

EMPHYSEMATOUS CALCULOUS CHOLECYSTITIS DIAGNOSED WITH ABDOMINAL CT IN A DIABETIC FEMALE PATIENT – CASE REPORT

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ABSTRACT

Emphysematous cholecystitis is reported to have a low incidence of less than 1% in all cases of acute cholecystitis and yet a high mortality rate of up to 15%. It is most commonly seen in male diabetic patients with advanced age. The diagnosis is established with the presence of gas in the gallbladder lumen and/or within its wall which can be seen on plain abdominal radiography, abdominal ultrasound, and abdominal computerized tomography. The clinical presentation refers to one of acute cholecystitis, but the treatment requires prompt cholecystectomy since the patient's condition can deteriorate due to the possibility of gallbladder perforation. We present a case of a 71-year-old female diabetic patient with calculous emphysematous cholecystitis treated with emergency open cholecystectomy.

Keywords: emphysematous cholecystitis, diagnosis, treatment, cholecystectomy

INTRODUCTION

Emphysematous cholecystitis (EC) refers to the presence of gas in the wall and/or lumen of an inflamed gall bladder. EC is a potentially fatal condition with incidence less than 1% in all cases of acute cholecystitis and its more often observed in men than in women, and it is highly associated with diabetes mellitus type 2 [1]. Its mortality rate is reported to be 15% [2]. We present a case of a diabetic female patient with gas presence in acutely inflamed partially gangrenous gall bladder treated with emergency open cholecystectomy.

CASE REPORT

A 71-year-old female patient was followed up in the emergency department due to abdominal pain in the right upper quadrant that is radiating to the back, with nausea and vomiting. She has begun to complain two days before the exam. The previous medical history of diabetes mellitus type 2, essential hypertension and coronary arterial disease were noted. The abdominal palpation revealed a positive Murphy's sign. The laboratory test results showed: elevated Leucocyte count of 20.40 (3.5-10.0 x

109 g/L), Neutrophil count of 18.20 (1.2-8.0 10⁹ g/L), Glycaemia 11.04 (3.9-5.8 mmol/L) and C-reactive protein value of 276.30 (0.0-5.0 mg/L). Contrast-enhanced abdominal computerized tomography scan (CT) was ordered, and it unveiled presence of small calculi in the gall bladder lumen (Fig. 1) and gas in the gall bladder lumen (Fig. 2). The post contrast series showed discontinuity of the gall bladder wall and pericholecystic fluid around the gallbladder fundus (Fig. 3). An emergency open cholecystectomy was indicated and performed. Intraoperatively a gangrenous gall bladder was found (Fig. 4). The bile content inside was sent to microbiology analysis. The patient was administered an empiric intravenous antibiotic therapy with Metronidazole (3 x 500 mg) and Ceftriaxone (2 x 1g). The postoperative period was uneventful. She was discharged on postoperative day 6. The microbiology analysis revealed presence of *Escherichia coli* in the bile.

DISCUSSION

EC is a potentially fatal variant of acute cholecystitis with reported high mortality rates. It is more common among patients with diabetes, renal failure, peripheral vascular disease, weakened immune system and patients undergoing chronic dialysis. The entity is encountered in about 1% of all cases of acute cholecystitis [2]. The very first published cases of EC were described by Stolz in 1901. The phenomenon was encountered during an autopsy and the condition was described as presence of gas in the lumen of gall bladder or biliary tree [3]. The reason behind the presence of air is bile infected with gas-producing bacteria (*Clostridium species*, *Fusobacterium nucleatum*, *Escherichia coli*, *Klebsiella species*, and *anaerobic streptococci*) [4, 5]. According to the reports, the ischemia of

the gall bladder is the main contributing factor for secondary infection occurrence with gas producing bacteria [6]. The gross pathology presents with gall bladder necrosis as seen in this case report. The clinical presentation doesn't vary much from acute cholecystitis. It includes signs and symptoms of right upper quadrant pain that radiates to the shoulder and tenderness with positive Murphy's sign, nausea, vomiting and fever. Exception is that in patients with EC the severity of signs and symptoms could be significantly enhanced [7]. The diagnosis of emphysematous cholecystitis is based on clinical features, laboratory tests and imaging modalities. Being the first method of choice, ultrasonography diagnostic accuracy is reported to be around 77%. Plain radiography on the other hand demonstrated precision in 50% of all cases of EC [8]. Only CT-scan showed an exactness of presence of gas in 100% of the cases, thus remaining the most sensitive and specific diagnostic method for EC. CT scan gives precise insight of gas location (intraluminal gas, gas within the GB wall, biliary ducts) and in case of GB perforation the pneumoperitoneum is diagnosed undoubtedly [8, 9]. Some of the complications associated with the EC include pneumoperitoneum, gas-forming liver abscess, and secondary biliary cirrhosis [10, 11]. The treatment of emphysematous cholecystitis usually involves early urgent surgical intervention (open or laparoscopic cholecystectomy). In patients with poor general condition, percutaneous cholecystostomy should be considered as the preferred treatment method [12]. Broad spectrum antibiotics should never be neglected [13].

The management of emphysematous cholecystitis can be challenging and requires a multidisciplinary approach involving surgeons and critical care physicians [14]. Early recognition and prompt treatment are key factors in improving the prognosis of EC and mortality rate reduction [15].

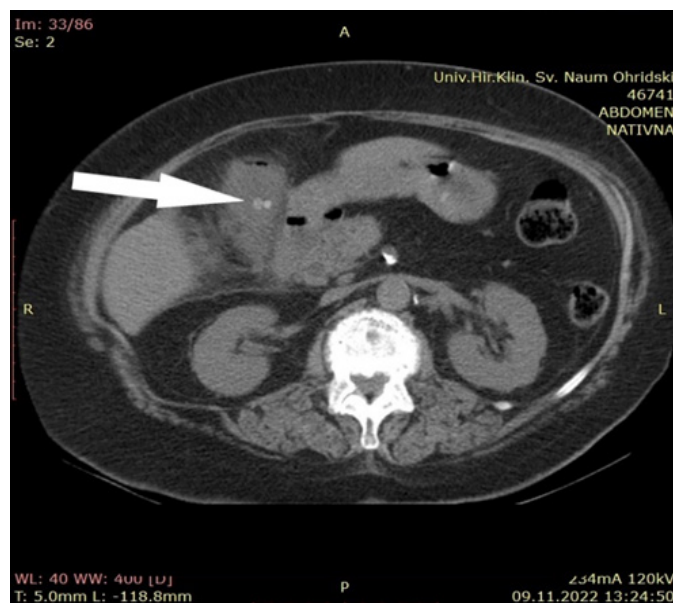


Figure 1. Axial scan of computerized abdominal tomography (native series) with calculi in gall bladder lumen (arrow)

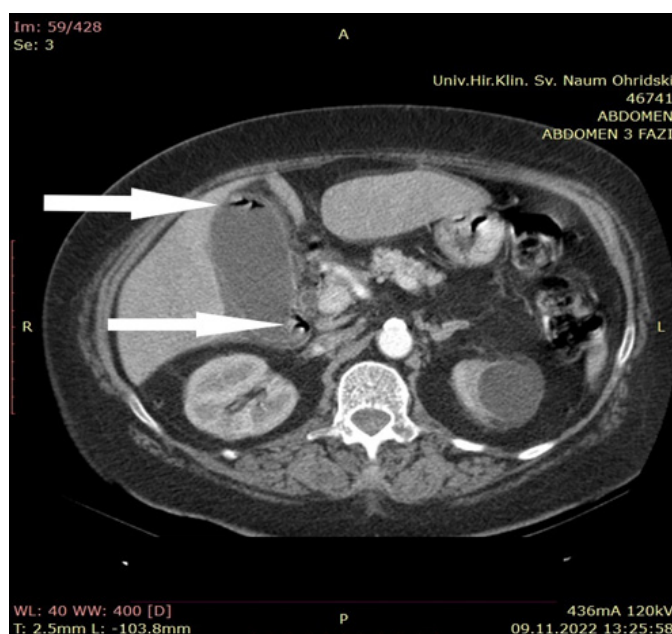


Figure 2. Axial scan of computerized abdominal tomography (contrast series) showing intraluminal gall bladder gas (arrows)

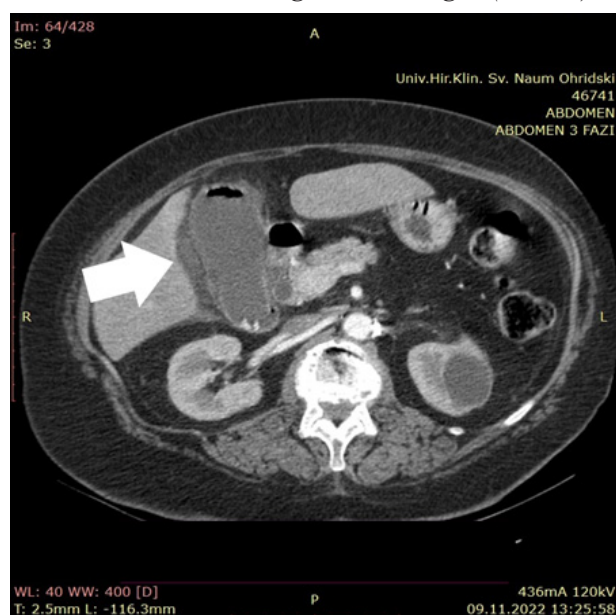


Figure 3. Axial scan of computerized abdominal tomography showing pericholecystic fluid (arrow)

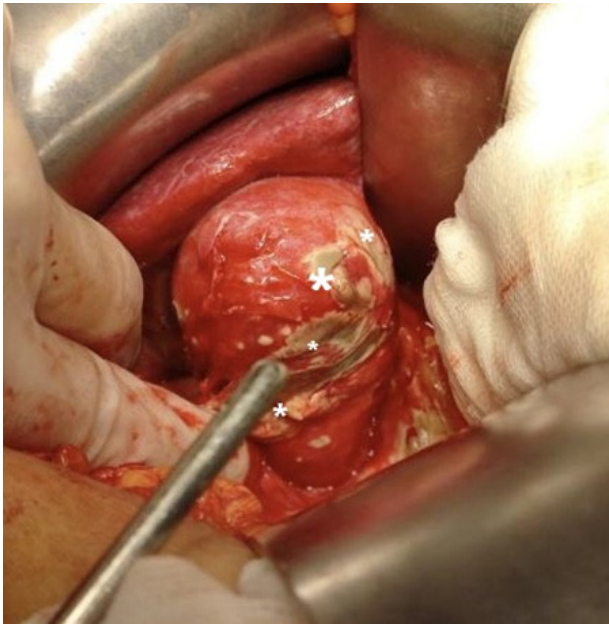


Figure 4. *Intra-operative finding of partial gangrene of the gallbladder (asterisks)*

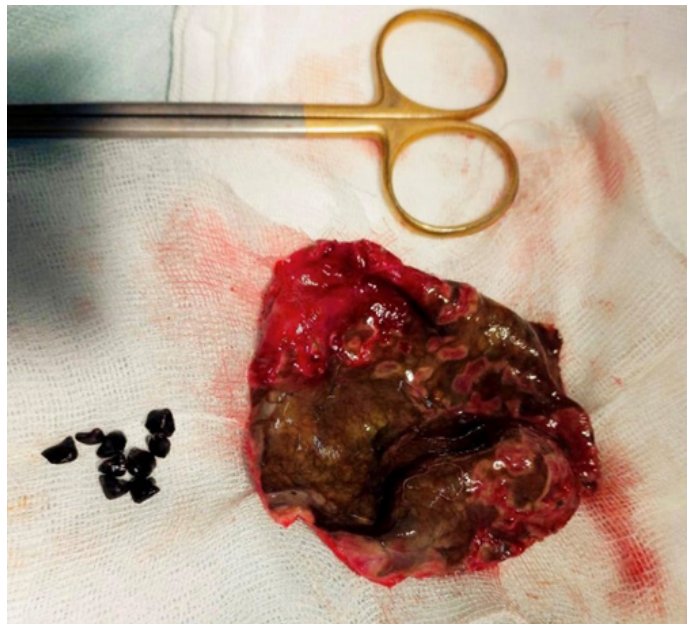


Figure 5. *Removed specimen with visual necrosis of gall bladder mucosa*

REFERENCES

1. Safwan M, Penny SM. Emphysematous Cholecystitis: A Deadly Twist to a Common Disease. *Journal of Diagnostic Medical Sonography*. 2016;32(3):131-137. doi:10.1177/8756479316631535.
2. Miyahara H, Shida D, Matsunaga H, Takahama Y, Miyamoto S. Emphysematous cholecystitis with massive gas in the abdominal cavity. *World J Gastroenterol*. 2013; 19:604–6.
3. Kowalski A, Kashyap S, Mathew G, et al. Clostridial Cholecystitis. [Updated 2022 Sep 12]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-
4. Stolz A. Ubergasbildung in derGollinwenger. *Arch Pathol Anat*. 1901; 165:90–123.
5. Kunadia A, Leong MB, Komanduri K, Abdelmasih R, Tarasiuk-Rusek A. Emphysematous Cholecystitis Secondary to *Fusobacterium nucleatum*. *Cureus*. 2021;13(6): e15660. Published 2021 Jun 15. doi:10.7759/cureus.15660.
6. Al Hammadi F, Buhumaid R. Point-of-care Ultrasound Diagnosis of Emphysematous Cholecystitis. *Clin Pract Cases Emerg Med*. 2020;4(1):107-108. Published 2020 Jan 23. doi:10.5811/cpcem.2019.11.45337.
7. Kowalski A, Kashyap S, Mathew G, et al. Clostridial Cholecystitis. [Updated 2022 Sep 12]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-
8. Sunnapwar A, Raut AA, Nagar AM, Katre R. Emphysematous cholecystitis: Imaging findings in nine patients. *Indian J Radiol Imaging*. 2011 Apr;21(2):142-6. doi: 10.4103/0971-3026.82300. PMID: 21799598; PMCID: PMC3137852.
9. Radswiki T, Alhusseiny K, Omar Carrim Y, et al. Emphysematous cholecystitis. Reference article, Radiopaedia.org (Accessed on 24 Mar 2023) <https://doi.org/10.53347/rID-15601>.
10. Al Hammadi F, Buhumaid R. Point-of-care Ultrasound Diagnosis of Emphysematous Cholecystitis. *Clin Pract Cases Emerg Med*. 2020;4(1):107-108. Published 2020 Jan 23. doi:10.5811/cpcem.2019.11.45337.
11. Gill KS, Chapman AH, Weston MJ. The changing face of emphysematous cholecystitis. *Br J Radiol* 1997; 70:986 –991.
12. Bari K, Aslanian HR, Pollak J, Reiner E, Salem RR, Taddei TH, Emre SH, Jamidar PA. Emphysematous Cholecystitis Resulting in Secondary Biliary Cirrhosis: A Rare Complication of Endoscopic Retrograde Cholangiopancreatography. *ACG Case Rep J*. 2013 Oct 8;1(1):51-4. doi: 10.14309/crj.2013.18. PMID: 26157820; PMCID: PMC4435262.
13. Kiriya S, Takada T, Strasberg SM, et al. TG13 guidelines for diagnosis and severity grading of acute cholecystitis (with videos). *J Hepatobiliary Pancreat Sci*. 2013;20(1):35-46. doi:10.1007/s00534-012-0561-8.
14. Moanna A, Bajaj R, del Rio C. Emphysematous cholecystitis due to *Salmonella* derby. *Lancet Infect Dis*. 2006; 6:118–20.
15. Garg SK, Kumar S, Jain M, et al. Emphysematous cholecystitis: is surgery mandatory. *J Gastrointest Surg*. 2008;12(8):1381-1385. doi:10.1007/s11605-008-0571-1.

Резиме**ЕМФИЗЕМАТОЗЕН ХОЛЕЦИСТИТИС ДИЈАГНОСТИЦИРАН
СО АБДИМНАЛНА КТ КАЈ ДИЈАБЕТИЧНА ПАЦИЕНТКА: ПРИКАЗ НА СЛУЧАЈ****Шќипе Мисими¹, Илир Алиу², Петар Каневче³, Андреј Николовски⁴**¹ Медицински факултет во Скопје, Универзитет „Св Кирил и Методиј“ во Скопје, РС Македонија² Општа болница Прилеп, РС Македонија³ Општа болница Охрид, РС Македонија⁴ Одделение за висцерална хирургија, Универзитетска хируршка клиника „Св. Наум Охридски“, Универзитет „Св. Кирил и Методиј“ во Скопје, РС Македонија

Емфизематозен холециститис се јавува во помалку од 1 % од сите случаи на акутен холециститис, но има висока стапка на морталитет до 15 %. Најчест е кај мажи дијабетичари во напредната возраст. Дијагнозата се поставува со присуство на гас во луменот и/или сидот на жолчното кесе, кои се видливи на нативна радиографија, абдоминален ултразвук или на абдоминална компјутеризирана томографија. Клинички се презентира како акутен холециститис, но бара итна холецистектомија од причина што општата состојба на пациентот може брзо да се влоши поради евентуално постоење на перфорација на жолчното кесе. Презентираме случај на 71-годишна пациентка – дијабетичар со емфизематозен холециститис третирана со итна отворена холецистектомија.

Клучни зборови: емфизематозен холециститис, дијагноза, третман, холецистектомија