

Study of Clinical Features, Laboratory Investigations and Radiological Findings of Gall Bladder Diseases

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ABSTRACT

Introduction: Clinical diagnosis of the gall bladder diseases is made, based on history and physical examination along with laboratory and radiological findings. Correlation of clinical findings, with laboratory findings and radiological findings is necessary to make correct diagnosis of gall bladder diseases excluding other causes of right hypochondrial pain as well as to determine appropriate mode of treatment in different gall bladder diseases.

Aim: To study clinical features of gall bladder diseases and correlating it with laboratory investigations and radiological findings.

Materials and Methods: The present study includes prospective cases of two years from June 2015 to May 2017 and also includes cases from retrospective archival of data of two and half years i.e., Jan 2013 to May 2015. Thus, it includes 130 cases of cholecystectomy specimens during Jan 2013 to June 2017.

Results: The commonest symptom was abdominal pain (100%), followed by vomiting (78%) and fever (8.5%). Higher values of

total leucocyte count, Serum alkaline phosphatase (>140 IU/mL), Serum aspartate aminotransferase (AST) (>40 IU/L), and Serum Alanine aminotransferase (ALT) (>45 U/L) were observed in cholecystectomy patients. Ultrasonography successfully detected cases of chronic cholecystitis and acute cholecystitis but out of total four cases of gall bladder adenocarcinoma, ultrasonography diagnosed malignancy in only two cases.

Conclusion: Clinical presentation of diseases of gall bladder is vague. Even malignancy of gall bladder presents late in the course and with nonspecific symptoms, which can misguide the clinicians. Findings of malignancy were subtle on radiological examinations also. Diagnosis of malignancy was made only by histopathological examination. So Clinical diagnosis of the gall bladder diseases should be supported by relevant laboratory and radiological findings. Correlation of clinical findings, with laboratory findings and radiological findings is necessary to make correct diagnosis of gall bladder diseases as well as to determine appropriate mode of treatment in different gall bladder diseases.

Keywords: Abdominal pain, Serum alkaline phosphatase, Serum aspartate aminotransferase, Total leucocyte count

INTRODUCTION

Cholecystectomy is one of the most frequently performed emergency abdominal operation as the gallstones are one of the major causes of morbidity and mortality all over the world affecting 10% of adult population [1]. Cholecystectomy specimens are mostly associated with gall stone called as calculous cholecystitis, and because of westernisation of life style incidence of gall stones is increasing in India. Hence, gall bladder is a frequent surgical specimen in most of the histopathology laboratories.

According to consolidated report of population based registries of India 2009-2011 (by National centre for disease informatics and research), India has shown high incidence of gall bladder cancer in female population of Kamrup (Assam) district, which is highest among the world [2].

Along with clinical findings; the laboratory and radiological investigations are necessary to make correct diagnosis of gall bladder diseases as well as to exclude other causes of right hypochondrial pain and to determine appropriate mode of treatment in different gall bladder diseases.

MATERIALS AND METHODS

The present descriptive study which was conducted in our tertiary care center at Satara district Maharashtra, which includes 58 prospective cases of two years from June 2015 to May 2017 and also includes 72 retrospective cases from archival of data of two and half years i.e.,– Jan 2013 to May 2015. Thus, it includes 130 cases of cholecystectomy specimens during Jan 2013 to June

2017. Ethical approval from institute and patients consent was taken to conduct the study.

The specimens were collected in 10% formalin following scrutiny of the patient details and identity. The specimens of cholecystectomy were fixed in formalin for 12-24 hours. Gross examination of all the specimens was done. Bits from one representative full-thickness section from the fundus, one through the body, one through neck of the gall bladder, and one cross section of the cystic duct margin were taken. Additional sections were taken when focal lesions were present. These were followed by routine paraffin processing.

Histological diagnosis of cholecystectomy specimen was studied with clinical features, laboratory investigations and radiological investigations. Among clinical features, pain was analysed further in detail.

Among laboratory investigations; Total Leucocyte Count, Random blood sugar level, Serum cholesterol, Serum bilirubin, Serum alkaline phosphatase, Serum aspartate aminotransferase, Serum Alanine aminotransferase were analysed in further detail. For haematological investigations XE-2100-Sysmex and for biochemistry investigations Vitros automatic analyser was used.

Among the radiological investigation parameters such as presence of stone, measurements of gall bladder and thickness of wall were studied and compared with histopathological specimen findings. For CT scan Somatom 16-slice –Siemens machine and for ultrasonography Acuson X300 Siemens machine were used.

RESULTS AND DISCUSSION

Out of these 130 cases, in 129 (99.23%) cases gall bladders was surgically resected as a therapeutic measure for clinically suspected cholecystitis and in remaining only one case (0.77%) gall bladder was removed with Pancreaticoduodenectomy.

Out of 130 cholecystectomy, 111 were laproscopic and 19 were open laprotomy cholecystectomy.

Out of 19 open laprotomy procedures two procedures were initially started as laproscopic cholecystectomy and were converted in to open procedures as gall bladders having necrotizing cholecystitis got ruptured during procedure.

Most common finding of pain [Table/Fig-1] was in concordance with other studies done by Siddiqui FG et al., Pradhan SB et al., [1,2]. Other digestive track symptoms like altered bowel habits (0.8%) (diarrhea/constipation) and loss of appetite (0.8%) were very less frequent. That finding is in concordance with studies of Siddiqui FG et al., Froutan Y et al., and Festi D et al., [1,3,4]. Pradhan SB et al., in his study observed 40% patients with loss of appetite [2]. As Froutan Y et al., and Festi D et al., observed that significant number of patients of their study had heartburn; in present study none of the patient had this symptom [3,4].

Clinical features	Number of cases (N=130)	Percentage
Abdominal pain	130	100%
Vomiting	101	78%
Fever	11	8.5%
Icterus	5	3.8%
Palpitations and sweating	2	1.5%
Diarrhoea	1	0.8%
Loss of appetite	1	0.8%

[Table/Fig-1]: Clinical features in patients of cholecystectomy.

Out of 130 cases [Table/Fig-2], in 101 cases severity of pain was moderate and non-radiating in right upper quadrant, while in 12 cases pain was severe on admission. Out of 10 cases having diffuse pain in abdomen, five cases were of malignancy among which four cases were gall bladder carcinoma and one case was of periampullary adenocarcinoma. Shabanzadeh DM et al., in his study also observed some similar kind of pain distribution and radiation [5].

Quadrant of abdomen	Number of cases
Severe pain in upper right quadrant	12
Moderate pain in upper right quadrant	101
Moderate pain in upper right quadrant, radiating to back	2
Moderate pain in upper right quadrant, radiating to epigastrium	1
Moderate diffuse pain in upper abdomen	10
Moderate pain in epigastrium	3
Moderate pain in back	1

[Table/Fig-2]: Classification of pain according to location and type.

As in this study, two patients out of 130 presented with palpitations and sweating along with, pain in abdomen. If that pain is not characteristic that of cholecystitis (Moderate Pain in Upper right quadrant) clinically diagnosis of cholecystitis may get omitted. Ultrasonography or other radiological diagnosis proves useful here.

Out of 130 cases [Table/Fig-3] 116 patients (89 %) had pain for more than 4 hours and less then one week. Out of eight cases where pain was for more than one week, five cases were of malignancy.

Actually Even though gall bladder pain is called as -colic, it's almost never sudden, acute in nature. In many cases its prolong for more than 4-5 hours, moderate, in right upper quadrant of abdomen with

Duration of pain	Number of cases (n=130)	Percentage
Less than 4 hours	6	04.6%
4 hours to 24 hours	74	56.9%
1 day to 1 week	42	32.3%
More than 1 week	8	06.1%

[Table/Fig-3]: Classification of pain according to duration.

positive Murphy's sign; irrelevant to nature of cholecystitis whether acute or chronic. In his study Festi D et al., observed that 60.8% patients were admitted to the hospital within three hours of onset of pain, while in present study very few (~4%) patients were admitted to the hospital for duration of pain within three hours of onset of pain [4]. Presentation of patient to the hospital after onset of pain was relatively late in present study; which could become responsible reason for high number of cases presenting with vomiting in present study compared to other study.

Understanding of pain of gall bladder disease is very important, not just because; ignoring gall bladder diseases could lead to lethal sequelae; but there are some other diseases which mimic pain of cholecystitis like gastric and duodenal ulcer, hepatitis, pancreatitis, gall bladder cancer, hepatic abscess, right lower lobar pneumonia, angina pectoris, myocardial infarction, and urinary infection. Some of them are associated with other specific clinical signs which can differentiate them from cholecystitis pain but it's always easy to blame gall bladder for right hypochondriac pain caused by those differentials and thus affecting diagnosis [6].

In present study [Table/Fig-4] we found 69.23% (90/130) patients with high Total Leucocyte count. Gurbulak EK et al., in his study observed total 235 (34.45%) patients having high Total leucocyte count out of 682 total number of patients and 561 (82%) patients were having high CRP values [7]. But this study included only acute cholecystitis cases.

Test	Number of patients having positive test results	Percentage of patients having positive result
Total Leucocyte Count (>11000/mm ³)	90/130 (N=130)	69.23%
Random blood sugar level (>175 mg/dL) (diabetics)	18/130 (n=130)	13.84%
Serum cholesterol (>200 mg/dL)	None (N=7)	None
Serum bilirubin (>1.2 mg/dL)	13/72 (N=72)	18.00%
Serum alkaline phosphatase (>140 iu/mL)	15/29 (N=29)	51.72%
Serum aspartate aminotransferase (AST) (>40 units/L)	05/11 (N=11)	45.45%
Serum Alanine aminotransferase (ALT) (>45 units/L)	04/11 (N=11)	36.36%

[Table/Fig-4]: Laboratory findings in cholecystectomy patients.

Present study noted increased incidence of gall bladder diseases in diabetic patients. Findings are in concordance with study of Froutan Y et al., Festi D et al., and Yen-Chun Chen et al., Borena W et al., [3,4,8,9].

Significant number of patients [Table/Fig-4] with gall bladder disease had higher total leucocyte count, Serum alkaline phosphatase (>140 iu/mL), Serum Aspartate Aminotransferase (AST) (>40 units/L), Serum Alanine aminotransferase (ALT) (>45 units/L). Out of total 20 patients with a history of chronic alcohol consumption [Table/Fig-5], high Serum Bilirubin and Serum Alkaline phosphatase values were observed in 4 patients, whereas High Serum aspartate aminotransferase (AST) and Serum Alanine aminotransferase (ALT) values were observed in 2 patients. Findings of study are in concordance with Sangma MM et al., Fikry AA et al., Ahmad NZ

Liver function tests in cholecystectomy patients with positive alcohol history	Number of patient with positive liver function tests (n=20)
Serum bilirubin (>1.2 mg/dL)	4
Serum alkaline phosphatase (>140 iu/mL)	4
Serum Aspartate Aminotransferase (AST) (>40 units/L)	2
Serum alanine aminotransferase (ALT) (>45 units/L)	2

[Table/Fig-5]: Liver function tests in cholecystectomy patients with positive alcohol history (n=20).

et al., [10-12]. In the present study, 18% patients had high serum bilirubin (>1.2 mg/dL) levels. Chang CC et al., in his study observed fever, leukocytosis, and mild jaundice (total bilirubin less than 4 mg/dL) are often associated in patients with acute cholecystitis [13]. Marked elevation of total bilirubin level or dilated bile duct in the imaging study highlights the presence of common bile duct stone with suppurative cholangitis. Immediate drainage of bile and proper antibiotics treatment are critical in these patients. Fikry AA et al., observed that the AST, ALT and bilirubin levels returns to normal within two weeks to one month after cholecystectomy [11]. He also observed Jaundice as a manifestation of gall bladder disease without evidence of CBD stones. In his study he observed mean total bilirubin was 1.35 mg/dL.

Patients with severe acute cholecystitis may have mild jaundice (serum concentrations of bilirubin <60 micromol/l, i.e., <3.5 mg/dL) caused by inflammation and oedema around the biliary tract and direct pressure on the biliary tract from the distended gall bladder. Concentrations of bilirubin >60 micromol/l, i.e., >3.5 mg/dL suggest a diagnosis of choledocholithiasis (a gall stone in the common bile duct) or Mirizzi's syndrome, which is obstruction by a stone impacted in Hartmann's pouch that compresses the common hepatic duct [14].

In the present study, only one case had associated choledocholithiasis with cholelithiasis.

In the present study, none of the patients had serum cholesterol value more than 200 mg/dL. But we found four patients with pure cholesterol gallstones and 95 patients with mixed stones. This suggests occurrence of cholesterol gallstones can be multifactorial. Chen YC et al., in his study observed average serum cholesterol value of 173 mg/dL for male and 183 mg/dL for female patients [8] and study done by Borena W et al., showed 0.84 relative risk ratio for patients having high serum cholesterol level [9]. Both the studies are also not statistically significant to prove that serum cholesterol less than 200 mg/dL has any protective effect on gall stone formation.

Total 51 (39%) patients had food intake for 3 or more times a day, and 79 (61%) patients had food intake for 2 times a day only. When food intake is less, frequent gall bladder activity becomes sluggish allowing crystals to grow in to large stones [15].

CRP levels and ESR is high in patients with cholecystitis. In the present study, ESR was estimated in only one case having poorly differentiated adenocarcinoma, and ESR was 130 mm at the end of one hour. Gall stones were observed in 113 (86.9%) out of total 130 caeses on histomorphological examination. Preoperatively ultrasonography detected all 113 cases with gallstone [Table/Fig-6]. Other lesions [Table/Fig-7] (proliferative lesions) were detected on histomorphological examination in five cases (one case of gall bladder adenoma and four cases of adenocarcinoma of gall bladder), while three cases (one case of gall bladder adenoma and two cases of gall bladder adenocarcinoma) were detected preoperatively by ultrasonography.

Similar findings were observed by study done by Chawla A et al., and Hwang H et al., [16,17].

Study done by Chawla A et al., and Wang A-J et al., considered more than 3 mm as a thickening of gall bladder wall as criteria to suspect cholecystitis [16,18].

	USG findings (N=130)	Histomorphological findings (N=130)
Presence of stone	113	113
Enlarged gall bladder (long axis >8 cm and diameter >4 cm)	61	53
Wall thickness (>3 mm)	39	32
Intraluminal adhesions	1	1
Other pathology detected	3	5

[Table/Fig-6]: Comparison of ultrasonographic findings with histomorphological findings in cholecystectomy cases.

Ultrasonographic diagnosis		Histopathological diagnosis	
Chronic cholecystitis		Chronic cholecystitis	
Chronic cholecystitis	116	Chronic cholecystitis	107
		Chronic xanthogranulomatous cholecystitis	3
		Cholecystitis Follicularis	1
		Eosinophilic cholecystitis	1
		Acute cholecystitis	2
		Adenocarcinoma	2
Gall bladder adenoma	1	Gall bladder adenoma	1
Acute cholecystitis	11	Acute cholecystitis	10
		Gangrenous cholecystitis	1
Carcinoma	2	Adenocarcinoma	2
Total	130	Total	130

[Table/Fig-7]: Comparison of ultrasonographic diagnosis with histopathological diagnosis.

Hwang H et al., observed mean gall bladder wall thickness 4.1 mm in his study [17]. In their study they conferred that the best clinical prediction was obtained with the triple test of positive Murphy sign, elevated neutrophil count and positive ultrasound. Ultrasonography alone has a high rate of false-negative studies for cholecystitis.

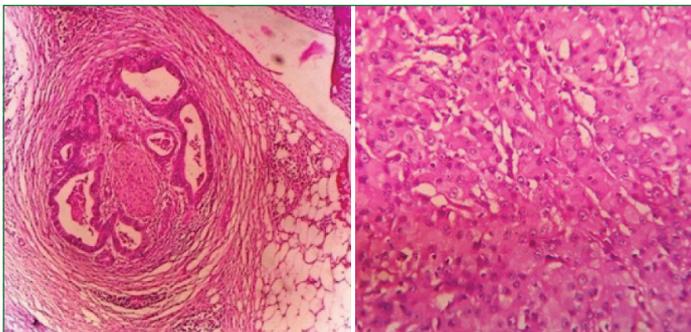
On histopathological examination four cases were found with adenocarcinoma of gall bladder [Table/Fig-8-11]. Preoperatively ultrasonography diagnosed two cases correctly as carcinoma of gall bladder but could not diagnose remaining two cases.

Preoperatively ultrasonography successfully detected 112 cases of chronic cholecystitis [Table/Fig-12-16]; but further subtyping like Xanthogranulomatous, Follicular and Eosinophilic cholecystitis was possible on histopathological examination only.



[Table/Fig-8]: Gross photograph of gall bladder specimen shows diffuse marked thickening of gall bladder wall. The histopathological diagnosis in this case was gall bladder adenocarcinoma.

[Table/Fig-9]: Gross photograph of gall bladder specimen shows growth at neck of gall bladder wall. the histopathological diagnosis in this case was gall bladder adenocarcinoma. (Images from left to right)



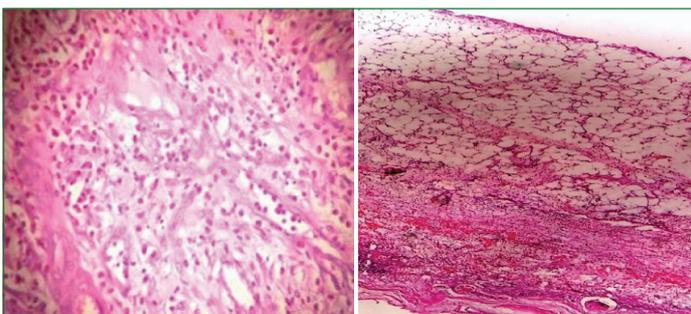
[Table/Fig-10]: Histology of gall bladder wall showing perineural invasion. (10X H&E).

[Table/Fig-11]: Histology of gall bladder wall is showing high grade adenocarcinoma. (H&E, 10X). (Images from left to right)



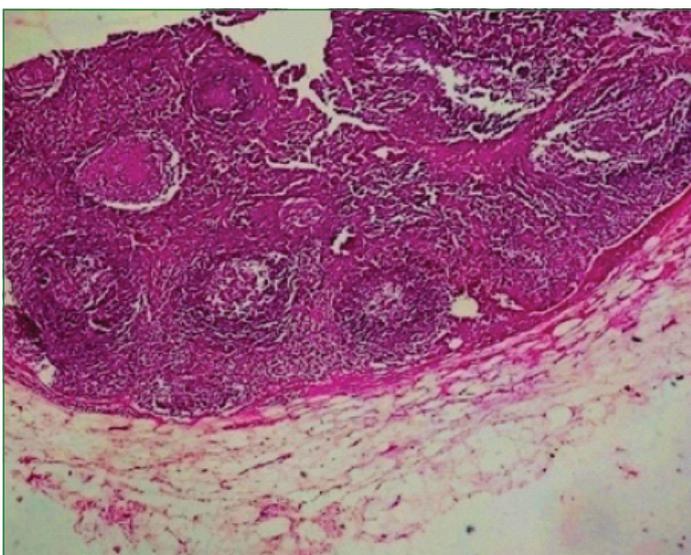
[Table/Fig-12]: Photomicrograph of wall of gall bladder in chronic cholecystitis showing Rokitansky Aschoff sinuses (H&E, 10X).

[Table/Fig-13]: Photographs showing specimen of gall bladder with gangrenous cholecystitis case, showing severely congested serosa. (Images from left to right)



[Table/Fig-14]: Photomicrograph of wall of gall bladder in chronic eosinophilic cholecystitis showing transmurular inflammatory infiltrate predominate in eosinophils. (H&E, 10X).

[Table/Fig-15]: Photomicrograph of wall of gall bladder in chronic xanthogranulomatous cholecystitis with abundant foamy macrophages (H&E, 4X). (Images from left to right)



[Table/Fig-16]: Photomicrograph of wall of gall bladder in cholecystitis follicularis showing ulceration of mucosa and lymphoid follicle formation (H&E, 4X).

Preoperatively ultrasonography diagnosed 11 cases as acute cholecystitis. On histopathological examination 12 cases were diagnosed as acute cholecystitis and one case as Gangrenous cholecystitis. Ultrasonography could not diagnose one case of acute cholecystitis and a case of Gangrenous cholecystitis.

Outcome and Duration of Hospital Stay

Out of total 130 cases 127 cases improved during hospital stay, while death of two patients were due to carcinoma of gall bladder and cause of death in one more patients was due to periampullary adenocarcinoma.

Average days of hospital stay after laproscopic surgery was 5.4 days, while average days of hospital stay after laprotomy (open) surgery was 11.00 days.

Clinical symptoms of cholecystitis include abdominal pain (right upper abdominal pain), nausea, vomiting, and fever. The most typical symptom is right epigastric pain. Tenderness in the right upper abdomen, a palpable gall bladder, and Murphy's sign are the characteristic findings of cholecystitis. A positive Murphy's sign has a specificity for cholecystitis.

Symptoms of cholangitis must be differentiated from acute cholecystitis as surgical management is different in both cases. Clinical findings associated with acute cholangitis include abdominal pain, jaundice, fever (Charcot's triad) and rigor. Acute cholangitis could be complication of gall stones so; cholangitis may be associated with acute cholecystitis or may occur as a separate disease and forms very close and significantly important differential diagnosis of acute cholecystitis.

Differential diagnosis diseases which need to be differentiated from cholecystitis are cholangitis, gastric and duodenal ulcer, pancreatitis, hepatitis, and septicaemia of other origins. Diseases which should be differentiated from acute cholecystitis are gastric and duodenal ulcer, hepatitis, pancreatitis, gall bladder cancer, hepatic abscess, right lower lobar pneumonia, angina pectoris, myocardial infarction, and urinary infection [19].

Acute cholecystitis is characterised by the constant pain in right upper quadrant of abdomen and positive Murphy's sign, other causes of biliary colic will not give positive Murphy's sign. Patient with severe acute cholecystitis have mild jaundice (serum concentration of bilirubin <60 micromol/l (<3.5 mg/dL)) caused by inflammation and oedema around the biliary tract and direct pressure on the biliary tract by distended gall bladder. Serum concentration of bilirubin >60 micromol/l (>3.5 mg/dL) suggest diagnosis of choledocholithiasis (a gallstone in common bile duct) or Mirizzi's syndrome (obstruction by stone impacted in Hartmann's pouch that compresses the common hepatic duct) [14].

Blood tests in the diagnosis of acute cholangitis requires a white blood cell count; measurement of the C-reactive protein level; and liver function tests, including alkaline phosphatase, Gamma-Glutamyltranspeptidase (GGT), Aspartate Aminotransferase (AST), Alanine Aminotransferase (ALT), and bilirubin. Serum Amylase levels are increased in complications such as choledocholithiasis causing biliary pancreatitis but it is not a specific blood test for acute cholecystitis; however, the total leucocyte count and the measurement of C-reactive protein is very useful in confirming an inflammatory process. For critically ill patients parameters such as Bilirubin, blood urea nitrogen, creatinine and PT are very useful.

The sonographic findings may be recorded on three point scale with one point each for; gall bladder distention, gall bladder wall thickness >3.5 mm, presence of sludge [20].

Evidence on the diagnostic accuracy of Computed Tomography (CT) is scarce. While diagnostic accuracy of Magnetic Resonance Imaging (MRI) might be comparable to that of abdominal ultrasound, insufficient data are available to support it. Higher cost restricts use of CT and MRI to have confirmatory diagnosis for the cases of gall bladder malignancy. Hepatobiliary Iminodiacetic Acid scan (HIDA SCAN) has the highest sensitivity and specificity for acute cholecystitis, although its scarce availability, long time required to perform the test, and exposure to ionising radiation limit its use [21]. Here it is important to differentiate Gangrenous cholecystitis from other forms of inflammatory cholecystitis, because Murphy's sign

of right upper quadrant i.e. tenderness on palpation over the distended gall bladder may actually be absent in two-thirds of the patients of Gangrenous cholecystitis, due to the denervation of the gall bladder from necrosis of the wall. For effective management, prompt open cholecystectomy is often the treatment of choice, rather than laparoscopic cholecystectomy. There is an increased prevalence of gall bladder perforation in more than 10% of patients with Gangrenous cholecystitis with associated peritonitis, fistula and intra-peritoneal abscess formation. Therefore, it is important to have a high index of suspicion of gangrenous cholecystitis, especially in patients who are diabetic and/or have renal and cardiac impairment.

On ultrasonography, decrease in focal wall perfusion on colour doppler, irregularity of gall bladder mucosal outline, gall bladder wall thickening with signs of de-lamination, gas within the gall bladder, absence of calculi, and large peri-cholecystic collections suggests diagnosis of gangrenous cholecystitis [22,23].

On lab investigations high levels of ALT, AST, ALP, and Total Bilirubin are observed. Study done by Nguyen et al., and Fagan et al., determined that diabetes, total leucocytes count >15,000/cumm, ALT >50 u/L, AST >43 u/L, ALP >200 u/L, older age (>51 years), and detection of pericholecystic fluid via USG are independent risk factors predicting development of gangrenous cholecystitis, whereas study performed by Onder A, Kapan M, BurakVeliiUlgur et al., found delayed admission to the hospital and low total leucocytes count to be independent risk factors affecting mortality, low leucocyte count may be seen in late phase when cytokine storm will suppress bone marrow as in septicaemia. Conversion from laparoscopic surgery to open surgery for technical reasons were observed significantly more frequently in the cases in which mortality occurred [21].

The syndrome consisting of chronic biliary symptoms, stone-free sonograms, low ejection fraction in Cholecystokinin-Stimulated Scintigraphy (CCK-HIDA), and absence of other pain sources is highly predictive for chronic acalculous cholecystitis (also called biliary dyskinesia), which is well treated with laparoscopic cholecystectomy, with results similar to those for calculous disease [24].

In cases of liver impairment and cirrhosis, the composition of black or pure pigment gallstones is unique because of the large fraction of Unconjugated Bilirubin (UCB), which is present as calcium bilirubinate or in an undefined polymeric form. The fact that these insoluble products are formed suggests that the biliary concentrations of UCB and calcium are increased to a point that exceeds their solubility product, or that the concentrations of solubilizing factors normally present are substantially decreased.

While small quantities of UCB in bile are probably maintained in solution by the association of both bilirubin and calcium with bile salt micelles, large concentrations may result in the formation of insoluble calcium bilirubinate. Moreover, solubilization in cirrhotics may already be impaired since the total bile acid pool size is markedly diminished and bile acid secretion rates are reduced. Thus, several factors are present as a result of cirrhosis that might promote pigment precipitation or polymerization [25].

Symptomatic gall stones are generally treated by laparoscopic cholecystectomy. Stones in bile ducts are treated with endoscopic retrograde pancreatography, sphincterotomy, and extraction, or by open choledochotomy. Medical treatment with ursodeoxycholic acid may be useful which dissolves stones, but persistence of symptoms after surgery are common [15].

Bile acid therapy is other option but is suitable for only those patients who do not have severe recurrent symptoms [26]. Recurrence of stones are common after treatment, those patients may then require further treatment [27,28]. The best bile acid therapy currently available is probably ursodeoxycholic acid (750 mg daily), which is well tolerated and as effective as

the alternatives, chenodeoxycholic acid or a combination of ursodeoxycholic and chenodeoxycholic acid. Larger stones do not respond to bile acid therapy. Other treatment modalities for larger stones are 'External shock wave lithotripsy' which has been used successfully in some highly specialised centers, but this treatment often leaves fragments that have to be cleared by subsequent bile acid therapy [15,29].

If before gall bladder surgeries, when there is a strong suspicion that common bile duct stones are present, or at the end of a cholecystectomy, if the surgeon detects stones in the common bile duct or when acute pancreatitis is caused by gallstones, urgent ERCP, along with antibiotics, may be used.

CONCLUSION

Clinical diagnosis of the gall bladder diseases should be supported by relevant laboratory and radiological findings. Correlation of clinical findings, with laboratory findings and radiological findings is necessary to make correct diagnosis of gall bladder diseases as well as to determine appropriate mode of treatment in different gall bladder diseases.

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