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## Original Research

### Assessment of complications of cholecystitis with CT scan

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#### ABSTRACT:

**Background:** Gallstones constitute a significant health problem in developed societies too. The present study assessed complications of cholecystitis with CT scan. **Materials & Methods:** The present study was conducted on 72 cases of cholecystitis of both genders. A careful examination was done in all patients. All patients underwent CT scan taken with Toshiba machine. All planes such as axial, coronal and sagittal were obtained and studied by experience radiologist. **Results:** Out of 72 patients, males were 42 and females were 30. Age group 20-30 years had 14, 30-40 years had 24, 40-50 years had 30 and 50-60 years had 5 cases. Common complications were gangrenous cholecystitis in 13, gallbladder perforation in 24, bilio-enteric fistula in 10, gallstone ileus in 20 and hemorrhagic cholecystitis in 5 cases. The difference was significant ( $p < 0.05$ ). **Conclusion:** Authors found CT scan useful in diagnosis of complications of cholecystitis.

**Key words:** cholecystitis, CT scan, gallbladder perforation

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#### INTRODUCTION

Gallstones constitute a significant health problem in developed societies too, affecting 10–15% of the adult population, meaning 20 to 25 million Americans have or will have gallstones. There are approximately 220,000 cases per year of cholecystitis requiring surgery in the United States.<sup>1</sup> Cholelithiasis has a wide range of prevalence between Europe, fluctuating from 5.9% in Italy to 21.9% in Norway, and is considered to be the primary cause of cholecystitis. Furthermore, cholecystitis is also one of the most frequent causes for hospitalization and abdominal surgery. Gallstones are much more common in the female population (61%) as compared to males (39%).<sup>2</sup>

Abdominal computed tomography (CT) scans are indicated after a negative or equivocal ultrasound, particularly for identification of other abdominal disorders or when complications from acute gallbladder disease are suspected. Gangrenous cholecystitis is a

severe complication of AC, occurring more frequent among the elderly and in diabetic patients. In general, the diagnosis is pathognomonic, with a focal defect of the gallbladder wall detected on CT in association with internal membranes.<sup>3</sup> Alternatively, gallbladder perforation is usually secondary to wall gangrene with the most common site occurring at the gallbladder fundus. Perforation may present with a pericholecystic abscess or phlegmon, or less frequently with direct perforation into the peritoneal cavity. Perforation can be detected in CT, or it may be suspected due to the presence of abscess or complex fluid.<sup>4</sup> The present study assessed complications of cholecystitis with CT scan.

#### MATERIALS & METHODS

The present study was conducted in the department of Radiodiagnosis. It comprised of 72 cases of cholecystitis of both genders. The study protocol was approved from institutional ethical committee. All patients were

informed regarding the study and written consent was obtained. General information such as name, age, gender etc. was recorded. A careful examination was done in all patients. All patients underwent CT scan taken with Toshiba

machine. All planes such as axial, coronal and saggittal were obtained and studied by experience radiologist. Results were subjected to statistical analysis. P value less than 0.05 was considered significant.

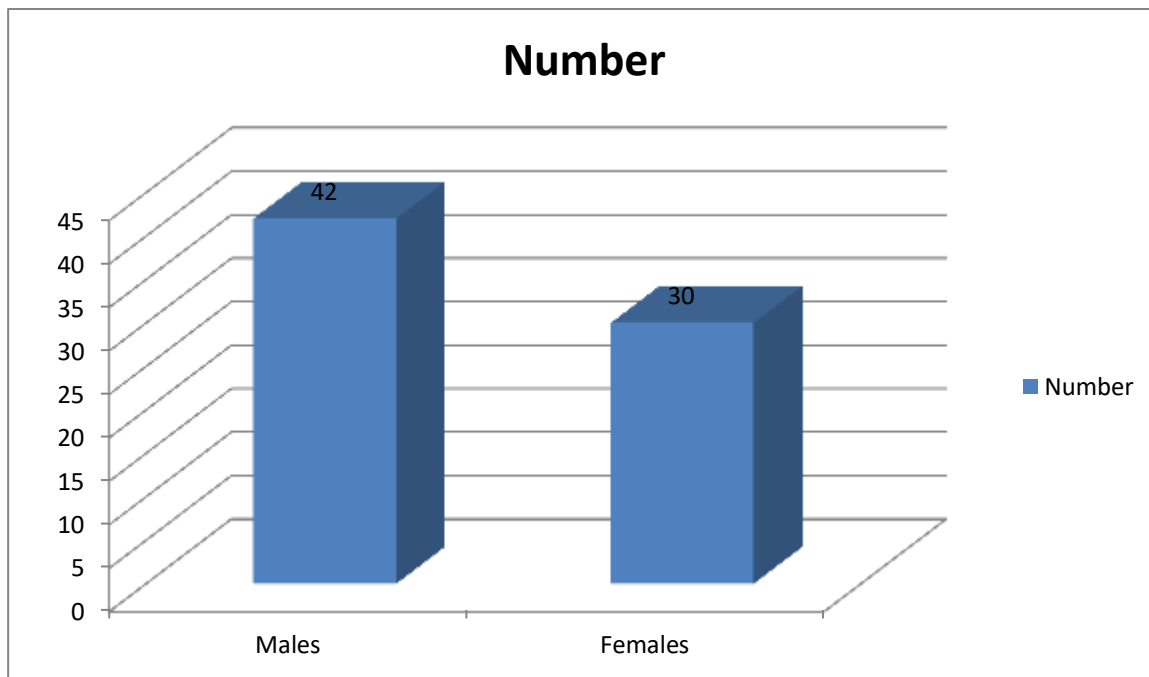
**RESULTS**

**Table I Distribution of patients**

Total- 72		
Gender	Male	Female
Number	42	30

Table I shows that out of 72 patients, males were 42 and females were 30.

**Graph I Distribution of patients**

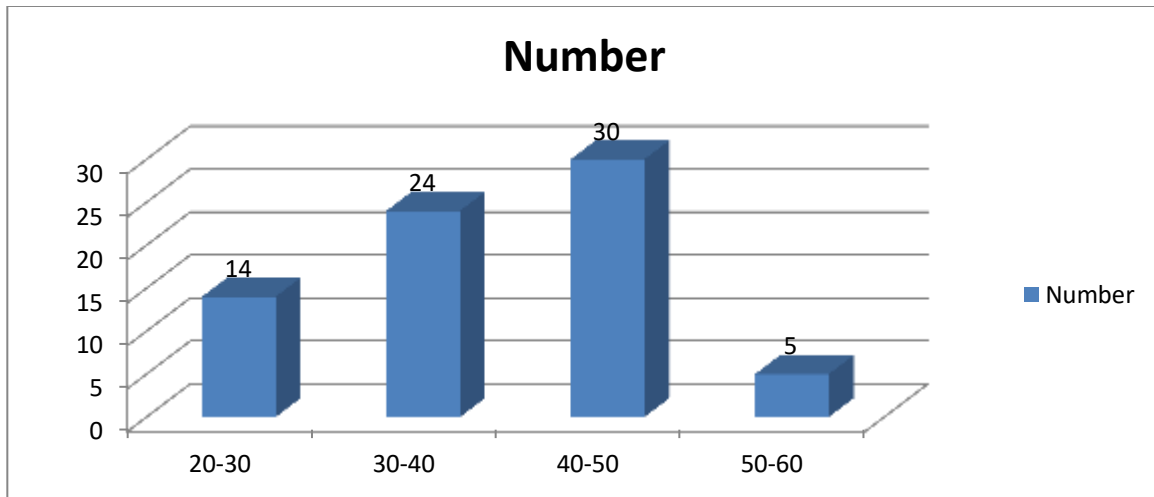


**Table II Age wise distribution of cases**

Age group (Years)	Number	P value
20-30	14	0.05
30-40	24	
40-50	30	
50-60	5	

Table II, graph II shows that age group 20-30 years had 14, 30-40 years had 24, 40-50 years had 30 and 50-60 years had 5 cases.

**Graph II Age wise distribution of cases**

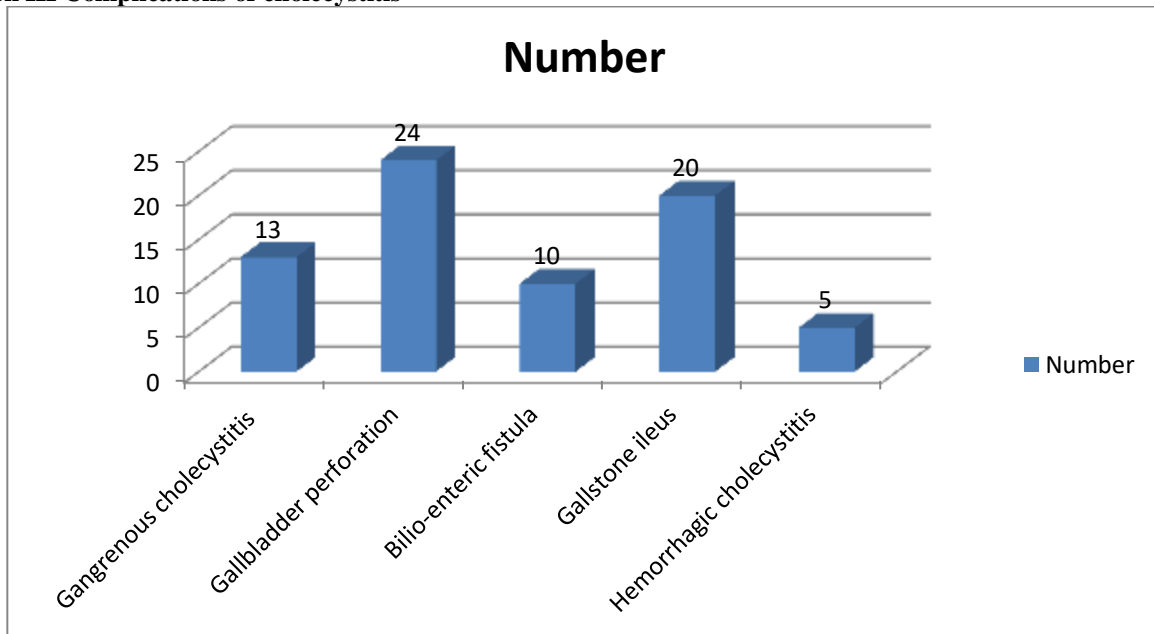


**Table III Complications of cholecystitis**

Complications	Number	P value
Gangrenous cholecystitis	13	0.01
Gallbladder perforation	24	
Bilio-enteric fistula	10	
Gallstone ileus	20	
Hemorrhagic cholecystitis	5	

Table III, graph III shows that common complications were gangrenous cholecystitis in 13, gallbladder perforation in 24, bilio-enteric fistula in 10, gallstone ileus in 20 and hemorrhagic cholecystitis in 5 cases. The difference was significant ( $p < 0.05$ ).

**Graph III Complications of cholecystitis**



## DISCUSSION

Acute cholecystitis is defined as an acute inflammation of the gallbladder, which is often, but not always, attributable to gallstones. Acute acalculous cholecystitis is defined as acute inflammation of the gallbladder in the absence of evidence of gallstones, or obstruction of the cystic duct.<sup>5</sup> Acute calculous cholecystitis is defined as acute inflammation of the gallbladder in the presence of gallstones. The process typically occurs when gallstones obstruct the cystic duct leading to increased pressure in the gallbladder.<sup>6</sup> There are two factors that determine the progression to acute calculous cholecystitis as degree of obstruction, i.e. partial or complete, degree of duration, i.e. short or long. If the obstruction is partial and of short duration, the patient experiences biliary colic. If the obstruction is complete and of long duration, the patient develops acute cholecystitis.<sup>7</sup> The present study assessed complications of cholecystitis with CT scan.

In present study, out of 72 patients, males were 42 and females were 30. Age group 20-30 years had 14, 30-40 years had 24, 40-50 years had 30 and 50-60 years had 5 cases. CT findings of AC include the presence of gallstones, gallbladder distension with diffuse wall thickening, increase in wall enhancement, and edema of pericholecystic fat. Studies show that among these findings the most common are: wall thickening (59%), pericholecystic fat edema (52%), gallbladder distension (41%), and pericholecystic fluid (31%). One of the main limitations to the CT evaluation of AC is the decreased sensitivity in comparison to US for detecting cholelithiasis. Mixed gallstones containing cholesterol and gallbladder pigments have similar attenuation values to the biliary salts present within the gallbladder lumen, therefore, limiting CT visualization.<sup>8</sup>

We found that common complications were gangrenous cholecystitis in 13, gallbladder perforation in 24, bilio-enteric fistula in 10, gallstone ileus in 20 and hemorrhagic cholecystitis in 5 cases. Gallbladder perforation is usually secondary to wall gangrene with the most common site occurring at the gallbladder fundus. Perforation may present with a pericholecystic abscess or phlegmon, or less frequently with direct perforation into the peritoneal cavity. Perforation can be detected in CT, or it may be suspected due to the presence of abscess or complex fluid.<sup>9</sup>

In CT, a gallstone (usually hyperdense) is seen at the site of small bowel obstruction with associated proximal dilatation and biliary tract gas (pneumobilia). The association of intestinal obstruction, pneumobilia, and a gallstone in an ectopic position is known as Rigler's triad.<sup>10</sup>

This is an infrequent complication of AC, secondary to the erosion of the gallbladder wall blood vessels with hemorrhage within the gallbladder lumen and resultant hemobilia. Fewer frequent causes of hemobilia include

gallbladder carcinoma, patients on anticoagulant therapy, or iatrogenic causes such as postliver biopsy or percutaneous transhepatic procedures. Noncontrast-enhanced CT findings include hyperdense material within the gallbladder consistent with hemorrhage or hematoma. A potential pitfall, could be vicarious excretion of intravenous contrast, yet in the latter there will be history of a recent contrast-enhanced CT performed.<sup>11</sup>

## CONCLUSION

Authors found CT scan useful in diagnosis of complications of cholecystitis.

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