ORIGINAL ARTICLE

A PROSPECTIVE CLINICOPATHOLOGICAL STUDY OF 50 CASES OF CHRONIC CALCULOUS CHOLECYSTITIS IN THE LOCAL POPULATION

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ABSTRACT: BACKGROUND AND OBJECTIVES: Chronic calculous cholecystitis is the most common benign disease affecting the gallbladder, frequently occurring condition in the middle aged female population. Cholecystectomy has been the gold standard as opposed to the various conservative methods of management and has shown better results in the literature. This study aims to look at the demographics, operative morbidity and pathology of the removed gallbladder in the local population. **METHODS:** This is a prospective study in which 50 patients presenting with clinical features of chronic cholecystitis to the hospital attached to the medical College, in the local population of Davangere, were investigated with ultrasound to correlate the diagnosis of chronic calculous cholecystitis and thence were included in the study. Their demographic data, symptomatology and associated illness were documented. All were subjected to cholecystectomy, the gallbladder was sent for histopathological examination and gallstones for biochemical analysis. **RESULTS:** The highest age incidence of chronic calculous cholecystitis was in the 5th decade, more common in females, majority with pain abdomen. 70% of the patients belonged to middle class and 84% consumed mixed diet. 10% of the cases showed wound infection in the open cholecystectomy group and 2% of cases had bile leak in laparoscopic cholecystectomy group. The average duration of post operative stay was 6.9 and 4.9 days for open and laparoscopic cholecystectomy group respectively. On histopathological examination, size of the gallbladder was normal in 58% of cases and degree of inflammation was moderate in 52% of cases. 60% of the gallstones were of pigment type. **INTERPRETATION AND CONCLUSION:** The result showed chronic calculous cholecystitis was more common in females, in the 5th decade. Laparoscopic cholecystectomy reduced the hospital stay and was associated with lesser post operative morbidity. Majority of the gall bladder specimens showed moderate degree of inflammation on histopathological examination and pigment stones were the most common type.

KEYWORDS: Chronic calculous cholecystitis; cholecystectomy; degree of inflammation; gallstone type; post operative stay.

INTRODUCTION: Cholecystitis is one of the commonest biliary pathologies defined as chemical or bacterial inflammation of the gallbladder. Although it occurs in a variety of pathological and clinical forms, cholecystitis associated with gallstones is the most common type, occurring in about 90-95% cases.

The risk factors like female gender, obesity; dietary factors and diabetes play a vital role in the development of calculous cholecystitis. The incidence of cholecystitis is higher in females, with a female to male ratio 3:1 upto about the age of 50 and a ratio of approximately 1.5:1 thereafter[1]. The prevalence of cholecystitis in the Indian subcontinent also varies in different regions. In northern region it is about 7 times more common than the southern regions[2].

Gallstones are categorized as cholesterol, mixed, black pigment, or brown pigment stones[11]. Cholesterol and mixed gallstones are formed from biliary sludge, while pigment stones are composed of calcium salts of unconjugated bilirubin, with varying amounts of cholesterol and protein.

Biliary colic is the most common presenting symptom of cholelithiasis with 75% of patients with symptomatic gallstone disease seeking medical attention because of this episodic abdominal pain due to intermittent obstruction of cystic duct by gallstones[3].

Ultrasonography is the initial diagnostic study of choice and most of the times it's the only study that is required for the diagnosis of the condition.

The management of chronic calculous cholecystitis includes non surgical therapies or surgical modality. The non surgical management consists of dissolution of gallstones with bile salts, extracorporeal shock wave lithotripsy (ESWL) and invasive contact dissolution with organic solvents. The surgical management is elective cholecystectomy, either standard open approach or, alternatively laparoscopic cholecystectomy. Various studies have reported that elective cholecystectomy for chronic calculous cholecystitis can be performed with near zero mortality of 1%.

The histological diagnosis of chronic cholecystitis is based on the following three characteristics: (1) a predominantly mononuclear inflammatory infiltrate in the lamina propria with or without extension to the muscularis and pericholecystic tissues. (2) fibrosis (3) metaplastic changes.

The present study aims to look at the demographics, operative morbidity and the pathology of the removed gallbladder of chronic calculous cholecystitis in the local population of Davanagere district admitted to the hospital, attached to the JJM medical college, Davangere.

MATERIALS AND METHODS: This is a prospective study conducted over 2 years from 2009 to 2011 in which 50 patients admitted to the hospital, attached to the medical college, in the local area of Davangere, with clinical features of chronic cholecystitis, investigated with ultrasound to correlate the diagnosis of chronic calculous cholecystitis and thence were included in this study.

The following exclusion criteria were applied before including the patients into this study:

1) Patients with acalculous cholecystitis.
2) Patients not fit or not willing for surgery.
3) Patients presenting with complications of cholecystitis viz, CBD stones, gallstone pancreatitis, septic complications, etc,

Detailed history of all the 50 cases were taken according to the proforma with the age, religion, socio economic status, nature of the symptoms, duration of the symptoms, past history of similar complaints, diet history, and history of OCP, alcohol ingestion, and diabetes and examined in detail.

All patients were investigated with haemogram, ECG, LFT, blood sugar, blood urea, serum creatinine, urine analysis, blood group, chest x-ray, ultrasound scan of the abdomen. Relevant investigations and specialist consultations were taken for patients with associated medical illness and their control was achieved.

Risk and complications of the condition as well as the types of surgical options available and their benefits and complications were explained to the patients, and consent was taken. The patients

were at will to choose the operative procedure of choice, either open cholecystectomy or laparoscopic cholecystectomy based on their affordability and the indications/contraindications of the procedure involved.

The necessary preoperative work up and preoperative antibiotics were given. After opening the abdomen the pathological features and anatomical variations were noted and documented. Since patients with CBD stones were excluded from the study, routine CBD exploration and intraoperative cholangiogram was not performed

After cholecystectomy, the removed gallbladder was sent for histopathological examination and the gallstones for chemical analysis. All the patients received routine post operative care. Patient was monitored in the post operative period to note the development of any complication and suitable treatment given according to the need. The patients were routinely discharged on 6th post operative day in case of open and 4th post operative day in laparoscopic cholecystectomy, unless they needed to stay for long due to development of any complications. The time duration of the patient stay in the hospital postoperatively and associated morbidity of the operative procedure were documented.

Patients were advised regarding diet, rest and to visit the surgical OPD for regular follow up.

RESULTS: The results of our study were as follows:

1) Incidence of Age:

Table 1: Age Incidence

Age in Years	Number of Cases		Total	Percentage
	Male	Female		
11 to 20	0	0	0	0
21 to 30	1	5	6	12
31 to 40	3	3	6	12
41 to 50	8	8	16	32
51 to 60	4	9	13	26
61 to 70	2	4	6	12
> 70	2	1	3	6
Total	**20**	**30**	**50**	**100**

The youngest patients were both a male and female each of age 21 years and the oldest patient was 80 years old. Majority of cases were noted in the age group of 41 to 50 years, which were about 16 cases, making for 32% of the total cases. Among the 16 cases, there were equal numbers of male and female patients, 8 in each gender. It was followed by 14 cases in the age group of 51 to 60 years, 4 of them being male and 9 of them being female, comprising about 28% of the total cases. There were no cases reported in the age group of 11 to 20 years.

2) Incidence of Sex:

Table 2: Sex Incidence

Gender	Number of Cases	Percentage
Male	20	40
Female	30	60

There was a female preponderance of 30 patients against 20 patients who were male. The male to female ratio was 1:1.5.

3) Socioeconomic Status:

Table 3: Socio-Economic Distribution of Cases

Socioeconomic Status	Number of Cases	Percentage
Upper Class	10	20
Middle Class	35	70
Lower Class	5	10
Total	**50**	**100**

35 patients belonged to the middle class (70%), 5 patients belonged to lower class (10%) and 10 patients belonged to the upper class (20%).

4) Clinical Features:

a) Presenting Symptoms

Table 4: Presenting Symptoms

Presenting Symptoms	Number of Cases	Percentage
Rt. Hypochondriac pain	42	84
Flatulent Dyspepsia	28	56
Fever	0	0
Nausea/ Vomiting	28	56
Jaundice	4	8

All the patients in this study presented with abdominal pain with 42 of them having predominantly right hypochondriac pain (84%), 7 patients having epigastric pain (14%) and one of the patient having a vague abdominal discomfort (2%). The pain was of colicky nature in 38 patients (76%) and dull aching type in the remaining 12 patients (24%). Pain was radiating to the back in majority of the 42 patients and to the shoulder in 8 patients. The next predominant symptoms were flatulent dyspepsia present in 28 patients (56%) and nausea/ vomiting in 28 of the patients (56%). 4 of the patients (8%) complained of yellowish discoloration of urine while none of them reported any fever.

b) Physical Signs

Table 5: Physical Signs

Signs	Number of Cases	Percentage
Upper abdomen tenderness	17	34
Palpable Gallbladder	0	0
Icterus	4	8

17 of the 50 patients had abdominal tenderness in the right hypochondriac region (34%) while 4 of them had icterus (8%). None of them had any abdominal mass suggestive of gallbladder mass on clinical examination.

2) Personal History

a) Type of Diet

Table 6: Type of Diet

Type of Diet	Number of Cases	Percentage
Vegetarian	8	16
Mixed	42	84
Total	**50**	**100**

Out of the 50 patients, 8 were vegetarians (16%) and the remaining 42 patients consumed mixed type of diet (86%).

b) Incidence of Obesity

Table 7: Incidence of Obesity

Body Type	Number of Cases	Percentage
Obese	7	14
Non-obese	43	86
Total	**50**	**100**

All the patients were examined for the presence of obesity and thence grouped into obese and non-obese. In our study, 7 patients (14%) were found to be obese, while the remaining 43 patients (86%) were non-obese.

3) Investigations:

All the patients were investigated with ultrasound as the initial investigation of choice and were included into the study with sonologic evidence of gallstones.

Routine blood investigations like Complete Blood Count, Blood Grouping and Typing, Blood Sugar, Blood Urea and Serum Creatinine were done and were found to be normal.

Urine examinations for albumin, sugar, and microscopy were normal in all patients except in 3 cases, where urine sugar positive. Urine bile salts and bile pigments were present in 2 out of 4 patients who showed icterus.

LFT was done in all patients, with 2 patients showing elevation of serum bilirubin in the range of 1.2 to 4.0mg%. The other 2 patients who had icterus showed marginal rise in the level of bilirubin.

Routine ECG and chest X-ray were done in all the patients prior to getting medical fitness for undergoing surgery.

4) **Surgical Treatment: Pre Operative Treatment:** Patients associated with jaundice were preoperatively treated with intravenous 5% dextrose, Vitamin K injection 10mg/day and B. complex injections for 3 to 5 days along with antibiotics. Elective surgery was done in jaundiced patients on remission of jaundice.

Table 8: Type of Surgery

Type Of Surgery	Number of Cases	Percentage
Open Cholecystectomy	40	80
Laparoscopic Cholecystectomy	10	20
Total	**50**	**100**

10 of the 50 patients (20%) underwent laparoscopic cholecystectomy and the remaining 40 patients (80%) underwent open cholecystectomy.

Table 9: Incidence of Post Operative Complications of Open and Laparoscopic Cholecystectomy

Post-Op Complications	Lap Chole (No. of Cases)	% of Cases	Open Chole (No. Of Cases)	% of Cases
Wound infection	0	0%	5	10%
Primary Hemorrhage	0	0%	0	0%
Bile leakage	1	2%	0	0%
Chest Infection	3	6%	1	2%

Table 9: Incidence of Post Operative Complications of Open and Laparoscopic Cholecystectomy

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Primary Hemorrhage	0	0%	0	0%
Bile leakage	1	2%	0	0%
Chest Infection	3	6%	1	2%

In the present study, the post operative complications of both open and laparoscopic cholecystectomy were studied. There was no incidence of primary hemorrhage noted in any of the 50 cases. Similarly the incidence of wound infection was zero in laparoscopic cholecystectomy, while 5 cases (10%) of open cholecystectomy had wound infection. Bile leakage was noted in one patient

(2%) who underwent laparoscopic cholecystectomy, which was treated conservatively, while there was no such incidence in open procedures. 3 patients (6%) in laparoscopic cholecystectomy group had chest infection while 1 patient (2%) in open cholecystectomy group had chest infection. There was no mortality in either group.

Table 10: Average Duration of Post-Operative Stay after Cholecystectomy

Type of Surgery	Average Duration of Post-Operative Stay (Days)
Open Cholecystectomy	6.9
Laparoscopic Cholecystectomy	4.9

The average duration of post-operative hospital stay was 6.9 days for open cholecystectomy while it was 4.9 days for laparoscopic cholecystectomy group.

5) Histopathological Study of the Gallbladder:

Table 11: Variation in Size of Gallbladder Specimens

Gross Appearance of Gallbladder	Number of Cases	Percentage
Normal	29	58
Enlarged	7	14
Contracted	14	28
Total	**50**	**100**

Size: Gallbladder was enlarged in 7 specimens (14%), normal in size in 29 specimens (58%) and contracted in 14 (28%) specimens.

Histomorphological Features:

Table 12: Wall Thickness in Gallbladder Specimens

Thickness of Gallbladder Wall	Number of Cases	Percentage
Normal	24	48
Thickened	25	50
Thin	1	2
Total	**50**	**100**

Wall thickness: Wall of the gallbladder was thickened in 25 (50%) of the specimens, normal in 24 (48%) specimens and thinned out in 1 specimen (2%).

Table 13: Degree of Inflammation

Microscopic Degree Of Inflammation	Number of Cases	Percentage
Mild	11	22
Moderate	26	52
Severe	13	26
Total	**50**	**100**

Histopathological Features: Chronic cholecystitis was diagnosed on the basis of the presence of chronic inflammatory cells such as lymphocytes, plasma cells, eosinophils, macrophages and presence of fibrosis. The presence of Rokitansky – Aschoff Sinuses was looked for. Chronic inflammation was graded as mild, moderate and severe, depending on the number of inflammatory cells and the degree of inflammation in chronic calculous cholecystitis was graded accordingly (Table 13). 11 specimens (22%) showed mild, 26 specimens (52%) showed moderate and 13 specimens (26%) showed severe chronic cholecystitis

Table 14: Type of Gallstones

Gallstone Type	Number of Cases	Percentage
Cholesterol	5	10
Pigmented	30	60
Mixed	15	30
Total	**50**	**100**

In our study of 50 cases, on gallstone analysis, it was found 30 stones (60 %) were of pigmented variety, 15 stones were of mixed variety (30%) and the remaining 5 stones (10%) were of cholesterol type.

DISCUSSION: Biliary tract disease is one of the commonest upper abdominal conditions which cause general ill-health and reduced physical efficiency. Cholecystitis and cholelithiasis account for majority of the gallbladder disease and its resection.

In the present study, we have prospectively analyzed the clinical and pathological features of chronic calculous cholecystitis over a period of two years. On analysis of our data with various studies conducted earlier, we could elicit a few findings as we see below.

1. **Age Incidence:** Chronic calculous cholecystitis was uncommon in the first 2 decades of life with only two cases in our study being below 20 years of age. Maximum incidence of cases was in the age group of 41 to 50 years as in the series of Ghosh SK et al[4] and Shenoy et al[19]. Tyagi et al[17] showed higher incidence in 31 to 40 years, while Bhansali SK et al[10] showed highest incidence in the age group of 51 to 60 years.
2. **Sex Incidence:** In the present study, there was a female preponderance with a male to female ratio of 1:1.5. In Ghosh SK et al[4] series, the ratio is 1:5.9, in Goswami[11] series it was 1:2.5 and in Sharma LB[5] series the ratio is 1:1.7. Our series correlated with the ratio of Malhotra[12] series, which also had a male to female ratio of 1:1.5.
3. **Diet:** In our study, the type of diet consumed was non vegetarian (mixed type) in 84% of the patients and vegetarian diet in the remaining 16% of patients. Non-vegetarians were found to be more commonly involved with chronic calculous cholecystitis than vegetarians. The ratio of incidence of cholelithiasis in non-vegetarians and vegetarians was found to be 10.5:2. The cause could be due to the consumption of high protein and fat. The findings were similar with the findings in a study done by Maskey et al[7] in 1990 AD in Nepal where incidence of cholelithiasis was found more frequently among the people who consumed more fat and protein. In the similar study done by Kotwal MR et al[8] in Sikkim and North Bengal, 97% cases of cholelithiasis were found in non-vegetarians.

4. **Presenting Symptoms:** In our study, right hypochondriac pain was the most common symptom present in 84% of the cases, followed by flatulent dyspepsia (56%) and nausea/vomiting (56%). Similar results were noted in Wani NA et al[6] series where right hypochondriac pain was present in 94.90% of patients and was the most common symptom. Arora et al[13] series also had 90% cases with most common symptom of right hypochondriac pain. Jaundice was noted in 8% of our study cases and Wani NA[27] series also documented 8.6% cases presenting with jaundice.
5. **Physical Signs:** In our study, upper abdomen tenderness was the most common sign, with an incidence of 34%, and icterus was noted in 8% of the cases. Wani NA[6] series had 11.7% of cases with upper abdomen tenderness as the most common sign, icterus seen in 9% of patients of their study. There were no cases of palpable gallbladder in our study, while Wana NA[6] series had 9% of such cases.
6. **Incidence of Obesity:** In our study, the incidence of obesity was 14% with 7 patients out of 50 in the study being obese. Ghosh SK et al[4] in their study had an obesity incidence of 10.66%.
7. **Incidence of Post Operative Complications:** In the present study wound infection was the most common complication, which was 10% in open cholecystectomy and nil in laparoscopic cholecystectomy. The wound infection rate in the study of Chung-Mao Lo et al[14] was 11.1%. 1 patient (2%) had bile leakage through the drain tube, the patient was managed conservatively and the patient improved. Harris[9] in his study found similar results of Bile leak of 2% in laparoscopic cholecystectomy and 1% in open cholecystectomy. Peters JH[15] study also showed an incidence of bile leak in 2% and incidence of wound infection in 2% of patients undergoing laparoscopic cholecystectomy.
8. **Duration of Post Operative Stay:** The mean duration of stay in hospital in our study, for patients who underwent open cholecystectomy was 6.9 days and 4.9 days for those who underwent laparoscopic cholecystectomy. Similarly Hardy et al[16] in their study had a result of post operative stay of 6.5 days for open cholecystectomy and 2 days for laparoscopic cholecystectomy.
9. **Morphology of the Gallbladder: Size -** In our study the size of the gallbladder was small or contracted in 14 (28%) specimens, normal in 29 (58%) specimens and enlarged in 7 (14%) specimens of cholecystectomy sent for histopathological examination.
   Tyagi et al[17] in their study observed small or contracted gallbladder in 16.6% of the cases, enlarged gallbladder in 29.8% of the cases and normal in 53.6% of the cases.

Wall Thickness: Of the 50 gallbladder specimens examined, thickened wall was seen in 25 (50%) specimens of our study. This finding was close with the observations of Tyagi et al[17] where thickened gallbladder wall was seen in 56.4% of chronic cholecystitis specimens.

Degree of Inflammatory Response in Chronic Calculous Cholecystitis: Chronic calculous cholecystitis was graded mild, moderate or severe, depending on the number of inflammatory cells. The inflammatory response was mild in 11 specimens (22%), moderate in 26 specimens (52%) and severe in 13 specimens (26%).

The results were comparable to those made by Tyagi et al[17] who observed mild inflammation in 19.4%, moderate in 52.1% and severe in 28.5% of the specimens. Another study by Barcia JJ[18]

showed mild inflammation in 28% of specimens, moderate inflammation in 57% of specimens and severe in 15% of specimens.

Gallstone Analysis: In our study, pigment stones were the predominant type comprising about 60% of the total with 30% of mixed stones and 10% showing cholesterol type of stones. Tyagi et al[17] study showed a predominance of mixed type (78.2%) of stones. Our study correlated with Jayanthi V et al[20] study where 63.8% were pigment type of stones, 34.8% were mixed type of stones and 14% were cholesterol stones.

CONCLUSION: Chronic calculous cholecystitis is the most common gallbladder disease, seen to be prevalent in ethnic groups and there is a marked geographical variation in the prevalence of the disease. The disease is more common in Western population, especially America, and is less common in Asian countries. In India, the disease is more common in North India than in South India.

In our study the incidence of chronic calculous cholecystitis was highest in the 5th and 6th decades of life, with maximum incidence being in the 5th decade. Female preponderance was noted with a male to female ratio of 1:1.5. Based on their socioeconomic status, it was noted that majority of the patients belonged to middle class, most of them were of normal weight and majority of them were non vegetarians. The most common symptom was the right hypochondriac pain and right upper quadrant tenderness was the most common sign noted. Wound infection was the most common complication noted mostly with open cholecystectomy and the duration of post operative stay was shorter in case of laparoscopic cholecystectomy group. The size of gallbladder was normal in 58% of the specimens; wall thickening was noted in 50% of specimens and most of the cases showed moderate degree of inflammation on histopathological examination. Pigmented stones were the most common type of the gallstones.

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