

Unanticipated Gangrenous Cholecystitis in a Healthy Young Adult: A Case Report Highlighting the Role of Advanced Imaging

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Abstract

Case Report

Background: Gangrenous cholecystitis (GC) is a severe form of acute cholecystitis, usually seen in patients with risk factors like advanced age or diabetes. This report highlights a rare case of GC in a young adult with no identifiable risk factors diagnosed by ultrasound and MRI. **Case Presentation:** A 22-year-old male with no significant medical history presented with a 20-day history of right hypochondrial pain and vomiting. Clinical examination revealed tenderness in the right upper quadrant with a positive Murphy's sign. Laboratory tests showed mildly elevated liver enzymes and inflammatory markers. Ultrasound and MRI indicated a distended, multi-lithiasic gallbladder with irregular thickened walls, presence of floating membranes in the vesicular lumen and discontinuous enhancement post-contrast administration. An urgent laparoscopic cholecystectomy confirmed severe inflammation and necrosis. Histopathology validated the diagnosis of gangrenous cholecystitis. **Discussion:** The imaging findings were consistent with known indicators of GC, including gallbladder wall thickening and intraluminal membranes. MRI provided critical diagnostic information. This case underscores the importance of considering GC even in young, healthy individuals. **Conclusion:** Advanced imaging techniques are crucial for the early diagnosis and management of gangrenous cholecystitis, significantly impacting patient outcomes through timely intervention.

Keywords: Gangrenous cholecystitis, MRI, young adult, case report.

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INTRODUCTION

Gangrenous cholecystitis (GC) is a severe form of acute cholecystitis characterized by transmural inflammation, necrosis, and potentially high morbidity. It typically occurs in patients with predisposing risk factors such as advanced age, diabetes, or cardiovascular disease. This case report describes a rare instance of GC in a young adult with no identifiable risk factors, highlighting the significance of advanced imaging techniques in early diagnosis and management [1-3].

CASE PRESENTATION

A 22-year-old male with no significant medical history presented to the emergency department with a 20-day history of progressively worsening right hypochondrial pain radiating to the right shoulder associated with multiple episodes of non-bilious vomiting. The patient denied any fever, jaundice, or changes in stool or urine color. He also reported a preserved appetite and no significant weight loss.

On physical examination, the patient appeared in mild distress due to pain but was afebrile and hemodynamically stable. There was marked tenderness in the right upper quadrant with a positive Murphy's sign. No palpable masses were noted, and there were no signs of peritoneal irritation. The remainder of the physical examination was unremarkable.

Laboratory investigations on admission showed a Gamma-glutamyl transferase (GGT) 80 U/L, Alkaline phosphatase (PAL) 135 U/L, White blood cell count (WBC) $5.97 \times 10^3/\mu\text{L}$, C-reactive protein (CRP) 100 mg/L, Bilirubin level was within normal limits.

An abdominal ultrasound revealed a distended gallbladder with multiple stones and thickened, layered walls showing focal vascularisation defect on colour Doppler. The gallbladder contained finely echogenic content and a floating membrane, indicative of

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intraluminal debris and possible sloughing of the mucosa (Figure 1).

MRI was ordered to investigate the biliary tree. It demonstrated a distended gallbladder with multiple large stones (macrolithiasis) and heterogeneous T1 and T2 signals within the lumen. There was irregular thickening of the gallbladder wall, measuring up to 6 mm, with a high signal on diffusion-weighted imaging and intense, discontinuous enhancement post-contrast administration. Additionally, there was significant

pericholecystic fat infiltration and evidence of an internal membrane detachment (Figure 2).

Given the imaging findings suggestive of gangrenous cholecystitis and the patient's persistent symptoms, an urgent laparoscopic cholecystectomy was performed. Intraoperative findings confirmed a severely inflamed and necrotic gallbladder with areas of gangrene and multiple large stones obstructing the cystic duct (figure 3). There was no evidence of perforation or abscess formation. Histopathological examination confirmed the diagnosis of gangrenous cholecystitis.

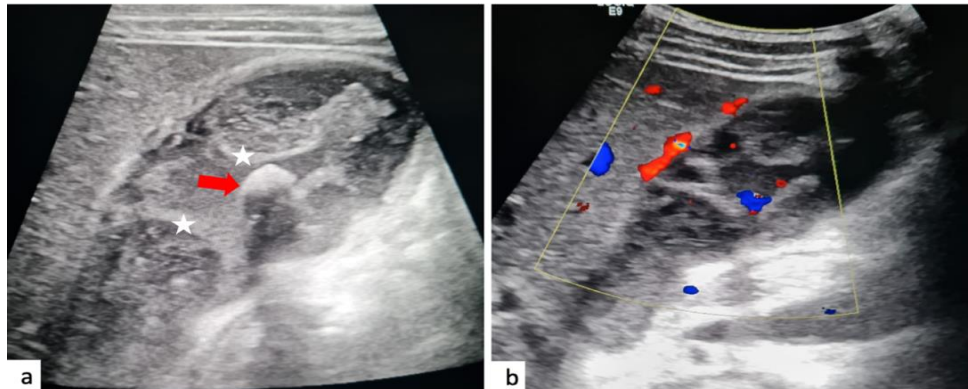


Figure 1 (a, b): abdominal ultrasound showing a distended gallbladder with stone (arrow), thickened, layered walls with focal vascularisation defect on colour Doppler. The gallbladder contained finely echogenic content and a floating membrane (star)

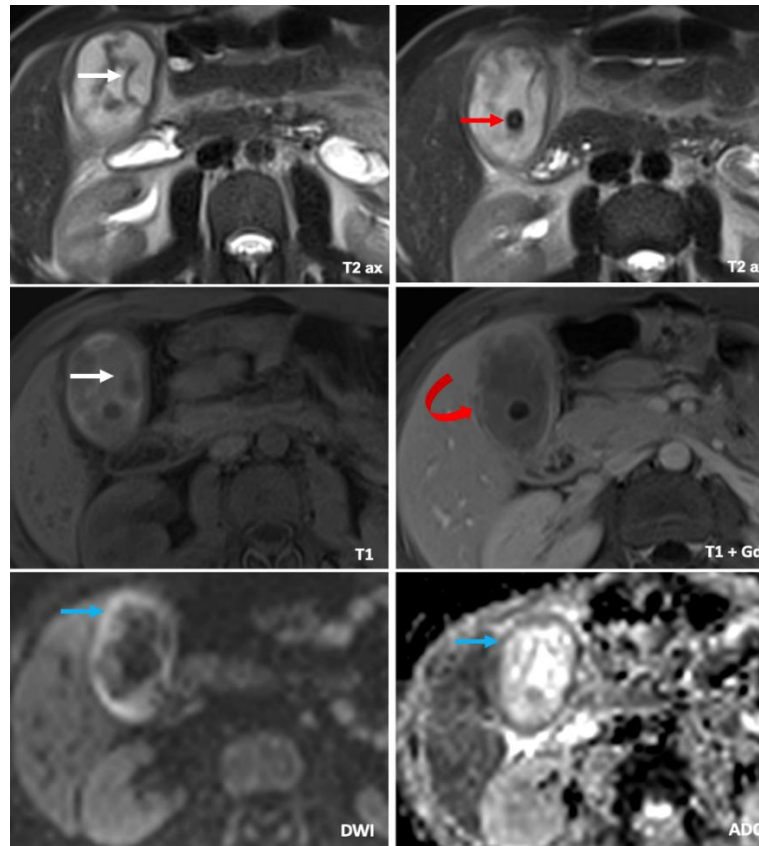


Figure 2: MRI, axial T2 and T1 sequence, axial T1 with contrast injection, axial DWI and ADC showing distended gallbladder with microlithiasis (red arrow) and heterogeneous T1 and T2 signals within the lumen. Irregular thickening of the gallbladder wall, with a restricted diffusion (blue arrow) and intense, discontinuous enhancement post-contrast administration (curved arrow). Additionally, there was evidence of an internal membrane detachment (white arrow)

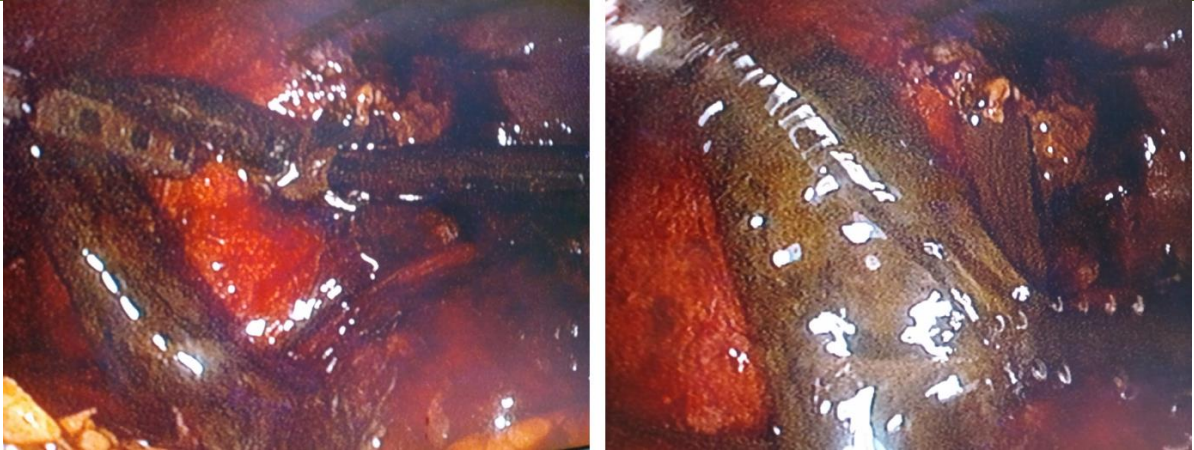


Figure 3: Intraoperative view showing a necrotic gallbladder

DISCUSSION

Gangrenous cholecystitis is an advanced stage of acute cholecystitis characterized by transmural inflammation and necrosis. This condition is often associated with high morbidity and requires urgent surgical intervention [1]. The absence of typical risk factors in this young patient underscores the need for heightened clinical suspicion and thorough diagnostic evaluation in similar presentations.

In this case, the imaging findings played a crucial role in diagnosing gangrenous cholecystitis. The presence of gallbladder wall thickening, distension, intraluminal membranes, and absent or decreased wall enhancement on MRI were consistent with the literature on GC [1]. These features, identified through imaging, have been documented as common in histopathologically confirmed cases of GC. The use of MRI with MRCP is particularly valuable in providing excellent tissue contrast and detailed visualization of the biliary tract, which is critical for accurate diagnosis and surgical planning [2, 3].

The high specificity of CT in identifying complications of acute cholecystitis is well established, though MRI offers superior soft-tissue contrast and detection of intramural abnormalities. This superiority was evident in our patient's case, where MRI provided detailed insights into the extent of gallbladder inflammation and necrosis, guiding the surgical team's approach [4, 5].

The presence of mural striation, patchy enhancement of the gallbladder mucosa representing areas of necrosis (interrupted rim sign), and intraluminal membranes are significant indicators of gangrenous cholecystitis. These indicators were clearly present in our patient, further supporting the diagnosis and highlighting the importance of advanced imaging in such cases [6]. The use of MRI allowed for a comprehensive assessment of the gallbladder's condition, which was crucial for the timely and effective surgical intervention [7].

The combination in patients with acute cholecystitis of distended gallbladder, intraluminal membranes, asymmetric gallbladder wall thickening due to intramural microabscesses, mural striation and absence or defect of parietal enhancement suggests a high probability of progression to gangrenous cholecystitis [1, 7].

In this young patient without traditional risk factors, the case underscores the importance of considering gangrenous cholecystitis in the differential diagnosis of acute cholecystitis. The timely identification and intervention facilitated by advanced imaging techniques significantly impacted the patient's outcome.

CONCLUSION

This case report illustrates the importance of advanced imaging techniques in the early diagnosis and management of gangrenous cholecystitis. The prompt identification and intervention in this young patient without typical risk factors underscore the need for vigilance and comprehensive diagnostic approaches in similar clinical scenarios. Early MRI can significantly impact patient outcomes by facilitating timely and accurate diagnosis, leading to appropriate surgical management.

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