

## Original Research

### Assessment of the imaging findings of Gangrenous Cholecystitis

Dr. Bijan Patnaik<sup>1</sup>, Dr. Sukanta Kumar Jena<sup>2</sup>, Dr. Prafulla Dash<sup>3</sup>, Dr. Dinesh Kumar Agrawalla<sup>4</sup>, Dr. Dhaneswari Jena<sup>5</sup>

<sup>1</sup>Associate Professor, Department of General Medicine, SCB Medical College, Cuttack, India;

<sup>2</sup>Associate professor, Department of Radiology, MKCG Medical College and Hospital, Brahmapur, Odisha, India;

<sup>3</sup>Associate professor, Department of Radiology, KIMS, Bhubaneswar, Odisha, India;

<sup>4</sup>Assistant professor, Department of Radiology, Bhimabhoi Medical College, Balangir, Odisha, India;

<sup>5</sup>Associate professor, Department of Community Medicine, MKCG Medical College and Hospital, Brahmapur, Odisha, India

#### ABSTRACT:

**Background:** The present study was conducted to assess the imaging findings of gangrenous cholecystitis cases. **Materials & Methods:** 64 histopathological confirmed cases of Gangrenous cholecystitis of both genders were included. All underwent Ultrasound performed with Toshiba XARIO-SSA-660A, Tokyo, Japan and Contrast-enhanced computed tomography. **Results:** Imaging findings were GB wall thickening (>3 mm) in 62, mural edema in 61, gallstones in 63, mucosal/wall irregularity in 57, pericholecystic stranding in 42, pericholecystic fluid in 38, mural striation in 34, intraluminal membranes in 28, GB wall hemorrhage in 14, GB perforation in 12 and Gas in 5 cases. The difference was significant (P< 0.05).

**Conclusion:** Both USG and CT scan is useful in assessment of cases of gangrenous cholecystitis, hence need to be performed together.

**Key words:** Gangrenous cholecystitis, CT, USG.

Received: September 26, 2020

Revised: October 28, 2020

Accepted: October 29, 2020

**Corresponding author:** Dr. Sukanta Kumar Jena, Associate professor, Department of Radiology, MKCG Medical College and Hospital, Brahmapur, Odisha, India

**This article may be cited as:** Patnaik B, Jena SK, Dash P, Agrawalla DK, Jena D. Assessment of the imaging findings of gangrenous cholecystitis. J Adv Med Dent Scie Res 2020;8(11):238-240.

#### INTRODUCTION

Gangrenous cholecystitis (GC) is a complicated advanced subtype of acute cholecystitis associated with high morbidity.<sup>1</sup> This most severe variant of cholecystitis is considered the terminal stage of gallbladder (GB) inflammation, beyond which perforation and sepsis is inevitable. Pathologically, gangrenous change in acute cholecystitis is characterized by transmural acute inflammation and intramural abscess formation resulting in full-thickness necrosis or ulceration of the GB wall secondary to obliteration of the cystic artery.<sup>2</sup>

Gangrenous cholecystitis (GC) has been described as a severe form of acute cholecystitis (AC). While GC is

reported to comprise 2%-40% of all AC, patients presenting with this pathology tend to be sicker and the associated cholecystectomy is usually more challenging.<sup>3</sup> Given the increased difficulty of cholecystectomy with GC, an open, or laparoscopic converted to open, cholecystectomy has historically been more common when compared to patients with simple acute cholecystitis.<sup>4</sup>

The radiological findings suggestive of gangrenous change in acute cholecystitis are varied: gas in the wall or lumen, intraluminal membranes, irregular wall, pericholecystic abscess, lack of mural enhancement, pericholecystic fluid, gallbladder distention, and wall thickening. There is significant overlap of these

imaging findings with other forms of complicated acute cholecystitis.<sup>5</sup> The present study was conducted to assess the imaging findings of Gangrenous cholecystitis cases.

**MATERIALS & METHODS**

The present study was conducted in the department of Radiodiagnosis, MKCG Medical College and Hospital, Brahmapur, Odisha, India. It comprised of 64 histopathological confirmed cases of Gangrenous cholecystitis of both genders. All were informed regarding the study and their consent was obtained.

Particulars of the patients such as name, age, gender etc. was recorded. All underwent Ultrasound performed with Toshiba XARIO-SSA-660A, Tokyo, Japan with abdominal use transducers and the frequency ranged from 1.0 to 7.0 MHz. Contrast-enhanced computed tomography protocol Computed tomography (CT) abdomen was performed using GE Discovery 750HD single-source dual-energy CT scanner. Findings of the study was recorded and tabulated. P value less than 0.05 was considered significant.

**RESULTS**

**Table I Distribution of patients**

Total- 64		
Gender	Males	Females
Number	40	24

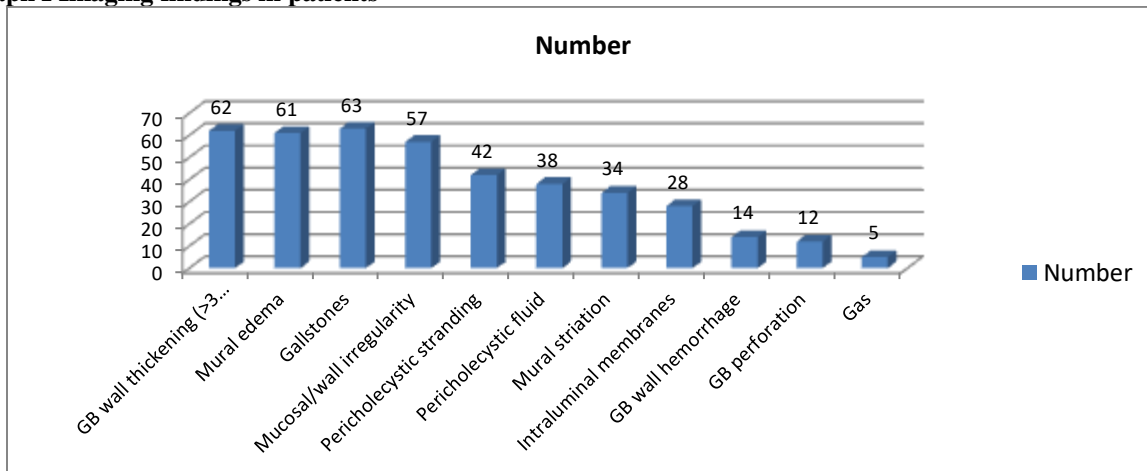
Table I shows that out of 64 patients, males were 40 and females were 24.

**Table II Imaging findings in patients**

Imaging findings	Number	P value
GB wall thickening (>3 mm)	62	0.04
Mural edema	61	
Gallstones	63	
Mucosal/wall irregularity	57	
Pericholecystic stranding	42	
Pericholecystic fluid	38	
Mural striation	34	
Intraluminal membranes	28	
GB wall hemorrhage	14	
GB perforation	12	
Gas	5	

Table II, graph I shows GB wall thickening (>3 mm) in 62, mural edema in 61, gallstones in 63, mucosal/wall irregularity in 57, pericholecystic stranding in 42, pericholecystic fluid in 38, mural striation in 34, intraluminal membranes in 28, GB wall hemorrhage in 14, GB perforation in 12 and Gas in 5 cases. The difference was significant (P< 0.05).

**Graph I Imaging findings in patients**



## DISCUSSION

Gangrenous cholecystitis (GC) is a severe and potentially deadly progression of acute cholecystitis that occurs in up to 30% of cases.<sup>6</sup> It is the end result of persistent and severe inflammation, where there is such significant distension of the gallbladder that the wall becomes ischemic.<sup>7</sup> Risk factors include male gender, age > 45 years, history of diabetes and heart disease. Although clinical signs of peritonitis are sometimes absent, these patients typically present with at least one or more of the following symptoms: right upper quadrant abdominal pain, loss of appetite, jaundice, and/or fever. These patients almost universally undergo emergent cholecystectomy to avoid fatal complications.<sup>8</sup> The present study was conducted to assess the imaging findings of Gangrenous cholecystitis cases. In present study, out of 64 patients, males were 40 and females were 32. Ganapathy et al<sup>9</sup> in their study a total of 141,970 cholecystectomies were identified with 7017 having a diagnosis of GC. Overall 30-d mortality for the entire cohort was 0.8% (n = 239) and overall 30-d complication rate was 8.0% (n = 2485). For GC patients, the 30-d mortality was 1.2% (n = 84) and overall complication rate was 10.8% (n = 761). The multivariate logistic regression model demonstrated a significant decrease in overall (odds ratio = 0.46; P < 0.001) complication rates for LC patients but did not reveal a significant difference in 30-d mortality (odds ratio = 0.59; P = 0.12).

We found that GB wall thickening (>3 mm) in 62, mural edema in 61, gallstones in 63, mucosal/wall irregularity in 57, pericholecystic stranding in 42, pericholecystic fluid in 38, mural striation in 34, intraluminal membranes in 28, GB wall hemorrhage in 14, GB perforation in 12 and Gas in 5 cases. Surekha et al<sup>10</sup> found that mean gallbladder wall thickening was 6 ± 1.93 mm. Gallstones, mural edema, mural striation, pericholecystic fluid, intraluminal membranes, gas were seen in 30, 27, 18, 20, 14 and 3 cases respectively. The mean short-axis distension of gallbladder lumen was 4.24 ± 0.91 cm. Gallbladder wall enhancement was studied in only 10 cases. Complete absence of enhancement was seen in 1, focal decreased enhancement in 8 cases. Mucosal/wall irregularity was seen in 28 cases. 74.2% cases had ≥4 cm gallbladder distension. Intraluminal membranes were present in 14 cases with mean short-axis distension of 4.6 cm and absent in 17 (P = 0.041), in 11 cases with mural striation (P = 0.036). Mean wall thickening was 6.69mm in patients with intraluminal membranes and 5.46 mm with absence of membranes (P = .078).

In the majority of patients worldwide, gallstones are the cause of acute cholecystitis. More than 80% of people with gallstones are asymptomatic. Acute cholecystitis develops only in 1–3% of patients with symptomatic gallstones. Acute cholecystitis is an emergency

condition and the patient should be referred to the hospital immediately. Around 20% of the patients with acute cholecystitis would require emergency surgery due to risk of developing GC or perforation.<sup>11</sup>

Different scoring systems have been devised to predict GC using various clinical parameters, but still it is very difficult for the surgeons to accurately diagnose this entity preoperatively. Thus, the responsibility of the radiologists increased two-fold, not only to diagnose acute cholecystitis but also to alert the surgeon if there are associated complications and the difficulties that can be encountered during surgery.<sup>12</sup>

## CONCLUSION

Authors found that both USG and CT scan is useful in assessment of cases of Gangrenous cholecystitis, hence need to be performed together.

## REFERENCES

1. Bennett GL, Rusinek H, Lisi V, Israel GM, Krinsky GA, Slywotzky CM, et al. CT findings in acute gangrenous cholecystitis. *AJR Am J Roentgenol* 2002;178:275-81.
2. Revel L, Lubrano J, Badet N, Manzoni P, Degano SV, Delabrousse E. Preoperative diagnosis of gangrenous acute cholecystitis: Usefulness of CEUS. *Abdom Imaging* 2014;39:1175-81.
3. IndarAA, Beckingham IJ. Acute cholecystitis. *BMJ* 2002;325:639-43.
4. KimuraY, Takada T, KawaradaY, NimuraY, Hirata K, Sekimoto M, et al. Definitions, pathophysiology, and epidemiology of acute cholangitis and cholecystitis: Tokyo Guidelines. *J Hepatobiliary Pancreat Surg* 2007;14:15-26.
5. Girgin S, Gedik E, Taçyıldız IH, Akgün Y, Baç B, Uysal E. Factors affecting morbidity and mortality in gangrenous cholecystitis. *Acta Chir Belg* 2006;106:545-9.
6. Mentzer RM Jr, Golden GT, Chandler JG, Horsley JS 3rd. A comparative appraisal of emphysematous cholecystitis. *Am J Surg* 1975;129:10-5.
7. Fry DE, Cox RA, Harbrecht PJ. Gangrene of the gallbladder: A complication of acute cholecystitis. *South Med J* 1981;74:666-8.
8. Nikfarjam M, Niumsawatt V, Sethu A, Fink MA, Muralidharan V, Starkey G, et al. Outcomes of contemporary management of gangrenous and non-gangrenous acute cholecystitis. *HPB (Oxford)* 2011;13:551-8.
9. Ganapathi AM, Speicher PJ, Englum BR, Perez A, Tyler DS, Zani S. Gangrenous cholecystitis: a contemporary review. *Journal of Surgical Research*. 2015 Jul 1;197(1):18-24.
10. Sureka B, Rastogi A, Mukund A, Thapar S, Bhadoria AS, Chattopadhyay TK. Gangrenous cholecystitis: Analysis of imaging findings in histopathologically confirmed cases. *Indian J Radiol Imaging* 2018;28:49-54.
11. Ansaloni L, Pisano M, Coccolini F, Peitzmann AB, Fingerhut A, Catena F, et al. 2016 WSES guidelines on acute calculous cholecystitis. *World J Emerg Surg* 2016;11:25.
12. Kiewiet JJ, Leeuwenburgh MM, Bipat S, Bossuyt PM, Stoker J, Boermeester MA. A systematic review and meta-analysis of diagnostic performance of imaging in acute cholecystitis. *Radiology* 2012;264:708-20.