyroidism, and bile duct infection, on the other hand, are all risk factors for the production of pigment calculus[5,6]. Cholelithiasis can be easily identified with abdominal ultrasonography, and early detection may benefit subjects because it can be treated conservatively or surgically before complications arise[7,8].

Aims & objectives: Present research was aimed to research factors associated with the Gall calculus at tertiary health care center.

MATERIAL AND METHODS

Present research was a hospital based, prospective, observational research, conducted in Department of General Surgery, from a medical college in Central India. Research duration was of 2 years. Research approval was taken from institutional ethical committee.

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

Exclusion criteria: Subjects underwent chole-cystectomy. Subjects who did not give consent for participation.

Research was explained to subjects 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/nonvegetarian) were also recorded. Medical history of diabetes, coronary artery disease (CAD), cholecystitis was noted. In female subjects 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 calculus disease was confirmed by ultrasonography, number of gall-calculus (single/multiple) and other USG findings were noted. Subjects 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 research period, 328 cases were studied with confirmed diagnosis of gall-calculus. Majority of subjects were from age group 51-60 years (31.1 %) followed by age group 41-50 years (26.8 %). Females (65.9 %) outnumbered males (34.15 %), male to female ratio was 1:2.

Table 1: General Characteristics.

Characteristics	No. of cases (n=328)	Percentage
Age group (years)		
≤ 20	6	1.83%
21-30	32	9.76%
31-40	68	20.73%
41-50	88	26.83%
51-60	102	31.10%
≥ 61	32	9.76%
Gender		
Male	112	34.15%
Female	216	65.85%

Diabetes mellitus (35.4 %), gastro-esophageal reflux disease (34.15 %), hypertension (27.44 %), ischemic heart disease (20.12 %) and renal calculus (10.4 %) were common comorbidities noted among subjects with gall calculus disease.

Table 2: Co-morbidities

Co-morbidities	No. of cases (n=328)	Percentage
Diabetes mellitus	116	35.37%
Gastro-esophageal reflux disease	112	34.15%
Hypertension	90	27.44%
Ischemic heart disease	66	20.12%
Renal calculus	34	10.37%

Common clinical symptoms noted among subjects with gall calculus disease were right hypochondrial pain (74.4 %), nausea (49.4 %), epigastric pain (47 %), vomiting (35.4 %) and jaundice (9.15 %).

Table 3: Clinical symptoms

Clinical symptoms	No. of cases (n=328)	Percentage
Right hypochondrial pain	244	74.39%
Nausea	162	49.39%
Epigastric pain	154	46.95%
Vomiting	116	35.37%
Jaundice	30	9.15%

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

Table 4: USG findings.

Findings	No. of subjects	%
Multiple calculus	154	46.95%
Two to three calculus	64	19.51%
Biliary sludge	62	18.90%
Single calculus	42	12.80%
Choledocholithiasis	8	2.44%
Carcinoma gall bladder	4	1.22%

Sedentary lifestyle (67.07 %), female gender (65.85 %), obesity (BMI > 25 kg/m2) (57.93 %), age > 50 years (40.85 %), family history (38.41 %) were common risk factors noted in subjects with gall calculus 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 subjects	Percentage
Sedentary lifestyle	220	67.07%
Female gender	216	65.85%
Obesity (BMI > 25 kg/m2)	190	57.93%
Age > 50 years	134	40.85%
Family history	126	38.41%
Parity ≥ 3	96	29.27%
H/o Rapid weight loss due to Fasting, illness	90	27.44%
Alcohol drinking	76	23.17%
Smoking	68	20.73%
Drugs like ceftriaxone, octreotide and thiazide diuretics.	20	6.10%

DISCUSSION

Gall-calculus disease (GSD) is one of the most prevalent illnesses among people presenting to emergency rooms with abdominal pain, and it is a huge burden on health-care systems around the world[9]. Sedentary lifestyle, overweight or obesity, and a raised W/H ratio were all found to be significantly associated with the development of GSD. This could be because obesity increases cholesterol synthesis, biliary cholesterol secretion, and cholesterol supersaturation; similar findings were found in other researches, while a few researches found no significant link between these personal risk factors and GSD[10]. The majority (26.6 percent) of cases in the research by Veerabhadrappa PS et al. were in the age category of 51-60 years, followed by 21.6 percent in the age group of 41-50 years. Females made up 63.3 percent of the population[11]. The majority of subjects (71.7 percent) complained of pain in the hypochondrial region, followed by nausea (46.6 percent). The least prevalent presenting sign was jaundice, which was seen in 6.6 percent of subjects. The majority of cholelithiasis subjects (59.6%) are between the ages of 41 and 60, according to Saxena P. et al. The male to female ratio was 1:1.7, with the females outnumbering the males. Subjects with a middling socioeconomic status were the ones who were most affected (45.0 percent). The majority of the subjects had previously been symptomatic with cholecystitis symptoms (78.9 percent). Increased age, female gender, family history or genetics, obesity, rapid weight loss, sedentary lifestyle, pregnancy, drugs such as ceftriaxone, octreotide, and thiazide diuretics, total parenteral nutrition or fasting, diseases such as cirrhosis, chronic hemolysis, and ileal Crohn's disease are all risk factors for cholelithiasis. Sayeed et al. performed ultrasonography on 5100 and 1448 persons with and without symptoms, respectively, and found a 6.20 percent prevalence of GBD[12-15]. GBD was shown to be more common in 5100 people with symptoms (7.12 percent) than in 1448 people without symptoms (2.99 percent) (P 0.05). GBD risk was shown to be considerably raiseder in females over 50, with an adjusted odds ratio (OR) of 1.703 (CI 1.292–2.245), multiparity 1.862 (CI 1.306–2.655), and a genetic history of 1.564 (CI 1.049–2.334). Males with diabetes had an elevated risk of 4.271 (CI 2.130–8.566), chickpea eating 2.546 (CI 1.563–4.146), and unclean water 3.835 (CI 2.368–6.209). Gall-calculus were found in 4.15 percent of the population, with females having 5.59 percent more than males (1.99 percent) (P 0.05). Raised parity, raised w/h ratio, physical inactivity, current smoking, smokeless tobacco, and raised BMI were all identified to be risk factors for gall-calculus disease in a research by Dhamnetiya D et al. GSD was linked to biochemical indicators such as plasma total cholesterol, triglycerides, and LDL cholesterol levels. Pimpale R et al. looked at 92 subjects, 62 (68.89%) of whom were female and had a mean age of 45.03 yrs 13.59. Fifty-four subjects (58.69%)

had a BMI of more than 25[16-18]. The most prevalent complaint among all subjects was pain. There was jaundice in 13 of the 1413 subjects (14.13 percent) who had CBD calculus. Sickling was found in 8.69% of the subjects. With a conversion rate of 6.57 percent, lap chole-cystectomy was performed in 71 subjects (77.17 percent). Nineteen subjects (20.65%) had an open chole-cystectomy with or without CBD exploration, while two others had a lap cholecystostomy. Surgical site infection was seen in three subjects (4.22%) after laparoscopic chole-cystectomy, five subjects (26.31%) after open chole-cystectomy, and biliary leak in three subjects (15.78%) after open chole-cystectomy. Chronic cholecystitis was found in 70 subjects (77.77%), malignancy was found in 5 subjects (5.55%), and Xanthogranulomatous cholecystitis was found in two subjects (2.22 percent). There were 13,437 GBD cases in a research by Jane et al. after a median of 10.7 years of follow-up. BMI greater than 25 kg/m2, diabetes, previous and current smoking, red meat consumption, saturated fat, and cholesterol were all significant risk variables (p-trends 0.01). Vigorous physical activity, alcohol consumption, fruits, vegetables, and foods raised in dietary fibre were all protective factors (p-trends 0.01). Women's parity was a significant risk factor, and the use of postmenopausal hormones was only related with an elevated risk among White women (HR = 1.24; 95 percent CI = 1.07–1.43 and HR = 1.23; 95 percent CI = 1.06–1.42). Gall-calculus damage the mucosal columnar epithelium of the gall-bladder, causing metaplasia, dysplasia, and neoplasia in the epithelium of the gall-bladder. An increased risk of cancer has been linked to a raiseder number of calculus, as well as larger and heavier calculus. Gall-bladder calculus that are large and heavy induce mechanical damage to the mucosa, which has been associated to the development of dysplasia and cancer[19-21]. An increased risk of cancer has been linked to a raiseder number of calculus, as well as larger and heavier calculus. Gall-bladder malignancies are frequently diagnosed in late stages, with a poor prognosis of less than 10%, and 5-year survival is less than 5% in many researches due to the anatomical position of the gall-bladder and the non-specificity of the symptoms. In both elective and emergency surgery, laparoscopic chole-cystectomy (LC) is the gold standard procedure for treating gall-bladder illness.

CONCLUSION

Gall-calculus disease is one of the most common causes of stomach pain in subjects who visit emergency rooms. Subjects with gall calculus illness were found to have sedentary lifestyles, female gender, obesity (BMI > 25 kg/m2), age > 50 years, and a family history of gall calculus disease. Gall-calculus disease can be treated with a variety of methods, including bile salts dissolving, laser fragmentation, extracorporeal shock wave lithotripsy, endoscopic extraction, and traditional surgery. Bile acid therapy works well for some cholesterol gall-calculus but not for calcium bilirubinate or calcium carbonate/phosphate calculus. As a result, it's preferable to figure out the calculus's composition before deciding on a treatment.

REFERENCES

1. Schirmer BD, Winters KL, Edlich RF. Cholelithiasis and cholecystitis. J Long Term Eff Med Implants. 2005;15:329-38.
2. Goktas SB, Manukyan M, Sellmen M. Evaluation of Factor Affecting The Type of Gall-calculus. Indian Journal Surgery. 2015;78(1):20-26.
3. Aune D, Norat T, Vatten LJ. Body mass index, abdominal fatness and the risk of gall-bladder disease. Eur J Epidemiol. 2015; 30(9):1009–19.
4. Tsai CJ, Leitzmann MF, Willett WC, Giovannucci EL. Long-chain saturated fatty acids consumption and risk of gall-calculus disease among men. Ann Surg. 2008; 247(1):95–103
5. Haribhakti SP, Mistry JH. Techniques of laparoscopic chole-cystectomy: Nomenclature and selection. J Minim Access Surg. 2015;11(2):113–8.
6. Siregar, D.R., Muhar, A.M., Pohan, D.P. 2021. The role of cholelithiasis risk factors in calculus categories in cholelithiasis subjects at Universitas Sumatera Utara Hospital. Bali Medical Journal 10(1): 63-65.
7. Hung SC, Liao KF, Lai SW, Li CI, Chen WC. Risk factors associated with symptomatic cholelithiasis in Taiwan: A population-based research. BMC Gastroenterol 2011;11:111.
8. Kumari DJ, Krishna SH. Role of body mass index, physical activity and nutrients in cholelithiasis in Guntur, Andhra Pradesh. J Hum Ecol 2010;31:151-5.
9. Sahi T, Paffenbarger RS Jr., Hsieh CC, Lee IM. Body mass index, cigarette smoking, and other characteristics as predictors of self-reported, physician-diagnosed gall-bladder disease in male college Alumni. Am J Epidemiol 1998;147:644-51.
10. Veerabhadrappa PS, Tank P, Singh A, Goel S, Nathwani P. A research of gall calculus disease from a tertiary care center of Madhya Pradesh, India. Int Surg J 2017;4:728-31.
11. Saxena P.K., Golandaj V.K., Malviya V.K. Epidemiological research in operated subjects with cholelithiasis and analysis of riskfactors. Surgical Update: Int J surg Orthopedics.2019;5(5):340-345.
12. Unisa S, Jagannath P, Dhir V, Khandelwal C, Sarangi L, Roy TK. Population-based research to estimate prevalence and determine risk factors of gall-bladder diseases in the rural Gangetic basin of North India. HPB (Oxford). 2011;13(2):117-125.
13. Dhamnetiya D, Goel MK, Dhiman B, Pathania OP. Risk factors associated with gall-calculus disease.Indian J Comm Health. 2018; 30, 2: 133-138.
14. Dhamnetiya D, Goel MK, Dhiman B, Pathania OP. Gall-calculus disease and quantitative analysis of

independent biochemical parameters: Research in a tertiary care hospital of India. J Lab Physicians 2018;10:448-52.
15. Pimpale R, Katakwar P, Akhtar M. Cholelithiasis: causative factors, clinical manifestations and management. Int Surg J 2019;6:2133-8.
16. Figueiredo, J.C., Haiman, C., Porcel, J. et al. Gender and ethnic/racial-specific risk factors for gall-bladder disease. BMC Gastroenterol 2017, 17, 153.
17. Gupta SC, Mishra V, Singh PA, et al. Gall calculus and carcinoma gall bladder. Indian J Pathol Microbiol 2000; 43:147-54.
18. Narang S, Goyal P, Bal MS, Bandlish U, Goyal S. Gall calculus size, number, biochemical analysis and lipidograman association with gall bladder cancer: a research of 200 cases. Int J Cancer Ther Oncol 2014; 2(3):020310
19. Batra Y, Pal S, Dutt a U, Desai P, Garg PK, Makharia G, Ahuja V, Pande GK , Sahni P, Chatt opadhyay T. Gall-bladder cancer in India: a dismal picture. J Gastroenterol Hepatol 2005; 20: 309-314.
20. Zou S, Zhang L. Relative risk factors analysis of 3,922 cases of gall-bladder cancer. Zhonghua Wai Ke Za Zhi 2000; 38: 805-808.
21. Agresta, F. et al. Laparoscopic chole-cystectomy: Consensus conference-based guidelines. Langenbecks Arch. Surg. 400(4), 429–453., 2015.