

A Case Report of Extensive Emphysematous Pancreatitis Caused by Multiple Bacteria

Qingyun Zhu, Yunpeng Zhu, Yan Liu, Tianjiao Lin, Ainqin Li, Jianxin Zuo, Ang Li, Yue Ma, Yingying Zhao, Xinting Pan

The Affiliated Hospital of Qingdao University, Qingdao, Shandong 266000, China.

*Correspondence:

Dr. Xinting Pan, the Affiliated Hospital of Qingdao University, Qingdao, Shandong 266000, China. Tel: +8653282911665.

Received: 30 May 2026; Accepted: 01 Jul 2026; Published: 11 Jul 2026

Citation: Qingyun Zhu, Yunpeng Zhu, Yan Liu, et al. A Case Report of Extensive Emphysematous Pancreatitis Caused by Multiple Bacteria. J Med - Clin Res & Rev. 2026; 10(7): 1-3.

ABSTRACT

Extensive emphysematous pancreatitis is a very rare type of acute necrotizing pancreatitis, with less morbidity, higher mortality, and a rapid onset process. This report mainly describes the extensive emphysematous pancreatitis accompanied by severe condition, with a large amount of gas in the abdominal cavity in a short period of time, it may provide significance for clinical diagnosis and treatment.

Keywords

Emphysematous pancreatitis, Infection, Case report.

Introduction

Acute pancreatitis is a disease of the digestive system. According to the pathological classification, it can be divided into edematous pancreatitis and necrotic pancreatitis, while emphysematous pancreatitis is a kind of necrotic pancreatitis [1]. In clinical practice, for patients with suspected necrotizing infectious pancreatitis, an enhanced CT scan should be performed early for the purpose of early diagnosis. With regard to the aetiology, previous reports have indicated that emphysema-type pancreatitis gas is a significant causative factor in the development of *Escherichia coli* and *Klebsiella pneumoniae* [2].

In this case, the patient exhibited multiple bacterial infections. The disease progressed rapidly, as evidenced by the enhancement CT, which revealed pancreatic necrosis and a larger area of gas. We proceeded with a second round of percutaneous drainage treatment, concurrently administering anti-infection therapy. Following this treatment, the patient's condition improved.

Case Report

A 55-year-old man who had been experiencing abdominal pain for four days was admitted to the local hospital with epigastric pain, nausea, and vomiting, with no history of familial diseases

such as diabetes mellitus. The CT scan revealed peripancreatic edema (Figure 1a). The patient developed delirium and required intubation for assisted respiration. Subsequently, the patient was admitted to the EICU of our hospital for further treatment. Following admission, the patient's physical examination revealed amylase levels of 292U/L, lipase levels of 738U/L, C-reactive protein levels of 389.39mg/L, total bilirubin levels of 63umol/L, creatinine levels of 114.3umol/L and the intra-abdominal pressure is 35 cmH₂O (25.725 mmHg). The patient's condition deteriorated with concurrent renal failure, necessitating the administration of hepatoprotective measures and continuous renal replacement therapy (CRRT). The CT scan on day 5 of illness revealed multiple gas density shadows surrounding the pancreas, leading to emphysematous pancreatitis, measuring 153.54mm*38.97mm (Figure 1b). The percutaneous catheter drainage procedure was conducted on day 7 (Figure 1c), the puncture site expelled a significant quantity of gas accompanied by white pus. The NGS results of the abdominal pus revealed the presence of *Clostridium perfringens*, *Escherichia coli*, and *Klebsiella pneumoniae* (Figure 2). Similarly, the blood NGS results also indicated the presence of *Escherichia coli* and *Klebsiella pneumoniae*. Besides, the lung bacterial culture results revealed the presence of *Acinetobacter baumannii*, while the blood GM test for *Aspergillus* showed a positive result of 0.94, indicating a potential fungal infection that cannot be completely ruled out. After treatment, the patient exhibited decreased symptoms of abdominal distension and

improved respiratory function, leading to the removal of the endotracheal tube on day 9. On day 13, the enhanced CT scan revealed a blurred margin surrounding the pancreas and persistent presence of a significant amount of gas. To ensure complete drainage, we proceeded with repeat puncture and catheterization on day 15 (Figure 1d). The drainage fluid was subjected to a bacterial culture, which yielded positive results for *Klebsiella pneumoniae* and *Enterococcus faecium*. The patient was treated with a proton pump inhibitor to inhibit gastric acid secretion, ulinastatin to inhibit trypsin, and imipenem combined with vancomycin to fight infection according to the results of drug susceptibility test (Tables 1,2). After treatment, the patient's inflammatory indicators decreased and liver function returned to normal (Figure 3a, b). The patient has successfully recovered and been discharged from the hospital on day 33.

puncture cannulation was performed.

属 (Genus)				种 (Species)			
类型* (Type)	中文名 (Chinese Name)	拉丁名 (Latin Name)	序列数 (Sequence Number)	中文名 (Chinese Name)	拉丁名 (Latin Name)	序列数 (Sequence Number)	相对丰度 (%) (Relative Abundance)
G-	埃希氏菌属	<i>Escherichia</i>	21551	大肠埃希菌	<i>Escherichia coli</i>	19113	27.87
G-	克雷伯氏菌属	<i>Klebsiella</i>	171466	肺炎克雷伯菌	<i>Klebsiella pneumoniae</i>	18918	27.58
G+	梭状芽孢杆菌属	<i>Clostridium</i>	24980	产气荚膜梭菌	<i>Clostridium perfringens</i>	17327	25.26

Figure 2: Results of metagenomic sequencing of pathogenic micro-organisms in abdominal pus.

Table 1: Results of antimicrobial susceptibility test of *Klebsiella pneumoniae* in abdominal cavity.

<i>Klebsiella pneumoniae</i>			
Antibiotic names	MIC (μg/ml)	Results	Range of breakpoint
Ceftazidime	16	R	4-16
Tobramycin	8	I	4-16
Amikacin	<=2	S	16-64
Tigecycline	1	S	2-8
Cefotetan	64	R	16-64
Ceftazidime-avibactam		S	20-21
Aztreonam	>=64	R	4-16
Ciprofloxacin	>=4	R	0.25-1
Imipenem	1	S	1-4
Ceftriaxone	>=64	R	1-4
Sulfamethoxazole trimethoprim	>=16/304	R	2-4
Gentamycin	>=16	R	2-8
Levofloxacin	>=8	R	0.5-2
Meropenem		R	19-23
Piperacillin-tazobactam	64	R	8-32
Esbl	Pos	+	
Ertapenem	>=8	R	0.5-2
Cefepime	>=64	R	2-16
Ampicillin-salbactam	>=32	R	16-32
Modified carbapenem inactivation assay		-	
Cefperazone-sulbactam		R	15-21
Cefazolin	>=64	R	2-8
Polymyxin B	2	S	2-4

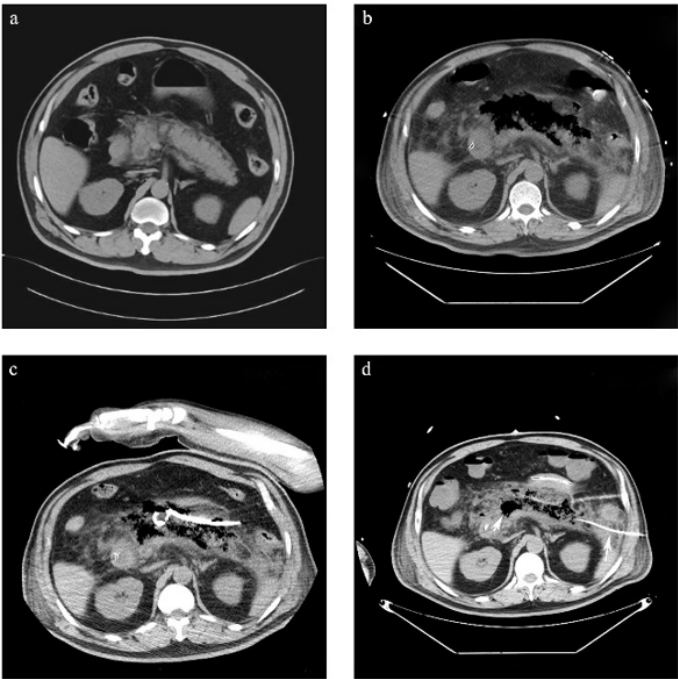


Figure 1: (a) CT showed pancreatic edema and inflammation. (b) The CT scan revealed a significant presence of gas surrounding the pancreas, measuring approximately 153.54mm*38.97mm. (c) The CT scan revealed that percutaneous catheterization was performed on the patient. (d) The CT scan revealed decreased peripancreatic gas, and a simultaneous second

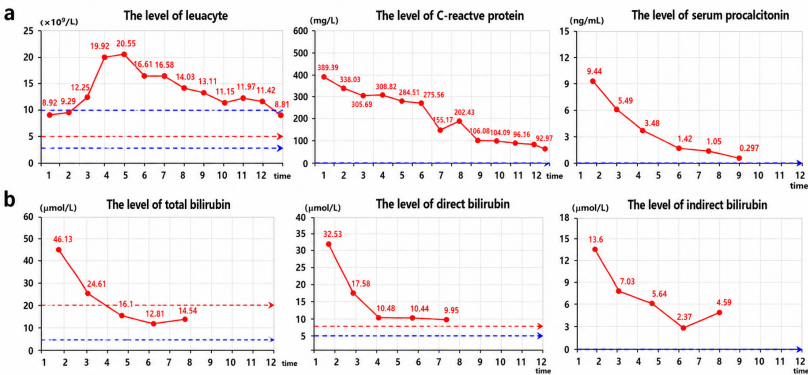


Figure 3: (a) The results of inflammatory markers in blood, including white blood cells, C-reactive protein, and procalcitonin. (b) The results of the level of liver function index, including total bilirubin, direct bilirubin, indirect bilirubin.

Table 2: Results of antibiotic susceptibility test of *Enterococcus faecium* in abdominal cavity.

Enterococcus Faecium			
Antibiotic names	MIC (µg/ml)	Results	Range of breakpoint
Penicillin G	>=64	R	8-16
Quinupristin/dalfopristin	0.5	S	1-4
Tigecycline	<=0.12	S	<=0.25
Erythromycin	>=8	R	0.5-8
Moxifloxacin	>=8	R	
Vancomycin	1	S	4-32
Ampicillin	>=32	R	8-16
High concentration of streptomycin	SYN-S	S	
Teicoplanin		S	10-14
High concentration of gentamicin	SYN-R	R	
Linezolid	2	S	2-8

Discussion

Emphysematous pancreatitis (EP), a subtype of necrotic pancreatitis, is characterized by the accumulation of gas around the pancreas and is associated with a high mortality rate [3]. EP can be divided into extensive EP (involving more than 50% of pancreatic/ peripancreatic necrotic tissue and connected into sheets) and common EP (involving less than 50%) according to the distribution of bubbles in the pancreas or peripancreatic [4]. The presence of pancreatic gas is primarily attributed to gas-producing organisms in the intestine [5]. At the same time, most of the gas production is due to the late treatment of pancreatitis combined with infection. In this case, the patient's condition progressed rapidly, with a large amount of gas accumulated in the abdominal cavity within a short time and increased intra-abdominal pressure, which may be related to a variety of bacterial infections. Previous studies have shown that most of the bacterial infections in the abdominal cavity of emphysema pancreatitis originate from the intestine, such as *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas*, etc [2].

In this case, there are many bacterial species and the disease progresses rapidly, the production of gas in the patient's abdominal cavity was caused by a bacterial consortium comprising *Escherichia coli*, *Klebsiella pneumoniae*, *Enterococcus faecium*, and *Clostridium perfringens*. The patient was concurrently afflicted with pulmonary infection, as well as experiencing liver and kidney failure, rendering the condition intricate and rapidly progressive.

In terms of diagnosis, an early CT examination is very important in the diagnosis of emphysematous pancreatitis, due to its high sensitivity and specificity, displaying the anatomical location and extent of gas accurately. In terms of treatment, some studies believe that EP progresses rapidly and requires active surgical intervention [4], while others believe that EP has a good prognosis and can heal itself [6]. The management of EP has shifted from early surgery

to more conservative measures, including advanced supportive care and early intervention, including percutaneous drainage and endoscopic treatment [7].

In the later follow-up, we found that the patient's blood glucose was high. Considering that the patient had no history of diabetes before admission, but his blood glucose increased after EP, we considered that pancreatic necrosis caused by EP may affect the endocrine function of the pancreas. Therefore, in the treatment of such patients, we should pay attention to the blood glucose of patients, which may be accompanied by diabetes in the later stage.

Conclusion

The patient in this case experienced significant distress due to the continued abdominal pain. Due to the rapid progression of the condition, the patient was admitted to the ICU for invasive treatment, including CRRT and percutaneous catheterization.

In conclusion, emphysematous pancreatitis is a rare and life-threatening pancreatic disease characterized by gas in the pancreatic parenchyma and peripancreatic space. CT scan is the primary imaging method for the diagnosis of emphysematous pancreatitis. Timely diagnosis, adequate drainage and effective anti-infection are extremely important for the treatment of this disease.

References

1. Bul Vadim, Yazici Cemal, Staudacher Jonas J, et al. Multiorgan Failure Predicts Mortality in Emphysematous Pancreatitis A Case Report and Systematic Analysis of the Literature. *Pancreas*. 2017; 46: 825-830.
2. Filipović Aleksandar, Mašulović Dragan, Bulatović Dušan, et al. Emphysematous Pancreatitis as a Life-Threatening Condition A Case Report and Review of the Literature. *Medicina Kaunas*. 2024; 60: 406.
3. Chou Chin-Yao, Su Yu-Jang, Yang Hsiu-Wu, et al. Risk factors for mortality in emphysematous pancreatitis. *J Drug Assess*. 2020; 9: 1-7.
4. Darawsha Basel, Mansour Subhi, Fahoum Tawfik, et al. Fulminant Emphysematous Pancreatitis Diagnosis Time Counts. *Gastroenterology Res*. 2024; 17: 32-36.
5. Hamada Seiko, Shime Nobuaki. Emphysematous pancreatitis. *Intensive Care Med*. 2016; 42: 1075.
6. Nadkarni Nikhil, D'Cruz Sanjay, Kaur Ravinder, et al. Successful outcome with conservative management of emphysematous pancreatitis. *Indian J Gastroenterol*. 2013; 32: 242-245.
7. Karakayali Feza Y. Surgical and interventional management of complications caused by acute pancreatitis. *World J Gastroenterol*. 2014; 20: 13412-13423.