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Original Research Article

A clinical study on diagnostic, clinicopathological correlation of acute cholecystitis

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ABSTRACT

Background: Acute cholecystitis (AC) one of the common surgical emergency. Thorough understanding of the profile of clinical presentation may help in clinical decision making in resource poor settings. Hence the present study is conducted with the objectives to study the clinico pathological profile of acute cholecystitis cases presenting to a tertiary care teaching hospital and to describe the management and complications.
Methods: A prospective observational study was conducted in the department of emergency and general surgery of Dhanalakshmi Srinivas medical college and hospital. The study included 50 clinically confirmed cases of acute cholestasis presented between June 2017 to December 2017.
Results: A total of 50 subjects were included in the final analysis. The highest proportion of subjects were in 46 to 50 years (28%) or 51 and above (26%) age groups. Females (56%) outnumbered males (44%). Right hypo chondral tenderness (100%) was the most common clinical presentation. The proportion of calculous and acalculous cholecystitis was 84% and 14% respectively, remaining 2% of cases were malignancies. The proportion of emergency and elective surgeries were 12% and 88% respectively. The most common organism cultured was E. coli in 24%, Staph, aureus in 14%, salmonella in 2% of the population. Post-operative wound infection was more commonly seen in culture positive cases.
Conclusions: Health care practitioners at various levels need to have a good understanding of varied clinical presentation of acute cholecystitis and different management options, their advantages, and disadvantages to be able to treat the condition effectively.

Keywords: Acute cholecystitis, Clinicopathological profile, Treatment

INTRODUCTION

Diseases of the gallbladder are common and their treatment is costly. Acute cholecystitis (AC) is the most frequent complication of gallstone disease and a frequent reason for abdominal emergency especially among middle-aged women and the elderly. Acute cholecystitis represents 10% acute abdomen and females are commonly affected with a female to male ratio of 2:1.[2] Although in the vast majority of cases gallbladder stones are present (calculous cholecystitis), inflammation of the gallbladder is possible in the absence of stones (acalculous cholecystitis).[1] Acute calculous cholecystitis (ACC) affects more than 20 million Americans annually.[3] More than 90% of cases of AC are due to cholelithiasis, while acalculous cholecystitis (AAC) occurs in 5%-15% of all cases of AC.[4]

The usual symptoms among the affected patients are the pain in the right upper quadrant with fever and chills. The diagnosis of AC is made easy when the clinician follows the parameters of the Tokyo (TG13) guidelines. The

TG13 protocol uses the information from patient history, physical examination, blood chemistry, and ultrasound sonography. The guidelines also help in classifying AC into three grades; mild cholecystitis (grade I), moderate cholecystitis (grade II), and severe cholecystitis with organ failure (grade III).[5,6]

The generally accepted standard treatment for patients with AC who are surgically fit is Cholecystectomy, the surgical removal of the gallbladder.[7,8] Currently, the minimally invasive laparoscopic technique is the prevailing procedure for the management of benign gallbladder pathologies including AC.[9,10]

Recent evidence regarding the optimal timing of the treatment of AC suggests that early cholecystectomy performed within 24-96 hours during index admission results in a shorter stay at the hospital and the complications are comparable to interval operations performed several weeks after index admission.[11,12]

However, the diversity of clinical presentation and comorbidities of patients with Acute Cholecystitis makes it extremely difficult to standardize treatment. Therefore, the clinical decision-making may not always be clear, especially for elderly and critically ill patients with reduced physiologic reserve.[13]

Considering scarcity of studies documenting the clinical profile, treatment provision pattern and the postoperative outcomes among Indian population, the current study was conducted with the following objectives:

To study the clinicopathological profile of acute cholecystitis cases presenting to a tertiary care teaching hospital. To describe the management and complications of acute cholecystitis presenting to a tertiary care teaching hospital.

METHODS

The current study was a prospective observational study, conducted in the department of emergency and general surgery of Dhanalakshmi Srinivas medical college and hospital, Permabalur, Tamilnadu., which is a tertiary care teaching hospital.

The study participants included all the clinically confirmed cases of acute cholestasis in the study setting between June 2017 to December 2017. The subjects who were not willing to provide informed written consent were excluded from the study. The study was approved by the institutional review board and informed written consent was obtained from the participants. Confidentiality of the participants was maintained throughout the study.

All the patients with suspected symptoms of acute cholecystitis were subjected to thorough clinical evaluation. Following appropriate confirmation using different imaging modalities, the patients underwent appropriate management as per the hospital protocol. The relevant sociodemographic details, clinical presentation, imaging and laboratory findings, the type of management, intraoperative findings and postoperative histopathology findings were documents in people undergoing surgical intervention.

All the data was collected using a structured proforma and was analyzed using IBM SPSS version 21. Descriptive analysis was done by frequency and proportion for categorical variables, the mean and standard deviation for quantitative variables. No inferential statistics were done, hence statistical significance was not reported.

RESULTS

A total of 50 subjects, who underwent cholecystectomy were included in the final analysis.

Table 1: Descriptive analysis of demographic profile of cholecystitis cases in the study population (N=50).

Demographic profile of cholecystitis cases	Frequency	Percentages
Age group		
20-25	4	8
26-30	2	4
31-35	5	10
36-40	4	8
41-45	8	16
46-50	14	28
51 and above	13	26
Gender		
Male	22	44
Female	28	56

Among the study population, the number of Cholecystitis in age group 20 to 25 years was 4 (8%), 26 to 30 years was 2 (4%), 31 to 35 years was 5 (10%), 36 to 40 years was 4 (8%), 41 to 45 years was 8 (16%), 46 to 50 years was 14 (28%) and 51 and above was 13 (26%). Among the study population, 22 (44%) were males and 28 (56%) were female (Table 1).

Among the study population, the right hypo chondral tenderness was 50 (100%). The number of subjects, 23 (46%) people had a fever, 12 (24%) had vomiting, 3 (6%) had jaundice and 17 (34%) had leukocytosis. Among the study population, the calculous cholecystitis was 42 (84%), idiopathic acalculous cholecystitis was 7 (14%), and malignancy was 1 (2%). Among the study population, the emergency was 6 (12%) and elective was 44 (88%). Among the study population, the management in early cholecystectomy was 27 (54%), elective cholecystectomy was 17 (34%), and emergency cholecystectomy was 6 (12%) (Table 2).

Table 2: Descriptive analysis of clinical presentation and types of pathology in the study population (N=50).

Symptoms	Number of patients	Percentage
Clinical presentation		
Right Hypo chondral tenderness	50	100
Fever	23	46
Vomiting	12	24
Jaundice	3	6
Leukocytosis	17	34
Type of pathology		
Calculous cholecystitis	42	84
Idiopathic acalculous cholecystitis	7	14
Malignancy	1	2
Mode of presentation		
Emergency	6	12
Elective	44	88
Type of cholecystectomy		
Early cholecystectomy	27	54
Elective cholecystectomy	17	34
Emergency cholecystectomy	6	12

Among the study population, the type of cholecystectomy in early cholecystectomy was 27(54%), elective cholecystectomy was 17(34%), and emergency cholecystectomy was 6 (12%). Among the study population, the type of pathology in calculous cholecystitis was 42(84%), malignancy was 1 (2%), and idiopathic acalculous cholecystitis was 7(14%). Among the study population, the Organism cultured in *E. coli* was 12 (24%), Staph, aureus was 7 (14%), No organism was 6 (12%), and salmonella was 1 (2%) (Table 3).

Table 3: Management and post-operative parameters in study population.

Symptoms	No. of patients	Percentage
Type of cholecystectomy		
Early cholecystectomy	27	54
Elective cholecystectomy	17	34
Emergency cholecystectomy	6	12
Type of pathology		
Calculous cholecystitis	42	84
Malignancy	1	2
Idiopathic acalculous Cholecystitis	7	14
Organism cultured		
E. coli	12	24
Staph. aureus	7	14
No organism	6	12
Salmonella	1	2
Culture not done	24	48

Table 4: Comparison of age and gender-wise distribution of calculous and acalculous cholecystitis.

Age group	Calculous cholecystitis	Acalculous cholecystitis	Chi square	P value
20-25 (N=4)	3 (75%)	1 (25%)	**	**
26-30 (N=2)	2 (100%)	0 (0%)		
31-35 (N=5)	5 (100%)	0 (0%)		
36-40 (N=4)	3 (75%)	1 (25%)		
41-45 (N=8)	6 (75%)	2 (25%)		
46-50 (N=14)	13 (92.85%)	1 (7.14%)		
51 and above (N=13)	10 (76.92%)	3 (23.07%)		
Sex				
Male (N=22)	19 (86.36%)	3 (13.63%)	0.163	0.686
Female (N=28)	23 (82.14%)	5 (17.85%)		

**No statistical test was applied- due to 0 subjects in the cells.

Among the age group 22-25 years, 3 (75%) people had calculous cholecystitis and remaining 1 (25%) people had acalculous cholecystitis. Among the age group 26-30 years, 2 (100%) people had calculous cholecystitis. Among the age group 31-35 years, 5 (100%) people had calculous cholecystitis. Among the age group 36-40 years, 3 (75%) people had calculous cholecystitis and remaining 1 (25%) people had acalculous cholecystitis. Among the age group 41-45 years, 6 (75%) people had calculous cholecystitis and remaining 2 (25%) people had acalculous cholecystitis. Among the age group 46-50 years, 13 (92.85%) people had calculous cholecystitis and remaining 1 (7.14%) people had acalculous cholecystitis. Among the age group, 51 years and above, 10 (76.92%) people had calculous cholecystitis and remaining 3 (23.07%) people had acalculous cholecystitis. Among the 22 male people, 19 (86.36%) people had calculous cholecystitis and remaining 3 (13.63%) people had acalculous cholecystitis. Among the 28 female people, 23(82.14%) had calculous cholecystitis and remaining 5(17.85%) people had acalculous cholecystitis. The difference in the proportion of cholecystitis group between gender was statistically not significant (P value 0.686) (Table 4).

Among the calculous cholecystitis group, 4 (9.52%) had an emergency cholecystectomy, 24 (57.14%) had an early cholecystectomy, and 14 (87.5%) had elective cholecystectomy. Among the acalculous cholecystitis group, 2 (25%) had an emergency cholecystectomy, 3 (37.50%) had an early cholecystectomy, 2 (25%) had an elective cholecystectomy, and 1 (12.50%) had cholecystectomy. Among the calculous cholecystitis

group, 10(23.80%) had *E. coli*, 7 (16.67%) had *Staph aureus*, 1(2.38%) had Salmonella and 24 (57.14%) had no organism. Among the acalculous cholecystitis group, 2(25%) had *E. coli*, and 6 (75%) had no organism (Table 5).

Among the 12 people with *E. coli*, 2 (16.66%) people had wound infection cases. Among the 7 people with staph, aureus, 2 (28.57%) people had wound infection cases. Among the 1 people with Salmonella, 1 (100%) people had wound infection cases.

Table 5: Comparison of management and organism culture distribution of calculous and acalculous cholecystitis.

Parameter	Calculous Cholecystitis (N=42)	Acalculous Cholecystitis (N=8)	Chi square	P value
Management				
Emergency cholecystectomy	4 (9.52%)	2 (25%)		
Early cholecystectomy	24 (57.14%)	3 (37.50%)		
Elective cholecystectomy	14 (33.33%)	2 (25%)	**	**
Cholecystectomy	0 (0%)	1 (12.50%)		
Laparoscopic cholecystectomy	0 (0%)	0 (0%)		
Organism Cultured				
E. coli	10 (23.80%)	2 (25%)		
Staph. aureus	7 (16.67%)	0 (0%)		
Salmonella	1 (2.38%)	0 (0%)	**	**
No organism	24 (57.14%)	6 (75%)		
Culture not done (N=24)	0 (0%)	0 (0%)		

**No statistical test was applied- due to 0 subjects in the cells

Table 6: Comparison of organism cultured and wound infection.

Organism Cultured	Wound infection cases	No wound infection cases	P value
E. coli (N = 12)	2 (16.66%)	10 (83.33%)	
Staph. aureus (N = 7)	2 (28.57%)	5 (71.42%)	
Salmonella (N = 1)	1 (100%)	0 (0%)	**
No organism (N = 6)	4 (66.67%)	2 (33.33%)	
Culture not done (N = 24)	0 (0%)	0 (0%)	
Mode of presentation			
Emergency (N = 6)	1 (16.67%)	5 (83.33%)	
Elective (N = 44)	8 (18.18%)	36 (81.82%)	0.941

Among the 6 people with no organism, 4 (66.67%) people had wound infection cases. Among the 6 people with an emergency, 1(16.67%) people had wound infection. Among the 44 people with elective, 8 (18.18%) people had wound infection. The difference in the proportion of wound infection between mode of presentation was statistically not significant (P value 0.941) (Table 6).

DISCUSSION

Acute cholecystitis is defined as an inflammation of the wall of the gallbladder and in most of the cases, it is due to the occlusion of the cystic duct by a stone. The inflammatory process thus elicited could be due to either or a combination of three factors. Firstly, the mechanical inflammation induced due to amplified intraluminal pressure followed by ischemia of the mucosa and wall of the gallbladder. Secondly, chemical inflammation initiated by the release of lysolecithin owing to the action of phospholipase on lecithin in bile and other local tissue factors. Lastly, bacterial inflammation occurring in 50-85% of patients with AC. Although bacterial infection is not common within the first 48 hours, the risk of infection may increase up to 70% by the end of the first week if treatment is not initiated.

Of the 50 patients with AC, age-wise, 16% of them belonged 41 to 45-year group, 28% to 46 to 50 group and 26% to 51year and above group, with a cumulative distribution of 70% of cases belonging to 4th and 6th decade of life. In line with study findings, Sangma MMB.[1] reported 58% of the patients out of 100 belonged 4th and 6th decade of life. Numerous studies have found that females are more commonly affected by AC than males. As per the studies by Daniel SL and Sangma MMB, the male to female ratio was 1.5:1 and 2.6:1 respectively, while in our study it was 13:1.[1,14] This may be due to a higher incidence of cholelithiasis among women of up to three times compared to men.[14]

In the present study, right hypochondreal tenderness was present in all patients, which is in accordance to the studies by Bagla, Cull, and Sangma1.[1,9,15] The typical

clinical manifestation of AC is tenderness on palpation of the right upper abdominal quadrant. The clinician can also find a Murphy sign (inspiratory arrest on palpation), which has a high sensitivity and specificity.

The organisms most commonly isolated from culture of gallbladder bile in patients with AC comprise *Escherichia coli*, Klebsiella species, Group D Streptococcus, Staphylococcus species, and Clostridium species. In present study, *E. coli* was the most frequently isolated bacteria followed by, *Staph aureus* (14%).

One of the most significant questions in the therapy of acute cholecystitis is the optimal timing of cholecystectomy.[8,16] The management includes two main approaches with opposing rationality and each is supported by the results of many studies; early surgery versus an early conservative treatment with antibiotics for complete resolution of inflammation, followed by delayed laparoscopic cholecystectomy after several weeks.[8] In day-to-day practice, specialization and preference of the physician at first patient contact and country-specific treatment protocol seem to influence the approach.[17]

Among the study population, 54% of the patients were managed with early cholecystectomy, 34% with elective cholecystectomy and 12% underwent emergency cholecystectomy was 6 (12%). Delayed surgery is based on the belief that affected inflammatory tissue is more vulnerable to surgical interventions and can lead to an increased risk of surgical complications.

Hence, laparoscopic cholecystectomy was contraindicated in acute cholecystitis during its early years.[18] With increasing experience and expertise in laparoscopic cholecystectomy, however, the concerns about performing the operation in inflamed tissue has become less relevant.

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