Original Research Article

A Clinical Pathological Study on Management of Gall Bladder Stones

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Abstract

Background: Gall stone disease is a common problem the incidence ranging from 10% to 20% of the world population. In India, it is seven times more common in the north than in the south. Gallbladder stones are known to produce histopathological changes in the gallbladder. It is also one of the predisposing factors for the development of cancer of the gallbladder.

Objectives: To study the clinicopathological spectrum of management of gall stone diseases and to find out the prevalence of different types of gall stones.

Materials and Methods: Retrospective study analysis of all cholecystectomy specimens received in the Department of Pathology from January 2018 to December 2019 was done. Histopathology of gall bladder diseases and biochemical analysis of gall stones was done. SPSS 21 was used for analysis.

Results: The total number of cholecystectomy specimens studied was 78. There were 65 cases of chronic calculous cholecystitis, the highest incidence of these being in the age group of 41- 50 years. In this male were 32 and females were 46. All patients underwent ultrasonography to confirm the clinical diagnosis. On morphological analysis, the commonest gall stone was pigment type and the commonest lesion was chronic cholecystitis by histopathology.

Conclusion: The morphological spectrum of gall stone disease identifies the possible risk factors like increasing age, female sex, multiparity and obesity. People who are at risk, may modify their diet to decrease the risk. Regular exercise may also reduce the risk of gall stones.

Key words

Cholecystectomy, Calculous cholecystitis, Biochemical analysis, Cholecystitis, Abdominal ultrasound, Cholesterol stone, Epigastric pain.

Introduction

Gall stone disease is a very common gastrointestinal disorder, present commonly in the western world. 10% of the adults patients have asymptomatic gall stones. The prevalence varies with age, sex and ethnic group. Overall prevalence of gall stone disease was 3.2% [1]. Prevalence increases with age from 21 years to 80 years and was higher in females than in males. Gallstones can occur anywhere within the biliary tree, including the gallbladder and the common bile duct. Gallstones are hard, pebble-like deposits. Gall stones vary in their composition, majority being cholesterol and remaining being mixed and pigmented. Gallstones made from cholesterol are by far the most common type [2]. Stones are made from excess bilirubin in the bile. Bile is a liquid made in the liver that helps the body to digest fats. Bile is made up of water, cholesterol, bile salts, and other chemicals, such as bilirubin. Such stones are called pigment stones. Mixed and pigment stones are common in northern India. The stones form when there is an imbalance or change in the composition of bile. The first factor that predisposes to stone formation is how often and how well the gallbladder contracts; incomplete and infrequent emptying of the gallbladder may cause the bile to become over concentrated and contribute to gallstone formation [3]. The second factor is the presence of proteins in the liver and bile that either promote or inhibit cholesterol crystallization into gallstones. Increased levels of the hormone estrogen as a result of pregnancy, hormone therapy, or the use of birth control pills, may increase cholesterol levels in bile and decrease gallbladder movement, resulting in gallstone formation [4]. Other factors are parity, smoking, alcohol, diabetes and overweight. Symptoms of gall stone diseases are pain in the right upper abdomen, fever, jaundice, abdominal fullness, clay-colored stools, nausea and vomiting [5]. Further complications of gallbladder disease include gallstone pancreatitis, gallstone ileus, biliary cirrhosis and gallbladder cancer. Gallstones may be as small as a grain of sand or they may become as large as an inch in diameter, depending on how long they have been forming. A stone blocking the opening from the gallbladder or cystic duct usually produces symptoms of biliary colic, which is right upper abdominal pain that feels like cramping [6]. Obstruction of the common bile duct is choledocholithiasis; obstruction of the biliary tree can cause jaundice, obstruction of the outlet of the pancreatic exocrine system can cause pancreatitis. Clinical symptoms were confirmed by ultrasonography of abdomen. Nowadays, laparoscopic cholecystectomy is the treatment of choice in most patients. Pathological changes vary from inflammation to malignancy. So, the rationale behind this study was to evaluate the clinic-pathological spectrum of gall stones.

Materials and methods

This was a retrospective study done, in the Department of Pathology of a tertiary care institute and hospital. Total of about 78 cholecystectomies from January 2018 to December 2019 were studied. Clinical data and pathological data were reviewed. The patients of "cholelithiasis" with gallstone alone or with common bile duct (CBD). Stones diagnosed by ultrasound are included in the study, and patients who did not give consent to join the study or diagnostic dilemma for, e.g., acalculous cholecystitis or with primary CBD stones. i.e., no calculus in gall bladder was excluded from the study and autolyzed specimen and under the age of ten was excluded from the study. A detailed clinical history and physical examination was carried out and recorded in a standard proforma which included demographic factors, dietary status clinical presentation factors and a standardized clinical examination was done which included general physical examination and

systemic examination specially looking for tenderness in right hypochondrium, palpable lump in the right hypochondrium and hepatomegaly. The investigations included complete blood count, random blood sugar, liver function test, routine urine examination and USG abdomen. Magnetic resonance cholangiopancreatography and endoscopic retrograde cholangiography was done prior to surgical intervention. Open cholecystectomy or laparoscopic cholecystectomy was done. All cholecystectomy specimens received, were fixed in 10% formalin, submitted to detailed gross examination and microscopy after haematoxylin and eosin staining. Sections were obtained from the fundus, body and neck of the gallbladder. The stones were powdered using a mortar and dissolved in different solvents depending on the type of chemical constituent to be analyzed.

Statistical analysis

The above date is compared using a scientific approach. Continuous variables were expressed as mean with standard deviation (SD). Categorical variables were expressed as absolute numbers and proportions. Bivariate relationship for categorical variables was assessed using Pearson's $\chi 2$ test or Fisher's exact test. SPSS - VERSION 21 SOFTWARE was used for analysis. A P value of < 0.05 was considered statistically significant.

Results

As per **Table – 1**, the most common age group was from 41-50 years (42%). The study was female preponderance (59%) this concludes that gallstones incidences in this area are more common in females and this was statistically significant (p<0.05). These all patients were having gallstones.

Table – 1: Age and Sex wise Distribution of the study participants (N=78).

Age groups (years)	Males (N=32)	Females (N=46)	p-value
11-20	3	2	**0.01***
21-30	7	7	
31-40	6	12	
41-50	11	22	
>51	5	3	

*p<0.05 was statistically significant

Table – 2: Chief complaints among the patients.

Chief complaints	Males*	Females*
Epigastric pain	11	12
Right hypochondrial pain	34	39
Nausea	7	11
Vomiting	12	19
Jaundice	3	5

*multiple responses

Table – 3: Classification of gall stone based on Morphology.

Type of stone	Morphology	Frequency	p-value
Cholesterol	Solitary, oval, large & yellow	16	**0.01***
Pigment	Multiple, small, jet black & mulberry shape	52	
Mixed	Multiple, multifaceted & size varies	10	

*p<0.05 was statistically significant

As per **Table – 2**, the most common presenting complaints in both males and females was right hypochondrial pain (93%), followed by vomiting (45%) and epigastric pain (39%). Least presenting symptom was jaundice (7%).

Table – 4: Abdominal USG findings.

USG finding	Frequency	p-value
Solitary calculus	20	**0.01***
Multiple calculi	49	
Common Bile duct calculus	9	

*p<0.05 was statistically significant

As per **Table – 3**, gall stones were classified based on morphology. It was seen the most common type of gall stone were pigment stone (67%), followed by cholesterol stone (21%). Most of the stone were multiple, small and jet black which signifies the morphology of pigment gall stone and this was found to be significant (p<0.05).

As per **Table – 4**, abdominal ultrasound of 78 patients revealed solitary calculus in 20 patients (26 %) and multiple calculi in 49 patients (65%) which was significant (p<0.05). Abdominal ultrasound diagnosed CBD. It was seen that Calculus in 9 patients. Thus, the accuracy of abdominal ultrasound for diagnosis CBD calculus was 60 % in this study.

Discussion

Gallstone disease known as cholelithiasis is the most common surgical disorder. Cholelithiasis is common with the incidence ranging from 10% to 20% of the world population, 11% of the general population of the US [7]. In our study, Total of about 78 cases, the mean age of presentation was 45.90. In a Brazilian study, the age at presentation was 60.2 years [8]. The maximum patients being between 41-60 years (51 %). In our study, Gall stone disease was predominantly seen in females (61.5%) as compared to males (38.4%). Female sex hormones appear to play a role, especially between the ages of 20 and 30 years. Another study that researched oestrogen receptors and cholesterol biosynthesis found that oestrogen stimulated the HMG-Co-A reductase enzyme causing increased synthesis of cholesterol and thus putting women at an increased risk of supersaturation [9]. Further supporting the link between estrogen and gallstones, it was determined that postmenopausal women on oestrogen replacement therapy were found to have an increased incidence of gallstones. Progesterone may also contribute to gall stone disease by inhibiting gallbladder contraction and promoting hypomotility and gallbladder stasis. Maskey CP, et al. found that the commonest age group for cholelithiasis below 30 years comprised 37.5% [10]. Our study correlated with studies conducted by Bockus, et al. [11]. Of the 47 females, 25 were of multiparous having 3 or more pregnancies. It is proved that increase in number of pregnancies is associated with increased risk of gall stone as seen in world literature. Parity also appears to be a factor in the development of gallstones. Women with more pregnancies and longer lengths of fertility periods appear to have a higher likelihood of developing gallstones than those who remain nulliparous. A study in Chile found gallstones in 12.2% of multiparous women versus 1.3% of nulliparous women within the same age [12]. Another study found women under the age of 25 years with > 4 pregnancies were 4 to 12 times more likely to develop cholesterol stones compared to nulliparous women of the same age and weight. Obesity is an important risk factor for the development of gallstone diseases. Obese women, defined as a body mass index (BMI) > 30kg/m) are at twice the risk of gallbladder disease than women with a normal BMI (<25kg/m). Women with extreme obesity or a BMI >40kg/m have a 7-fold

increased risk of gallstones [13]. The reason for the increased risk of gallstones in obese patients is due to an increased hepatic secretion of cholesterol. In our study, obesity was seen in 39%. In this present study, the mean weight of the females was 55.8 kg. Abdominal pain was the most common presenting symptom. Gosh SK, et al. and Wani, et al. observed tenderness in the right hypochondrial region as the most common sign Histopathological study showed 85.8 % of these patients suffering from chronic cholecystitis, 2.5% with acute cholecystitis, 2.5% polyp, 1.2% granulomatous cholecystitis, 1.2% empyema, 5.1% eosinophilic cholecystitis and 1.2% carcinoma [14, 15].

Conclusion

The most common age group for cholelithiasis is found to be 41- 50 years with a female being more common than males. Majority of the patients presented with right hypochondrial pain. Upper abdominal ultrasonography facilitates the screening and early detection of gallstone disease. Pigment type stone was found to be the most common type of stone comprising 63%, followed by cholesterol stone. Early cholecystectomy is the treatment of choice in symptomatic patients.

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