2025 Volume 10, Issue 1
Advances in Precision Medicine
ISSN: 2424-9106 (Online)
ISSN: 2424-8592 (Print)

Diagnosis and Treatment of Appendicitis Combined with Delayed Egerter Blood Infection

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Abstract:

Objective: To summarize the effective diagnosis and treatment methods for appendicitis complicated with delayed Escherichia coli blood infection. *Methods:* A retrospective analysis of the medical course of one patient with appendicitis complicated with delayed E. coli blood infection was conducted. *Results:* The main clinical symptom of appendicitis complicated with delayed E. coli blood infection is high fever. Due to the long culture time of delayed E. coli, early empirical antimicrobial therapy is extremely important. Cefoperazone-sulbactam is one of the effective drugs for treating appendicitis complicated with delayed E. coli blood infection.

Keywords:

Slow Egerterella
Blood infection
Appendicitis

Online publication: March 13, 2025

1. Data analysis

The patient, male, 52 years old, visited the hospital emergency department at around 10:06 AM on October 30, 2022, due to "fever for one day." The patient developed a fever without any obvious cause about one day prior, with the highest temperature reaching 41℃. He experienced chills, shivering, headache, and dizziness, but had no nausea, vomiting, sore throat, coughing, sputum production, abdominal pain, diarrhea, frequent urination, urgency, or dysuria. After self-administering medication, his symptoms did not improve. The specific medications taken are unknown. Following an investigation by the fever clinic, he was admitted to the department's intensive care unit. After symptomatic treatment for fever reduction, he broke out in a heavy sweat. The hospital administered cefmetazole for infection control and fluid replacement. Currently, his blood pressure is lower than baseline. For further diagnosis and treatment, he was admitted to the department with "undetermined fever." Throughout the course of the illness, the patient has been

in good spirits, able to eat, and has normal bowel and bladder function. Past medical history includes over 10 years of hypertension, regularly taking Lopressor and Irbesartan for antihypertensive treatment, which has controlled his blood pressure. One year ago, he underwent coronary stenting after a myocardial infarction and now takes aspirin, clopidogrel, and rosuvastatin regularly. On admission, physical examination revealed: temperature 39℃, pulse rate 88 beats per minute, respiratory rate 20 breaths per minute, blood pressure 137/63 mmHg. He was wheeled into the ward, conscious and cooperative during the examination. His lips were not cyanotic, and there were no rashes, jaundice, or petechiae on the skin or mucous membranes. Physical examination of the heart and nervous system showed no abnormalities, and auscultation of the lungs revealed normal breath sounds coarse, wet rales heard at the right lung base. Abdomen soft, mild tenderness below the xiphoid process, no rebound tenderness or muscle rigidity, liver and spleen not palpable, shifting dullness (-), normal bowel sounds, no water-hammer sound, positive percussion pain in both renal areas. Ancillary tests: Complete blood count: White blood cells: 4.70 × 10^9/L; Neutrophil ratio: 77.20%; Red blood cells: 4.17 × 10^9/L; Hemoglobin: 131.00 g/L; Platelets: 120 × 10^9/L; Urine routine: Ketones 1+. Electrolytes and kidney function showed no significant abnormalities.

2. Medical treatment process

After admission to the emergency internal medicine department, active treatment was provided with intravenous administration of cefoperazone and tazobactam sodium for anti-infection, oral administration of ibuprofen suspension, and intramuscular injection of paracetamol for fever reduction and other symptomatic supportive treatments. On the day of admission, the patient developed a high fever with a peak temperature reaching 41℃. An enhanced abdominal CT scan indicated peri-appendiceal exudation. The general surgeon was consulted, and the initial diagnosis was appendicitis with exudation. Due to the presence of peri-appendiceal exudation, surgical resection was not suitable. It was recommended to complete relevant examinations to determine the cause of the fever, provide symptomatic supportive anti-inflammatory treatment, and closely monitor the patient's condition changes. Continued symptomatic supportive treatments such as anti-infection were provided. On the second day of admission, follow-up tests included routine blood tests, liver function, kidney function, electrolytes, C-reactive protein, procalcitonin, 11 respiratory virus tests, blood culture, coagulation profile, D-dimer, myocardial enzymes, infectious disease screening, peripheral blood morphology analysis, and bedside electrocardiogram. On the second day of admission, outpatient blood culture results showed: aerobic bottle initial report: Gram-negative bacilli; anaerobic bacteria initial report: Gram-positive bacilli. The current diagnosis is "fever of unknown origin, bacteremia, appendicitis with exudation, hypertension, coronary artery atherosclerotic heart disease, post-coronary stent surgery, hypokalemia, multiple cysts in both kidneys." Further relevant auxiliary examinations were actively completed, and the results of the enhanced abdominal CT scan are currently available. No specific infection site was indicated, but blood culture reported the presence of bacteria. The specific results will be reported later. Currently, the antibiotics used are cefoperazone and sulbactam, which can cover infections of abdominal organs. Although the patient has been feverish since admission, there has been no recurrence of chills, indicating effective anti-infection treatment. Treatment will continue as is for now, with close monitoring of the patient's abdominal condition. If necessary, follow-up abdominal CT scans or other relevant examinations may be required. On the third day of hospitalization, C-reactive protein: 119 mg/L, Procalcitonin: 2.330 ng/mL; Complete blood count: White blood cells: 4.70 × 10^9/L, Neutrophil ratio: 77.20%, Red blood cells: 4.17 × 10^9/L, Hemoglobin: 131.00 g/L, Platelets: 120 × 10^9/L; Urinalysis: Ketones 1+. No significant abnormalities were found in electrolytes or renal function. Based on the patient's medical history, physical examination, and auxiliary tests, the following considerations are made:

(1) Blood cultures indicate Gram positive bacilli and Gram negative bacilli. Temporary administration of cefoperazone and sulbactam for anti-infection treatment. The peak temperature and related inflammatory indicators have both decreased, suggesting effective anti-infection treatment.

There is currently no evidence of urinary tract infection, so continue current anti-infection treatment and schedule a follow-up abdominal CT scan.

(2) The patient has diarrhea without significant abdominal pain. Please consult the gastroenterology department for assistance in diagnosing and adjusting medication. Oral administration of *Bifidobacterium trilactis* enteric-coated capsules is recommended.

On the fifth day of hospitalization, physical examination of the heart, lungs, and abdomen showed no abnormalities. Rechecked C-reactive protein: 7.25 mg/L, procalcitonin: 0.387 ng/mL; blood culture for five days showed no growth of bacteria or anaerobes. The patient had not been feverish in the past three days, and routine blood tests, white blood cell count, and neutrophil ratio were significantly lower than before. It is considered that the anti-infection treatment has been effective, and further consolidation therapy is recommended. During the five-day hospital stay, the patient's vital signs remained stable, with no fever, abdominal pain, diarrhea, or significant discomfort. After communicating with the patient and their family, they requested discharge to continue treatment at a local hospital. It was informed that anti-infection treatment may still lead to perforation, abscess formation, peritonitis, or septic shock. The patient and their family expressed understanding but insisted on discharge. A higher-level doctor was consulted to approve the discharge. On November 10th, the blood culture returned a slow-growing *Escherichia coli*.

3. Discussion

Cheratococcus elegans is an obligate anaerobic gram-positive bacillus that grows slowly and forms visible colonies within five days. It was first isolated from human feces by scientist Ernst Egerth in 1935 and initially classified as an anaerobic bacillus. After sequencing in 1999, it was subdivided into the Ernst Egerth genus [1]. This bacterium is mainly found in the digestive tract and is a rare pathogen of appendicitis, liver abscess and renal abscess. Slow-growing bacteria can enter the blood with primary diseases and form bacteremia [2]. At present, there are few reports on the blood infection caused by slow Egerteria both at home and abroad. This study summarizes the effective diagnosis and treatment of appendicitis combined with slow Egerteria blood infection based on the diagnosis and treatment process of one patient with appendicitis combined with slow Egerteria blood infection.

Infections caused by slow Egerterella include blood infection, myelitis, liver abscess, kidney abscess, etc., and are also related to appendicitis in adults and children. Blood infection is rarely reported, and if not treated effectively in time, it will endanger the life safety of patients [3,4]. According to the latest literature at home and abroad, when slow Egerterella causes blood infection, the average time of positive blood culture is about one week [5]. The time of blood culture positivity in this study was similar to that of the patients, mainly because of the slow growth of the bacteria. Therefore, empirical antibiotic therapy is particularly important. Summarizing the clinical characteristics and antibiotics used for delayed *Escherichia coli* bloodstream infection can provide reference for empirical clinical treatment.

A clinical study of a case of slow Egerterella bloodstream infection abroad found that the main symptoms of patients at admission were fever, nausea and vomiting, and abdominal pain and diarrhea [6]. Most of the clinical symptoms of patients in this study were consistent. Although the number of cases observed in this study was limited, it cannot be ruled out that gastrointestinal diseases are a high-risk factor for delayed *E. coli* bacteremia. The reason may be that delayed *E. coli* can colonize the normal gastrointestinal mucosa, and when the gastrointestinal mucosa is damaged or the body's immune function declines, this bacterium can invade the bloodstream, leading to bacteremia. In a clinical study of cases in Canada, it was found that almost all patients with delayed *E. coli* bacteremia had underlying gastrointestinal diseases, with adult appendicitis accounting for the highest proportion at 32.8% [7,8]. Because of the few clinical reports on this bacterium, there is no unified drug guide for the selection of antibiotics. Many domestic and foreign literature reports have proved that slow Egett bacteria are resistant to penicillin, but highly sensitive to amoxicillin, metronidazole and vancomycin [9,10].

4. Conclusion

In short, the main clinical symptoms of appendicitis combined with delayed Egerter blood infection are high fever and mild right lower abdominal pain, which often leads to missed diagnosis by clinicians. Blood culture and 16sRNA gene sequence analysis can be used to identify delayed Egerter [11,12]. However, the cultivation time is long, so it is necessary to apply empirical antibiotics in advance. This study proved that cefoperazone-sulbactam sodium was one of the effective antibiotics for the treatment of appendicitis combined with delayed Egerter blood infection.

Disclosure statement

The authors declare no conflict of interest.

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