

Acalculous Gangrenous Cholecystitis in a Young Patient: A Case Report

Faiyyaz ur Rehman^{1*}, Shahzore Gul², Kanwal Hanif², Dipa Yadav³, Imran Khan², Roshan⁴

ABSTRACT

We present a 20 years old male with no known comorbid in emergency complaining of pain localized to the right upper quadrant for two days, followed by fever (101F) with 15-16 episodes of vomiting, which were non-bilious and containing food particles. The patient was vitally stable on examination and had a mild jaundiced look; the abdomen was soft and tender over the right hypochondrium. Ultrasound of the abdomen showed a hypoechoic liver and thick-walled acalculous gall bladder along with pericholecystic fluid, suggesting acute cholecystitis. On further evaluation, the diagnosis of gangrenous cholecystitis was made, and an emergency exploratory laparotomy along with a cholecystectomy was performed.

KEYWORDS: Acalculous gall bladder, cholecystectomy, gangrenous cholecystitis, exploratory laparotomy.

INTRODUCTION

Gangrenous gallbladder (GB) is a rare but fatal complication of acute cholecystitis with a high mortality rate. It can result from excessive gallbladder enlargement, resulting in ischemia and subsequent necrosis. The incidence of gangrenous cholecystitis is much higher in acalculous cholecystitis than in calculous cholecystitis, probably owing to the insidious onset and delayed diagnosis of the former¹. Although the management of gangrenous cholecystitis is similar to that of acute cholecystitis, the incidence of postoperative complications, mortality (ranging from 17% to 29%) and morbidity increases in the presence of gangrenous gallbladder². In cases of complicated cholecystitis, gangrenous cholecystitis usually occurs in people with diabetes, patients with cardiovascular diseases, older adults, or immunocompromised persons. Males aged more than 45 are at a greater risk for developing gangrenous gallbladder than women of the same age³. The symptoms of gangrenous GB are similar to those of acute cholecystitis, which include fever, anorexia, right upper quadrant abdominal pain, and/or jaundice. The clinical signs of peritonitis may not appear; however, they are always present. In addition to an increased likelihood of conversion to open cholecystectomy, patients with gangrenous cholecystitis also have an

increased risk of mortality and gallbladder-related complications such as perforation and abscess⁴.

Case Presentation

A 20 years old male with average height and weight, without any known co-morbidity, presented to the emergency department with the complaint of pain localized right upper quadrant (RUQ) for two days followed by fever (101F) with 15-16 episodes of vomiting, which were non-bilious, and containing food particles. Additionally, patients denied smoking or alcohol consumption. The patient's drug and family history regarding genetic and infectious diseases were insignificant. The patient was vitally stable on examination and had a mild jaundiced look; the abdomen was soft and tender over the right hypochondrium. The patient's initial hematology report (**Table I**) revealed decreased hemoglobin and decreased hematocrit, with a slight increase in prothrombin time (PT), liver function tests (LFT) showed slightly increased total and direct bilirubin (**Table I**), considerably high c-reactive protein (CRP)-178.35 mg/dl. The patient's serum lipase and amylase values were normal.

Table I:
Patients initial biochemical & hematology reports

Lab tests	Patient lab value	Lab reference range
Hb (g/dl)	12.8	14-17.4
Hct (%)	34.7	42-58
TLCs (10 ⁹ /L)	8.6	5-10
Neutrophils (%)	78	50-75
Lymphocytes (%)	20	25-40
Platelets (10 ⁹ /L)	202	140-400
Urea (mg/dl)	49	10-50
Creatinine (mg/dl)	0.94	0.5-1.5

¹Department of Emergency Medicine, Pak-Oman Hospital, Pasni, Baluchistan, Pakistan

²Department of General Surgery, Jinnah Postgraduate Medical Centre, Karachi, Pakistan

³Department of Pediatrics Medicine, Norvic International Hospital, Kathmandu, Nepal

⁴People's Primary Healthcare Initiative, Sindh, Pakistan

Correspondence: fayyazyounus56@gmail.com

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PT (sec)	15.6	11.0
INR	1.42	<1.1
Serum amylase (U/L)	19	<60
Serum Lipase (U/L)	48	<90
Total bilirubin (mg/dl)	1.86	<1
Direct bilirubin (mg/dl)	0.79	0.0-0.25
ALT (U/L)	21	0-43
ALP(U/L)	54	30-120
G-GT (U/L)	29	0-37
Urinary amylase (U/L)	821	Up to 800
C-reactive protein (CRP) (mg/L)	178.35	0.5-1.0

*Hemoglobin-Hb, Hematocrit-Hct, Total Leukocyte Counts-TLCs, Prothrombin Time –PT, International Normalized Ratio- INR, Alanine transaminase-ALT, Alkaline phosphatase –ALP, Gamma-glutamyl Transferase-G-GT

The patient's X-ray chest (PA view) was unremarkable; an abdominal X-ray (upright/supine) showed a mildly dilated colon (**Figure I**), while an Ultrasound abdomen showed a hypoechoic liver and thick-walled acalculous gall bladder along with pericholecystic fluid suggesting acute cholecystitis. His Abdominal computed tomography (CT) scan with intravenous contrast showed thick-walled GB (0.6 cm) associated with pericholecystic fluid and significant fat stranded. Upon initial evaluation, the patient was admitted to the surgery ward and emergency exploratory laparotomy, plus the consultant general surgeon did a cholecystectomy. Perioperative findings of 100 cc of pericholecystic fluid, pussy fluid from the right hepatic space, a distended gangrenous gall bladder (**Figure II**) up to the neck, and a normal clot triangle were noted. Peritoneal fluid culture and sensitivity revealed numerous pus cells without bacterial growth, and the gallbladder biopsy specimen reported acute or chronic necrotizing cholecystitis. Postoperatively, the patient was managed in the intensive care unit (ICU) with intravenous ceftriaxone 1g twice a day and metronidazole 500 mcg three times a day, along with IV fluids, antiemetics, and painkiller injections. Later, on the second day in ICU, the patient developed high-grade fever (104F) with total leukocyte counts (TLC) of $13 \times 10^9/L$ and neutrophils count 88.7%, because of which ceftriaxone was switched with IV meropenem 500mg thrice a day. On the third postoperative day in the surgery ward, four packs of fresh frozen plasma (FFP) were transfused as the patient's platelet count was declining and the prothrombin time (PT) was worsening. The patient was managed in the ward per postoperative management protocol and discharged on the 8th day of hospital admission. Moreover, his

follow-up visits were uneventful. This case has been reported as per SCARE guidelines⁵.

Figure I: X-ray abdomen: A-Erect, B-Supine

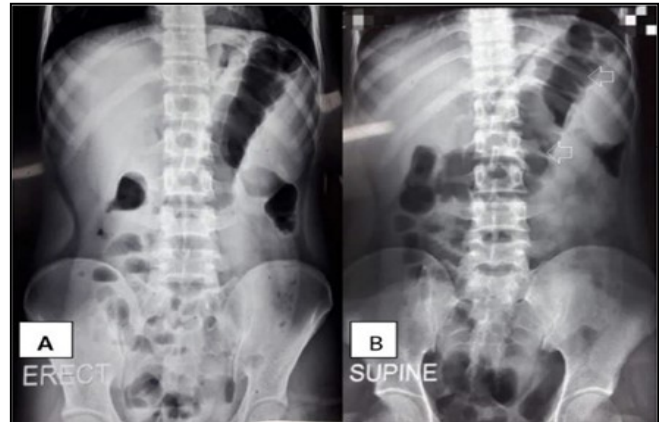


Figure II: Distended & gangrenous gallbladder



DISCUSSION

It's critical to understand the progression of gangrenous cholecystitis and its potentially fatal consequences. Although people often encounter acute cholecystitis, gangrenous cholecystitis without gallstones is extremely rare. Once gangrenous, a GB nearly always perforates, and the overall complication rate is almost 25%. A perforation may cause peritonitis and the development of an abscess. Medina et al. reported the rate of mortality as approximately 22%^{3,6}. Patients with gangrenous cholecystitis have a mortality rate that is comparable to that of patients with uncomplicated acute cholecystitis or chronic cholecystitis. Improvements in CT imaging accuracy and surgical planning will probably result in a further reduction in mortality. Patients with gangrenous cholecystitis can be treated earlier in the disease process, reducing the risk of fatal sepsis or severe sepsis with the utmost utilization of preoperative diagnostic tools and prompt surgical procedures⁴. The previous study conducted by Falor et al.⁷ found that male gender, a heart rate greater than 90 beats/min, a WBC higher than $14,000/mm^3$,

and sodium of 135 mg/dL or less are characteristics that should raise a clinician's concern for gangrenous pathology. Even though there are no well-defined preoperative ultrasonography indicators for GC, contrast-enhanced CT abdomen and ultrasound abdomen are much more specific and sensitive for GC but cannot completely rule out the gangrenous state of the gallbladder. Therefore, the confirmatory diagnosis of gangrenous GB can only be made through intraoperative/laparoscopic visualization and histopathology of GB⁶. The GC group also had higher white blood cell count levels, CRP, bilirubin, urea, and creatinine. Patients with GC are more likely to be older, male, have diabetes and appear on examination with fever, tachycardia, or abdominal stiffness⁸.

Another commonality in our case with previous gangrenous cholecystitis was elevated CRP levels. Several studies also showed that the serum CRP level was associated with acute cholecystitis and was found to be a predictive factor in the assessment of the severity of the disease. Mok et al. discovered that patients with gangrenous cholecystitis had considerably higher CRP values and that CRP levels greater than 200 mg/dL provided a 50% positive and 100% negative predictive value for gangrenous cholecystitis, with 100% sensitivity and 87.9% specificity⁹. Men are more likely than women to be diagnosed with gallbladder necrosis. Men are thought to have a higher pain tolerance and a propensity for delaying seeking medical care. Additionally, persistent, untreated subacute inflammation that affects the anatomy of the gallbladder over time may increase the risk of problems¹⁰.

CONCLUSION

Considering the patient's age, absence of any comorbid conditions, and highly elevated CRP levels, it can be assumed that the sequelae leading to our cases of gallbladder gangrene were acute. Early diagnosis and management are crucial to preventing life-threatening complications in such cases. We performed exploratory laparotomy with cholecystectomy due to limited resources in our emergency setup. Still, minimally invasive techniques like laparoscopic techniques in such cases are preferred, recommended, and gold standard if the setup is well equipped. This case report will help manage gangrenous cholecystitis in hospitals with limited resources. Additionally, more research is needed to establish the role of noninvasive techniques like CECT abdomen in diagnosing gangrenous cholecystitis.

Consent: Written informed consent was obtained from the patient regarding the publication of this case & associated images with complete anonymization of

identifiable details. A copy of the consent form is available for review by the editor-in-chief of this journal.

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Data Sharing Statement: The corresponding author can provide the data proving the findings of this study on request. Privacy or ethical restrictions bound us from sharing the data publicly.

AUTHOR CONTRIBUTION

Rehman FU: Contributed to the conceptualization, identified its relevance, data gathering, literature reviews, and writing of the first draft of the manuscript

Gul S: Contributed to the conceptualization, identified its relevance, data gathering, literature reviews, and writing of the first draft of the manuscript

Hanif K: Played a role in optimizing the grammatical and English language, extensive review of the first draft and substantial contributions in revising it critically for important intellectual content in the final manuscript

Yadav D: Played a role in optimizing the grammatical and English language, extensive review of the first draft and substantial contributions in revising it critically for important intellectual content in the final manuscript

Khan I: Played a role in optimizing the grammatical and English language, extensive review of the first draft and substantial contributions in revising it critically for important intellectual content in the final manuscript

Roshan: Played a role in optimizing the grammatical and English language, extensive review of the first draft and substantial contributions in revising it critically for important intellectual content in the final manuscript

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