

A Case of Emphysematous Cholecystitis Managed by Laparoscopic Surgery

George Bouras, MRCS, Sorinel Lunca, PhD, Michel Vix, MD, Jacques Marescaux, FRCS

ABSTRACT

Background: Emphysematous cholecystitis is a rare condition caused by ischemia of the gallbladder wall with secondary gas-producing bacterial proliferation. The pathophysiology and epidemiology of this condition differ from that in gallstone-related acute cholecystitis. This report illustrates a case of emphysematous cholecystitis successfully treated by laparoscopic surgery.

Methods: An 83-year-old female patient was admitted to the hospital with acute abdominal syndrome. Clinical examination and blood tests suggested acute cholecystitis. Plain radiography revealed a circular gas pattern in the right upper quadrant suggestive of emphysematous cholecystitis. Subsequent computed tomography confirmed the presence of gas in the gallbladder wall and a gas-fluid level within the organ.

Results: Emergency laparoscopic cholecystectomy was successfully performed during which bubbling of the gallbladder wall was observed. Intraoperative cholangiography revealed no bile duct stones or biliary obstruction. The patient made an unremarkable recovery from surgery with no postoperative complications or admission to the intensive care unit. Pathological analysis revealed full-thickness infarctive necrosis of the gallbladder. Bacterial cultures grew *Clostridium perfringens*.

Conclusions: This case illustrates a typical case of emphysematous cholecystitis successfully treated by laparoscopic surgery. It contributes to suggestions from other reports that this condition can be safely treated by the laparoscopic approach.

Key Words: Emphysematous cholecystitis, Laparoscopy, Management.

INTRODUCTION

Emphysematous cholecystitis is a rare condition first described by May and Strong in 1971.¹ Its pathophysiology is related to infarctive insult of the gallbladder wall leading to ischemic necrosis and mural bacterial translocation. The resulting gas-producing proliferation of anaerobic bacteria gives rise to the characteristic emphysematous changes. Emphysematous cholecystitis occurs more commonly in the absence of gallstones (acalculous cholecystitis) and in elderly men, thus giving this condition a different epidemiological profile than that of cholecystitis related to gallstones.² It is also more common in diabetic patients. Complications include perforation and sepsis, which are more common than in nonemphysematous cholecystitis.² Data on this condition, in particular related to laparoscopic intervention, are scarce. A literature search performed using the Medline database revealed 110 cases reported in the last 10 years worldwide, the majority of which were not treated by laparoscopy. This report illustrates a case of emphysematous cholecystitis successfully treated by laparoscopic surgery.

CASE REPORT

An 83-year-old female patient was admitted to the emergency department presenting with fever, vomiting, and diffuse abdominal pain starting in the right upper quadrant. Her past medical history included rheumatoid arthritis, atrial fibrillation, asthma, cerebrovascular disease, hysterectomy, and intestinal obstruction. The patient had no previous history of gallstones. Regular medication included oral steroids, methotrexate, clopidogrel, omeprazole, paracetamol, hormone replacement therapy, and a nonsteroidal anti-inflammatory drug. Clinical examination revealed tenderness and guarding in the right upper quadrant of the abdomen. Her temperature was 37.6°C. Blood tests revealed leukocytosis of $22.58 \times 10^9/L$, C-reactive protein of 306 mg/L, abnormal liver enzymes (ALT 137 U/L, AST 97 U/L, GGT 220 U/L) and a total blood bilirubin level of 30.5 mmol/L. Plain abdominal radiography revealed a circular gas pattern in the area of the gallbladder suggestive of emphysematous cholecystitis (**Figure 1**). Subsequent computed tomography (CT) confirmed the presence of gas in the gallbladder wall and a gas-fluid level

IRCAD, Louis Pasteur University, Strasbourg France (all authors).

Address reprint requests to: George Bouras, 8 Caernarvon Road, Norwich, NR2 3HX, England, UK. Telephone: 447733004502, E-mail: GeorgeBouras@hotmail.com

© 2005 by JSLS, Journal of the Society of Laparoendoscopic Surgeons. Published by the Society of Laparoendoscopic Surgeons, Inc.



Figure 1. X-ray showing gas in and around the gallbladder.

within the organ (**Figure 2**). An emergency laparoscopic cholecystectomy was performed. Initial laparoscopic inspection revealed extensive inflammation and necrosis of the gallbladder that was grossly distended. To facilitate the resection, the gallbladder was initially punctured by using a percutaneous needle to extract the intraluminal pus. Following dissection in Calot's triangle and exposure of the cystic duct, intraoperative cholangiography was performed that excluded biliary obstruction. Cholecystectomy followed, during which bubbling from the gallbladder wall was observed (**Figure 3**). Resection of the gallbladder was successfully completed with no complications or conversion to open surgery. Extensive laparoscopic abdominal lavage and drainage followed. The pa-



Figure 2. Computed tomographic scan showing intramural gas and gas-fluid level in the gallbladder.

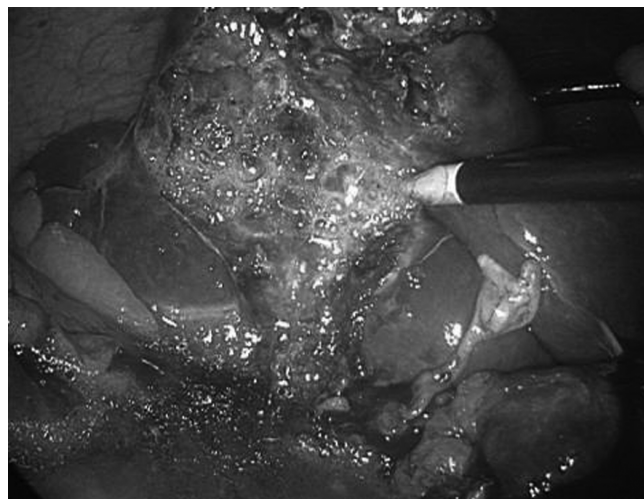


Figure 3. Laparoscopic image showing bubbling from the gallbladder wall.

tient was treated postoperatively with intravenous antibiotic therapy and made an unremarkable recovery from surgery. The patient was discharged on the 11th postoperative day. Pathological analysis of the resected gallbladder reported full-thickness infarctive necrosis of the whole organ and an abscess together with a single small calculus at the gallbladder neck. Microbiological analysis of the pus showed that *Clostridium perfringens* was the causative organism.

DISCUSSION

Emphysematous cholecystitis is a separate pathological entity to nonemphysematous cholecystitis. This is reflected both in the difference in epidemiology as well as pathophysiology. Emphysematous cholecystitis occurs as a result of a primary ischemic insult, the main predisposing factor being vascular pathology including vasculitis, atherosclerosis, and arterial embolic disease. There have also been reports of this condition developing following angiographic procedures.³ The patient in this case had multiple risk factors including rheumatoid vasculitis, atherosclerosis, and the potential for arterial emboli secondary to atrial fibrillation. The histology from the resected specimen confirmed infarction of the gallbladder although the exact cause is not clear. In addition, the immunosuppressive treatment may have contributed to the etiology and progression of the disease. Ischemic necrosis allows mural translocation of gas-forming bacteria and subsequent proliferation leading accumulation of gas in the wall and the lumen of the gallbladder. Causative organisms previously reported in the literature include *Clostridium*

welchii, *Clostridium perfringens*, *Escherichia coli*, Klebsiellas, and Streptococci. Clostridia are the most commonly reported culprits and indeed *Clostridium perfringens* was cultured in this patient. Emphysematous cholecystitis is a severe and advanced form of gallbladder disease causing a significant threat to the patient's life. Compared with nonemphysematous acute cholecystitis, patients may deteriorate rapidly due to the high propensity for early gangrene and perforation making systemic sepsis more likely. Postoperative complications are also more common and patients often require extended monitoring in the intensive care unit.³ Diagnostic imaging is the most reliable way to detect emphysematous cholecystitis. Various imaging modalities can be used including plain radiography, ultrasound and CT. Ultrasonography demonstrates a characteristic effervescent gallbladder. Plain radiography and CT may show gas in the lumen and wall of the gallbladder as well as a gas-fluid level. CT helps in the clarification of the pathological anatomy and exclusion of other diagnoses thus facilitating surgical decision making, in particular the decision to take a laparoscopic approach. Definitive treatment is cholecystectomy, which is traditionally performed by laparotomy. A further option, especially for patients in poor condition, is cholecystostomy as a temporary measure to control sepsis.⁴ This may also be facilitated by antibiotics and hyperbaric oxygen therapy. Advances in laparoscopic surgery have made it possible to perform emergency cholecystectomy through a minimally invasive approach while respecting the fundamental surgical principles used in open surgery. Previously recognized contraindications are now considered relative depending on the patient and the skill of the surgeon. However, due to the anatomical distortion caused by acute inflammation, high conversion rates have been reported in emergency laparoscopic surgery for em-

physematous cholecystitis.⁵ Despite a previous history of pelvic surgery and the possibility of intraabdominal adhesions, the laparoscopic approach was appropriate for this case as the patient had multiple comorbidities necessitating a definitive intervention with minimal surgical trauma. Conversion to open surgery was not necessary, and the patient made a good postoperative recovery, not requiring admission to the intensive care unit.

CONCLUSION

This report illustrates a typical case of emphysematous cholecystitis successfully treated by laparoscopic surgery. It contributes to suggestions from other reports that this condition can be safely treated by a laparoscopic approach.³

References:

1. Mary RE, Strong R. Acute emphysematous cholecystitis. *Br J Surg.* 1971;58:453–458.
2. Mentzer RM, Golden GT, Chandler JG, Horsley JS. A comparative appraisal of emphysematous cholecystitis. *Am J Surg.* 1975;129:10–15.
3. Hazey JW, Brody FJ, Rosenblatt SM, Brodsky J, Malm J, Ponsky JL. Laparoscopic management and clinical outcome of emphysematous cholecystitis. *Surg Endosc.* 2001;15:1217–1220.
4. Slot WB, Ooms HW, Van der Werf SD, Puylaert JB. Percutaneous gallbladder drainage in emphysematous cholecystitis. *Neth J Med.* 1995;46:86–89.
5. Eldar S, Sabo E, Nash E, Abrahamson J, Matter I. Laparoscopic cholecystectomy for the various types of gallbladder inflammation: a prospective trial. *Surg Laparosc Endosc.* 1998; (3):200–207.