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## Case Report

# Diagnostic utility of ultrasonography and computerized tomography in gall bladder perforation: A case report <sup>☆,☆☆</sup>

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## ABSTRACT

Gall bladder (GB) perforation can be misdiagnosed as any other more common cause of acute abdomen. We present a case of a 72-year-old female who had presented to the emergency department with an acute abdomen. The clinical presentation and the biochemical markers had pointed towards acute pancreatitis. However, the ultrasonographic examination of the abdomen and the pelvis suggested GB perforation which was confirmed by the multislice computerized tomography scan. Following this the patient underwent open cholecystectomy and was successfully managed. The invaluable contributions from the radiological modalities led to the successful management of the patient.

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## Introduction

Acute abdomen is a very common clinical presentation in the emergency department (ED). Rare causes like gall bladder (GB) perforation can easily mislead an unsuspecting clinician into a more common diagnosis like acute pancreatitis, acute cholecystitis or gastritis. We present a case which was initially misdiagnosed as pancreatitis only later to be proven and managed

as GB perforation as shown by the different radiological imaging modalities.

## Case report

A 72-year-old female presented to the ED with the complaints of epigastric pain associated with multiple episodes of

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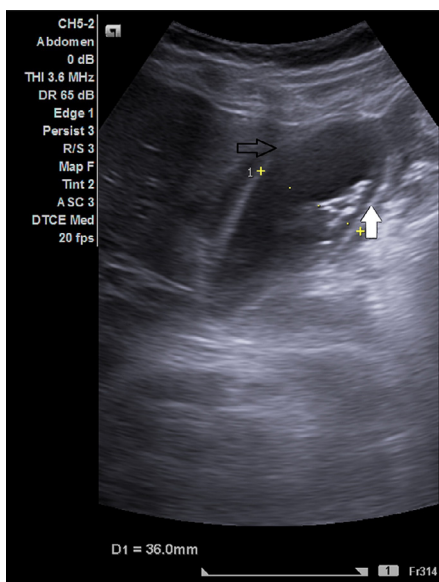
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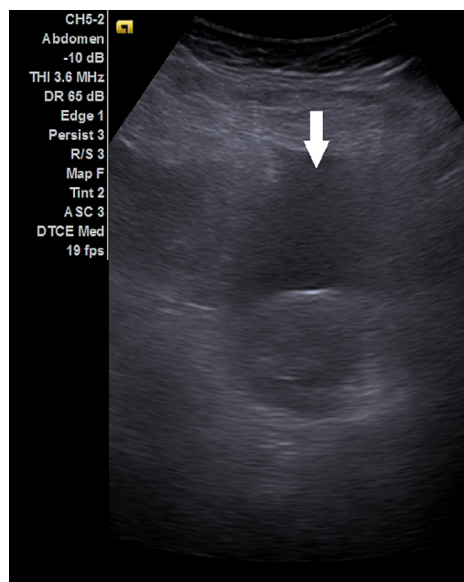
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**Fig. 1 – Longitudinal sonographic image of the GB showing suspicious wall defect (black arrow) and intraluminal sludge.**



**Fig. 2 – Transverse sonographic image showing peritoneal free fluid.**

**Table 1 – Peritoneal fluid and concomitant serum values.**

Investigation	Serum	Peritoneal fluid	Reference serum values
Total bilirubin	0.7 mg/dL	7.5 mg/dL	0.2–1.3 mg/dL
Direct bilirubin	0.28 mg/dL	5 mg/dL	<0.3 mg/dL
Amylase	214 IU/L	2840 IU/L	<95 IU/L
Lipase	1294 U/L	2289 U/L	<160 U/L

vomiting for 1 day. There was no associated fever. Her past medical history was significant for hypertension. She had also been diagnosed and was under therapy for pancreatitis. She did not have any other significant past medical or surgical history. On arrival at the ED, her vitals were all within normal ranges. Her physical examination was unremarkable except for mild tenderness over the epigastrium. Her laboratory investigations showed a total leukocyte count of 9900 per cc. Her serum amylase and lipase were also elevated to 214 IU/L and 1294 U/L respectively. A preliminary diagnosis of acute pancreatitis was made. An ultrasound of the abdomen and pelvis was obtained which demonstrated mildly distended gall bladder (3.6 cm antero-posterior diameter) with contour irregularities and suspicious wall defect in the body with significant amount of intraluminal sludge (Fig. 1). Free fluid was noted in the pelvis which was aspirated (Fig. 2). The fluid was dark green in color (Fig. 3). It was sent for diagnostic evaluation (Table 1). A contrast enhanced multislice computerized tomography (MSCT) scan was done which showed a distended gall bladder with multiple defects along the wall of the body of gall bladder largest measuring 13 mm (Figs. 4–6). Faint densities were noted within and adjacent to the gall bladder suggestive of sludge/phlegmon with marked adjacent fat stranding. Free fluid was noted in the abdomen and pelvis with features

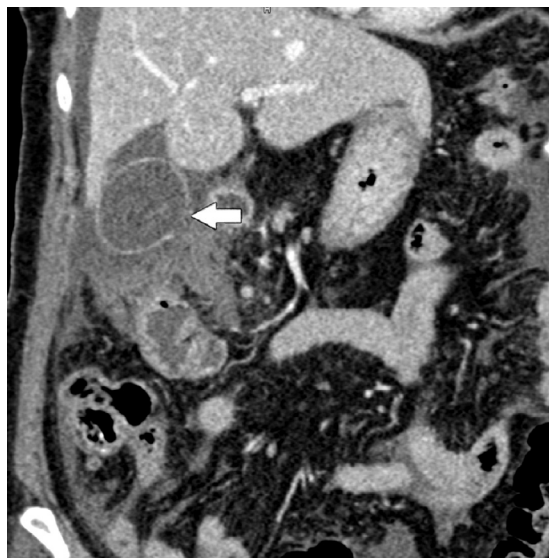


**Fig. 3 – Percutaneously aspirated intraperitoneal free fluid. Note the dark bilious color of the fluid.**

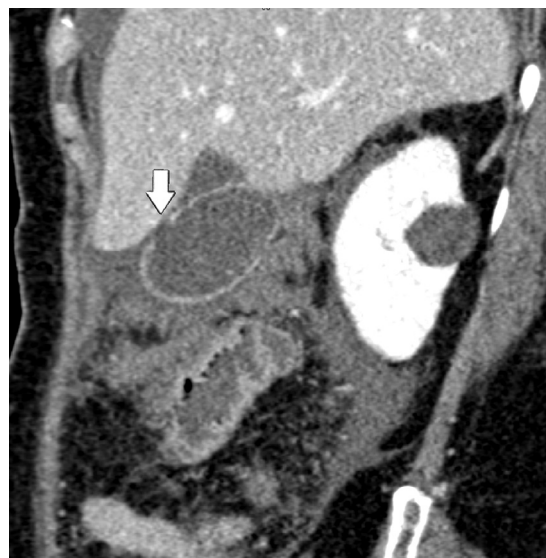
suggestive of peritonitis. A small right sided reactive pleural effusion with adjacent atelectasis of the lung base was also noted.

The patient's diagnosis was revised to GB perforation with peritonitis and surgical consultation was done. Urgent exploratory laparotomy was performed by the surgical team. The intraoperative findings were about 500 mL of blood mixed bilious free fluid in the peritoneal cavity and a thinned gangrenous gall bladder without any visible wall defects. Rest of the abdominal contents including the pancreas, were grossly normal. Cholecystectomy was performed. The histopathologic evaluation of the gall bladder reported it to be chronic cholecystitis with cholesterosis and acute suppurative serosal inflammation containing bile, most likely as a result of organized perforation.

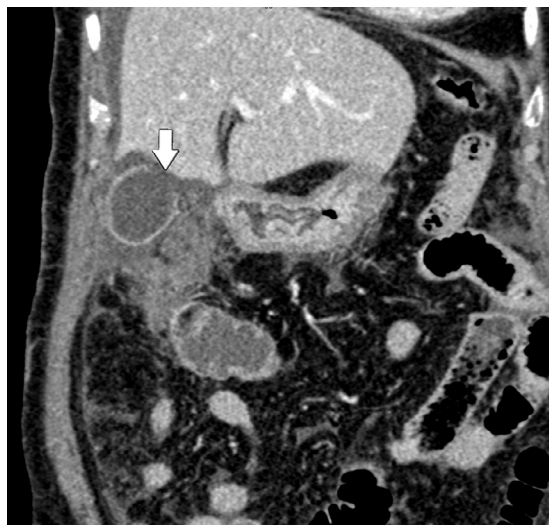
After surgery, the patient was shifted to the post operative ward. She had an uneventful post operative period. She was transferred to the ward on day three and discharged home on day seven.



**Fig. 4 – Coronal section of the contrast enhanced MSCT showing multiple GB wall defects.**



**Fig. 6 – Sagittal sectional image of contrast enhanced MSCT showing another GB wall defect.**



**Fig. 5 – Coronal section of the contrast enhanced MSCT showing multiple GB wall defects.**

## Discussion

Gall bladder perforation has been reported to be "a diagnostic dilemma" in the past. The development of various imaging modalities like ultrasound and MSCT scan have aided in the early diagnosis and management of this entity [1,2]. It still is an uncommon diagnosis, often leading to an initial misdiagnosis as some other common cause of acute abdomen [3,4]. In our case, the initial diagnosis had been acute pancreatitis due to the increase in the pancreatic enzymes in biochemical work up. Pancreatic hyper-enzymemias have been found in various other conditions. There are reports of concomitant

GB perforation with pancreatitis, however the pancreas was normal in USG, MSCT and even on direct inspection during the laparotomy [5]. In cases of gall bladder perforation, pancreatic hyper-enzymemia may be seen due to the presence of ectopic pancreatic tissue in the gall bladder wall which is not a rare site for ectopic pancreatic tissue [6]. The histopathologic examination also did not reveal any evidence of this. Hence the cause for increase in the serum and peritoneal fluid pancreatic enzymes still remain poorly understood in our case though it could be nonspecific [7].

The suspicion of gall bladder perforation in our case was made after the initial abdominal ultrasound. There was free fluid in the peritoneal cavity which was aspirated per cutaneously and confirmed by biochemistry to be bile. Also there was nonvisualization of wall defects in the gall bladder. The sensitivity of ultrasound to diagnose gall bladder perforation depends on the type of perforation and has been found to be around 35% [2]. An MSCT was thus obtained which has been reported to be 100% sensitive [8]. The presence of features of peritonitis and the gall bladder wall defect prompted to the urgent laparotomy and cholecystectomy. Although the GB wall was gangrenous and thinned, no visible perforation was seen on inspection. This finding was clarified by the histopathology which confirmed an organized perforation. The presence of free fluid but no visible defect in the gall bladder wall suggests that the perforation must have sealed off on its own due to the inflammatory response.

## Conclusion

The uncommon incidence of GB perforation often leads to an initial misdiagnosis. With the advent of ultrasonography and MSCT, early diagnosis and treatment has been possible leading to better outcomes than those reported in the past [2].

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**Supplementary materials**

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.radcr.2020.07.068](https://doi.org/10.1016/j.radcr.2020.07.068).

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