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Research Article

Clinicoetiopathological studies of acute cholecystitis

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ABSTRACT

Background: Acute cholecystitis is a common cause of acute abdomen and a frequently encountered surgical emergency. It constitutes about 10% of acute abdomen. Gallstones are the most common biliary and digestive disease leading to hospitalisation. About 95% of the patients with cholecystitis are calculus cholecystitis and the remaining 5% of the patients are acalculus cholecystitis. This is a descriptive study and the objective of the study is to find the various modes of clinical presentation, different etiological factors and various pathological of acute cholecystitis in the RIMS Hospital, Imphal, Manipur, India.
Methods: Detailed history of the 100 cases was taken from the patient and examined clinically for their complaints suggestive of gallbladder disease. All the cases were then subjected to a battery of investigations. Operations were performed in all the cases through standard Kocher's subcostal incision. Cholecystectomy was accomplished either by cystic duct or fundus first techniques or by combination of both. The specimens removed were sent for histopathological examination for final diagnosis.
Results: Majority of' the patients (45%) in the age group of 41-60 years, suffered from acute cholecystitis. Female predominance over the male counterpart was seen in the present study with female comprising 72% and male 28% only. Only 10% of the cases had a family history suggestive of gallstone disease. The remaining 90% of the cases did not have any family history suggestive of gall stone disease.
Conclusions: In most of the cases gallstones are the cause of acute cholecystitis. Patients suspected of having acute cholecystitis should be admitted to hospital immediately for the first line treatments including fasting, intravenous fluids, and analgesia. The first line treatment should be followed by Surgery (cholecystectomy) within 24 – 48 hours of admission (early). Even though open cholecystectomy was performed in this study, Laparoscopic cholecystectomy is the gold standard and operation of choice. The present work will give a reference value for other workers to know the disease spectrum of acute cholecystitis in this part of the region.

Keywords: Acute cholecystitis, Calculus cholecystitis, Acalculus cholecystitis

INTRODUCTION

Acute cholecystitis is a common cause of acute abdomen and a frequently encountered surgical emergency. It constitutes about 10% of acute abdomen. Gallstones are the most common biliary and digestive disease leading to hospitalization. About 95% of the patients with cholecystitis are calculus cholecystitis and the remaining 5% of the patients are acalculus cholecystitis.

The management of patients with gallstone disease has been revolutionized during last three decades with the introduction and evolution of laparoscopic cholecystectomy. This technique is rapidly emerging as the gold standard for the treatment of patients with symptomatic gallstone disease, and is now available throughout most parts of the world. This technique has a number of advantages as compared to conventional therapy, including improved patient compliance and satisfaction, and reduced cost.[1]

There have been conflicting opinions on the management of acute cholecystitis, particularly on the optimal time for surgical intervention. For the purposes of discussion, early operation is defined as one performed within 48 hours after the onset of symptoms; intermediate operation is one carried out between 72 hours and the cessation of clinical manifestations; delayed operative management permits the acute inflammatory process to subside; and scheduled elective surgery is performed after an interval of 6 weeks to 3 months.[2]

Ultrasound imaging also provides diagnostic information for acute and chronic cholecystitis. The characteristic signs include edema and thickening of the gallbladder wall, occasionally gas in the wall, and absence of visualization of the organ. Thickening and edema of the wall is particularly useful in establishing the diagnosis of acalculous cholecystitis when they are coupled with tenderness over the organ evoked by pressure of the ultrasound probe.

Acute inflammation of the gallbladder wall usually follows obstruction of the cystic duct by a stone. Inflammatory response can be evoked by three factors:

- Mechanical inflammation produced by increased intraluminal pressure and distention with resulting ischemia of the gallbladder mucosa and wall
- Chemical inflammation caused by the release of lysolecithin (due to the action of phospholipase on lecithin in bile) and other local tissue factors, and
- Bacterial inflammation, which may play a role in 50 to 85 percent of patients with acute cholecystitis. The organisms most frequently isolated by culture of gallbladder bile in these patients include Escherichia coli, Klebsiella species, Group D Streptococcus, Staphylococcus species, and Clostridium species.

The objective of this study was to find the various study modes of clinical presentation, different etiological factors and various pathological of acute cholecystitis in the RIMS Hospital, Imphal, Manipur, India.

METHODS

The present study was carried out in the Department of Surgery, Regional Institute of Medical Sciences Hospital (RIMSH), Imphal, Manipur, India.

100 cases of acute cholecystitis treated surgically in the Department of General Surgery, Regional Institute of Medical Sciences Hospital, Imphal, Manipur, India were randomly selected in this study.

Detailed history of the cases was taken from the patient and examined clinically for their complaints suggestive of gallbladder disease.

All the cases were then subjected to a battery of investigations, which included chiefly a complete Haemogram, urine R/E, liver function tests, kidney function tests, serum electrolytes, and blood sugar estimation, X-ray chest, ECG and ultrasonography of the abdomen.

The initial diagnosis of acute cholecystitis was made from the detailed history, clinical examination, and analysis of available laboratory data supported by radiological and ultrasonographic findings. The confirmation was made at operation, examining appearance of the gall bladder and its contents and finally by histopathological examination.

The initial medical measures such as intravenous fluids and electrolytes administration, administration of analgesics and antibiotics, and nasogastric tube was placed when indicated.

Operations were performed in all the cases through standard Kocher's subcostal incision. Cholecystectomy was accomplished either by cystic duct or fundus first techniques or by combination of both.

Operation records, the state of gall bladder during the surgery like colour, oedema, inflammation, empyema, necrosis of the wall, gangrene, perforation, mucocele, pericholecystic changes, presence or absence of stone, number of stones and the state of surrounding structures in relation to the diseased gall bladder were recorded.

The specimens removed were sent for histopathological examination for final diagnosis.

The results thus obtained were recorded systemically as per the proforma (Appendix-I), tabulated, evaluated and discussed.

RESULTS

The cases for the present study were collected randomly from one hundred cases of acute cholecystitis admitted for surgical treatment in Regional Institute of Medical Sciences Hospital, Imphal, Manipur, India. All these cases were studied and the observations were analyzed systematically.

In the present study, out of the total of 100 patients, the maximum incidence of 45% was observed in the age group of 41-60 years, followed by age groups 21-40 years, which was 37%, 61-80 years, which was 13% and 0-20 years, which was 5%. Similarly in sex wise distribution, the female predominance was seen with a female male ratio of 2.6:1.

In the present study, a family history suggestive of acute cholecystitis was present in only 10% of the cases. The remaining 90% of the cases did not present with any family history suggestive of the disease (Table 1).

Table 1: Distribution of acute cholecystitis in various terms.

Age (in years)	No. of patients	%
0-20	5	5
21-40	37	37
41-60	45	45
61-80	13	13
>80	0	0
Total	100	100
Sex	**No. of patients**	**%**
Male	28	28
Female	72	72
Total	100	100
Religion	**No. of patients**	**%**
Hindus	82	82
Christians	9	9
Muslims	9	9
Total	100	100
Marital status	**No. of patients**	**%**
Married	91	91
Unmarried	9	9
Total	100	100
Dietary habits	**No. of patients**	**%**
Vegetarian	1	1
Non-vegetarian	99	99
Total	100	100
Family history	**No. of patients**	**%**
Suggestive	10	10
Non-suggestive	90	90
Total	100	100

Table 2: Parity in acute cholecystitis.

Parity	No. of patients	%
Multipara	64	88.9
Primipara	5	6.9
Nullipara	3	4.2
Total	72	100

Out of the 72 female patients, 88.9% of the cases were multipara, 6.9% of the cases were primipara and 4.2% of the cases were nullipara.

Symptomatology

The different symptoms and signs of acute cholecystitis observed during the present study are shown in (Table 3).

All the patients presented with pain in the right hypochondrium (100%) followed by fever in 94% of the cases. The other symptoms were upper abdominal dyspepsia (84%), vomiting (76%), nausea (44%), referred pain in the back and shoulder (32%), jaundice (6%) and itching (5%) in decreasing order of frequency.

Table 3: Symptoms and signs in acute cholecystitis.

Presenting features	No. of patients	(%)
A. Symptoms:		
Pain in right hypochondrium	100	100
Nausea	44	44
Vomiting	76	76
Upper abdominal dyspepsia	84	84
Jaundice	6	6
Fever	94	94
Referred pain in the back and shoulder	32	32
Itching	5	5
B. Signs:		
Tenderness in right hypochondrium	100	100
Lump in the right hypochondrium (Palpable gall bladder)	15	15
Enlarged palpable liver	1	1
Murphy's sign	95	95
Icterus	5	5
Total	100	100

The study suggests that, the associated diseases in acute cholecystitis were Hypertension (13%), Diabetes Mellitus (3%) and Recurrent Appendicitis (2%) (Table 4).

Table 4: Associated diseases in acute cholecystitis.

Associated disease	No. of patients	%
Hypertension	13	13
Diabetes mellitus	3	3
Recurrent appendicitis	2	2

Investigations

Different investigations like Hb, total serum bilirubin, total serum protein, SGOT, total serum protein, were done in patients with acute cholecystitis.

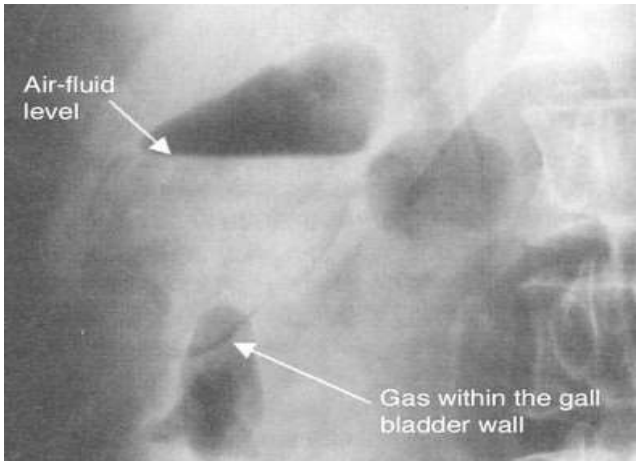

Figure 1: Plain radiographs showing emphysematous cholecystitis.

Table 5: Investigations of acute cholecystitis.

Hb (in gm%)	No. of patients	%
≤9	1	1
9.1-11	35	35
11.1-13	49	49
13.1-15	15	15
Total	100	100
Total serum bilirubin (In mg%)	**No. of patients**	**%**
0.2-0.8	68	68
0.9-1.5	25	25
1.6-2.5	2	2
2.6 and above	5	5
Total	100	100
Total serum protein (in gm%)	**No. of patients**	**%**
4-5.9	10	10
6-8	69	69
8.1-10	21	21
Total	100	100
SGOT (in UI/L)	**No. of patients**	**%**
≤5	0	0
5-10	0	0
10.1-20	4	4
20.1-30	42	42
30.1-40	29	29
40.1-50	8	8
50.1 and above	17	17
Total	100	100
SGPT	**No. of patients**	**%**
≤5	0	0
5-10	0	0
10.1-20	13	13
20.1-30	33	33
30.1-40	26	26
40.1-50	12	12
50.1 and above	16	16
Total	100	100
Alkaline phosphatase (in UI/L)	**No. of patients**	**%**
<110	4	4
110-310	72	72
311-620	20	20
621-930	2	2
931 and above	2	2
Total	100	100

In the present study, plain X-ray of gall bladder area did not show any radio-opaque shadow in all the 100 patients. Ultrasonography of the whole abdomen in acute cholecystitis demonstrated calculi in 94% Calculus cholecystitis and 6% Acalculus cholecystitis.

Figure 2: Ultrasound findings in acute cholecystitis.

Table 6: Operative findings in acute cholecystitis.

Operative findings	No. of patients	(%)
Calculus cholecystitis	94	94
Acalculus cholecystitis	6	6
Calculi in		
GB	81	86.2
CBD	13	13.8
Number of calculus		
Single	16	17.02
Multiple	78	82.98
Type of stone		
Mixed	65	68.1
Pigment	17	18.1
Cholesterol	13	13.8
Associated operative findings		
Adhesion of GB	30	30
Mucocele of GB	5	5
Empyema of GB	3	3
Dilatation of GB	13	13
Polyp of GB	2	2
Ascariasis of GB /CBD	0	0
Cirrhosis of liver	3	3
Hepatomegaly	4	4
Perforation of GB	2	2
Peptic ulcer	7	7
Lymphadenopathy (Lymph node of Lund)	3	3

Out of these 94 cases of calculus cholecystitis, 81 patients (86.2%) had calculi in the gall bladder and 13 patients (13.8%) in the common bile duct. Majority of the patients had multiple stone (82.98%). The remaining had solitary stone (17.02%). The most common type of gallstone was the mixed type comprising 68.1% of the cases followed by pigment stones (18.1%) and cholesterol stones (13.8%). The adhesion of the gall bladder with the omentum, duodenum and the surrounding structures was the most common associated operative findings comprising 30% of the cases. Also, very often, the dilatation of the common bile duct was found in 13% of the cases. The other associated operative findings were

peptic ulcer (7%), mucocele of the gall bladder (5%), hepatomegaly (4%), empyema of the gall bladder, and cirrhosis of liver and enlargement of the lymph node of Lund in 3% of the cases, polyp of gall bladder and perforation of gall bladder in 2% of the cases respectively. There was not a single case of ascariasis in the gall bladder and the common bile duct.

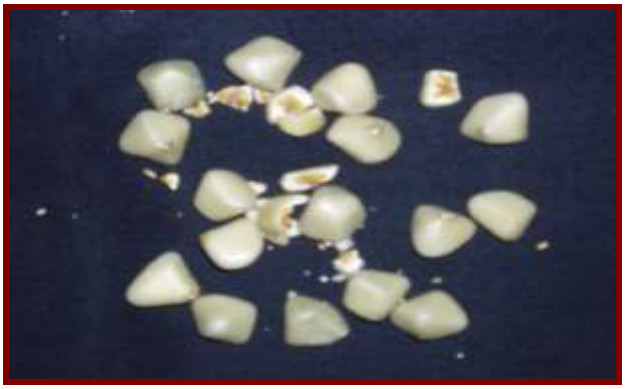

Figure 3: Gall stones (mixed type).

Final diagnosis

Table 7: Final diagnosis of acute cholecystitis by HPE.

Final diagnosis	No. of patients	%
Acute calculus cholecystitis	26	26
Chronic calculus cholecystitis	68	68
Acute acalculus cholecystitis	2	2
Chronic acalculus cholecystitis	4	4
Total	100	100

Figure 4: Gall stones (mixed type).

The final diagnosis of acute cholecystitis was done after detailed histopathological examination (Table 7). The maximum number of cases was suffering from chronic cholecystitis comprising 68% of the cases. Only 26% were suffering from acute calculus cholecystitis, which included 5 cases of mucocele of the gall bladder, and chronic calculus cholecystitis included 3 cases of empyema of the gall bladder. Chronic acalculus cholecystitis accounted for 4% of the total cases and acute acalculus cholecystitis for only 2% of the cases.

Figure 5: Gall bladder perforation.

Figure 6: Mucocele of the gall bladder (Side view).

Post-operative complications

Superficial wound infections were observed in 5% of the cases, pulmonary infection in 3% and temporary leakage of bile in 2% of the cases (Table 8).

Table 8: Post-operative complications of acute cholecystitis.

Final diagnosis	No. of patients	%
Wound infection	5	5
Pulmonary infection	3	3
Temporary leakage of bile	2	2

Intra-operative complications

Severe bleeding due to injury of right hepatic artery occurred in a 58 year old male patient. It was apparently caught and ligated and the bleeding was controlled. In the evening of the operative day, there was a large amount of fresh blood coming out of the drain. The patient was managed conservatively.

Overall mortality rate in the present study was 0%.

Follow-up

75 patients turned up for follow up. Out of these, only 6 cases reported to the out-patient department with the chief complaints of upper abdominal dyspepsia, nausea & vomiting and pain on the right side of the abdomen on and off. Post-operative investigations were carried out for these patients and they were found to be suffering from other gastrointestinal diseases such as gastritis. These patients were treated conservatively.

DISCUSSION

Many studies found that, acute cholecystitis is more commonly observed in the female than in male. According to study by Bhansali KS, Daniel SL and Eggleton FC the female to male ratio as 1.5:1 and 3:1 respectively.[3,4] In the present study the female to male ratio is 2.6:1. They also reported the maximum number of cases between the 4th and the 6th decades, which is in agreement with the present study.

In the present study, 91% of the patients were married and the remaining 9% were unmarried persons. Out of these cases, 72 patients were female out of which 64% females were multiparous. A study by Rains AJH and Ritchie HD, suggests that the high incidence among these multiparous women may be due to gall bladder relaxation and dilatation, which may progressively increase with each pregnancy, resulting in increased gall bladder volume and emptying.[5]

The analysis of dietary habits of the patients suggests that 99% of the patients were non-vegetarians and only 1% were vegetarians. It was observed that Hindus take large amount of highly purified oil as their medium of cooking, with decreased intake of vegetables and vegetables fibers.

Acute cholecystitis has been reported to show a family aggregation. 10% of the cases had family history of acute cholecystitis in the present study.

In the current study it was observed that 83% of the patients were of low socioeconomic group and 17% were of middle socioeconomic group. Acute cholecystitis was not observed among the high socioeconomic group in the present series. This could be due to the fact that rims hospital is catering to the needs of the poor and the needy sections of the society and people from the high socioeconomic group prefers to go outside the state for the treatment of their ailments and also most of them prefers to go to nursing homes rather than come to rims hospital for their treatment.

On examination, tenderness was present in the right hypochondrium in all the patients. 95% of the patients had positive murphy's sign. As mentioned by Nathaniel MM et al, Kenneth WS and Roslyn JJ and Zinner MJ localized tenderness, guarding and rebound tenderness in the right upper quadrant and positive murphy's sign were consistent and suggestive of acute cholecystitis.[7,8] The palpable gall bladder was observed in 15% cases and enlarged liver was palpable in only 1% of the cases. In 5% of the cases icterus was observed. In a study by Kune GA and Gill GD, palpable gall bladder was found to be present in 40%. The presence of tender mass in right hypochondrium was described in 10 to 20% of cases by Gagie N et al, Kenneth WS, Roslyn JJ and Zinner MJ. The findings in the present series closely correlated with that reports.[7-10]

Leucocytosis of 10,000 to 15,000/cu min was seen in 60% of cases. Similar findings were reported by Gunn AA, Nathaniel MM et al, Roslyn JJ and Zinner MJ.[6,8,11]

Mild elevation of serum alkaline phosphatase and bilirubin level in 30 to 40% of cases found were similar to findings of Nathaniel MM et al.[6]

This study revealed that ultrasonography was accurate in verifying the clinical diagnosis of acute calculus cholecystitis and acute acalculus cholecystitis in 100% of the cases. The 95% accuracy rate of ultrasonography in diagnosis of acute cholecystitis was reported by Kenneth WS.[7]

In 3% of the patients empyema of gallbladder was encountered which appeared as reddish, oedematous and moderately distended organ containing stones and pus. There were 6% cases of acute acalculus cholecystitis which included mucocele of the gall bladder. According to Gagie N et al out of the 93 cases of acute cholecystitis, 61.25% were uncomplicated at operation. 20.43% were empyema, 12.9% gangrene and 5.37% were perforation of the gall bladder.[10]

The contents of gallbladder gut were decompressed and drained into the intestine through the cholecystoenteric fistula that formed. Kenneth WS described that complications like perforation and gangrene occurred in only 10% of patients. As comparison to that in the present series, 24% of cases of uncomplicated acute calculus cholecystitis and 68% of the cases of chronic calculus cholecystitis were observed. There were 2% cases of acute acalculus cholecystitis and 4% cases of chronic acalculus cholecystitis.[7]

In the present study, in 86.2% of cases stones were found in gallbladder and 13.8% of the patients had stones in the common bile duct. 82.98% had multiple stones and 17.02% of the patients had single stone. Three patients had a large solitary stone impacted in the neck of the gallbladder. As emphasized by Nathaniel MM et al the obstruction of the cystic duct by a stone was probably the main etiologic factor to the pathologic changes of acute calculus cholecystitis. As reported by Rains AJH and Ritchie HD 95% of acute calculus cholecystitis, gallstone was found impacted in Hartmann's pouch or obstructing the cystic duct. In the present series stones in the gallbladder were found in 86.2% of the cases of acute

calculus cholecystitis which is comparable to the earlier views on the role of stone in the pathogenesis of' acute calculus cholecystitis. Nathaniel MM et al described only 3 to 4% incidence of acute acalculus cholecystitis.[5,6]

All the 100 cases of' acute cholecystitis treated by surgery were confirmed from the appearance of gall bladder during the operation. 24% of the cases were noted to have acute calculus cholecystitis with complication appearing reddish, oedematous, distended, inflamed and surrounded by omentum forming a mild protective covering in most of the cases. In 3% of the cases, the gallbladder was found to be distended with pus and stones. However, histopathological examination of` 68% of' the cases showed features of chronic calculus cholecystitis.

A study by Gunn AA observed that 140 cases of acutely inflamed gallbladder was found at operation, whereas acute inflammation was reported by the histopathologist reported in only 65% of cases. Similar histopathological downgrading was reported by Rains AJH and Ritchie HD, Pickleman J and Gonzalez RP.[5,11,12] In the present series, histopathological downgrading of up to 68% was similar with observation in the previous series as stated above.

In the present study, there was no major complication either local or systemic. Superficial wound infections noted as slight serous discharge were recorded in 5% of the cases. The mortality rate was nil in this present study.

CONCLUSION

In most of the cases gallstones are the cause of acute cholecystitis. Patients suspected of having acute cholecystitis should be admitted to hospital immediately for the first line treatments including fasting, intravenous fluids, and analgesia. The first line treatment should be followed by Surgery (cholecystectomy) within 24-48 hours of admission (early). Even though open cholecystectomy was performed in this study, Laparoscopic cholecystectomy is the gold standard and operation of choice. The present work will be a reference value for other workers to know the disease spectrum of acute cholecystitis in this part of the region.

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