

Multiple Retroperitoneal Abscesses Caused by Extended-Spectrum β -Lactamase-Producing *Escherichia coli*: A Case Report

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Abstract- Diagnosis, and management of retroperitoneal abscesses caused by ESBL (Extended-Spectrum- β -Lactamase) *Escherichia Coli* require special attention. A female patient came to the Emergency Department with complaints of abdominal discomfort, bloating, nausea, fever, and urination pain for 1 week, and a physical examination demonstrated an enlarged mass in the left flank for the past 6 months. Laboratory results showed an increase in leukocytes and procalcitonin; hence the antibiotic cefoperazone sulbactam was given as empirical therapy. An abdominal CT scan revealed multiple retroperitoneal abscesses in the left and right hemiabdomen; therefore, levofloxacin and metronidazole were given as additional antibiotics. Percutaneous abscess drainage was performed and from the pus culture obtained grew ESBL *Escherichia Coli* bacteria. Furthermore, antibiotics were changed to intravenous amikacin according to the results of the susceptibility test. The patient's clinical symptoms improved significantly, and she was discharged and evaluated in the outpatient clinic.

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Introduction

Retroperitoneal abscesses are rare infections but can be fatal (1). In contrast to intraperitoneal processes that have manifestations such as abdominal pain and can be identified through physical examination, retroperitoneal abscesses present no specific symptoms and often do not show the classic symptoms of inflammation on physical examination (2). As a result, diagnosis may be delayed, and this can lead to prolonged sepsis conditions. Infection caused by extended-spectrum β -lactamase (ESBL) pathogenic bacteria requires particular management due to their resistant nature to various antibiotics. The increasing number of pathogenic bacteria that produce ESBL is a challenging problem, requiring more difficult handling (3). Here, we report a female patient who developed multiple retroperitoneal abscesses caused by ESBL *Escherichia coli*. We discuss the diagnostic difficulty and management of this

condition.

Case Report

A 49-year-old female presented to Emergency Department with abdominal discomfort, bloating, fever, nausea, and painful urination for the last 1 week. She also complained enlarged mass in her left flank area for the last 6 months. In the past year, she had experienced painful urination several times, but it always improved every time she took medication. On physical examination, she appeared weak; her blood pressure was 129/80 mmHg, heart rate was 86 bpm, respiratory rate was 22 bpm, and the temperature was 36.5 C. Examination of the left flank revealed a mass with tenderness on palpation, with no radiating pain. Laboratory results showed an increase in leukocytes 20,710/ μ L [neutrophils 77%], procalcitonin (PCT) 41.83 g/L, and hypoalbuminemia 2.1 g/dL. Laboratory

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examinations for the metabolic panel and urinalysis were unremarkable. Based on the results of the history taking and initial physical examination, she was diagnosed with a suspected renal tumor and bacterial infection. The intravenous antibiotic cefoperazone sulbactam (1000 mg every 8 hours) was started empirically.

Subsequently, abdominal contrast-enhanced computed tomography (CT) was performed, and it showed multiple retroperitoneal abscesses in the right posterior hemiabdomen and in the left hemiabdomen

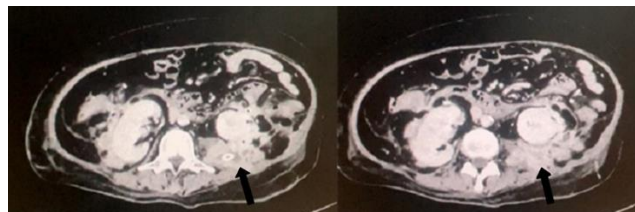


Figure 1. Abdominal contrast-enhanced CT Scan showed multiple retroperitoneal abscesses with the size of 8x5x4 cm in the right posterior hemiabdomen and 8x5x5 cm in the left hemiabdomen involving right and left musculus psoas and musculus quadratus lumborum extending to perirenal

Percutaneous abscess drainage was performed and from the pus culture obtained grew Extended-Spectrum-Lactamase (ESBL) *Escherichia Coli*. Antibiotics were changed to intravenous amikacin (1000 mg every 12 hours) according to the results of the bacterial susceptibility test. On the 15th day after drainage, the patient's clinical symptoms improved significantly, and she was discharged and evaluated in the outpatient clinic.

Discussion

Retroperitoneal infection is a secondary infection caused by the inflammatory process, trauma, or perforation of organs adjacent to the retroperitoneum (4). The retroperitoneal cavity consists of loose tissue and does not have many blood vessels extravasation; hence when there is an infection, it can spread quickly and form an abscess (5). This infection spreads persistently and often causes a delay in diagnosis. As retroperitoneal infection often presents with nonspecific signs and symptoms, misdiagnosis often occurs (6).

Kidney and urinary tract infection is the most frequent origin of secondary retroperitoneal infection. Other causes include organ perforation due to neoplasm, diverticulitis, appendicitis, pancreatitis, Crohn's disease, pancreatitis, cholecystitis, and osteomyelitis (7). Risk factors include the elderly, malnutrition, obesity,

(Figure 1). Other abdominal organs were within normal limits. From these findings, the patient was given additional levofloxacin (750 mg every day) and metronidazole (500 mg every 8 hours) intravenously. On the 5th day after treatment, nausea and abdominal discomfort had improved, but flank pain and fever were persistent. Laboratory results revealed a decrease in leukocytes of 19230/ μ L [neutrophils 77%] and procalcitonin of 2.65 g/L. Blood and urine cultures were negative for bacterial growth.

diabetes, tumors, and immunodeficiency (4). A study by Crepps *et al.*, reported that 50 cases of retroperitoneal infection patients had immunodeficiency conditions, diabetes, malignancy, and chronic renal failure (8).

Retroperitoneal infection is a rare condition (4). In our case report, the patient presented abdominal discomfort, bloating, nausea, and fever. These nonspecific symptoms sometimes make the clinician not initially think of an infection in the retroperitoneal area. Another study revealed that only less than half of the patients reported abdominal pain (8). In this case, the patient complained of frequent urinary pain, and this can be a suggestion that indicates the possibility of a chronic urinary tract infection. We suggest this long-term urinary tract infection may lead to chronic pyelonephritis and predispose to abscess formation in the retroperitoneal space. The patient also complained of a mass in the left flank but did not show any signs of inflammation. The extraperitoneal area is relatively inaccessible to the examiner's hand, and the tissue shows signs of inflammation that are less prominent than a bacterial infection. This results in a lack of certain clinical signs when there is bacterial growth in the retroperitoneum (9).

Laboratory results showed an increase in leukocytes and procalcitonin, thus supporting the possibility of an infection. Although the initial urinalysis results were normal, the abdominal contrast-enhanced computed

Multiple retroperitoneal abscesses caused by ESBL

tomography (CT) showed multiple abscesses on the left and right retroperitoneal. In addition, the patient also had risk factors for malnutrition. Malnutrition can be caused by several factors, but in this case, on the initial laboratory result, the patient's albumin serum was 2.1 g/dL. Malnutrition can increase the risk of developing an infection. A study by Alam *et al.*, also reported that malnutrition was significantly associated with the incidence of liver abscesses (10). In another case report by de Montmollin *et al.*, retroperitoneal abscesses were found in malnourished patients. Malnutrition is known to disrupt the body's cellular immune system; hence it can affect the condition of patients with infection (11).

From the clinical symptoms, increased markers of infection, and confirmation of the CT scan results, the patient was diagnosed with multiple retroperitoneal abscesses. To prevent misdiagnosis and delay in treatment, the diagnosis of retroperitoneal abscesses should be considered in patients who present atypical abdominal-related symptoms and have possible risk factors. Early diagnosis and optimal treatment are important in improving the patient's prognosis.

In this case, the patient was initially treated with cefoperazone sulbactam as empirical antibiotic therapy, then additional levofloxacin and metronidazole were given after a CT scan was performed. As the pus culture obtained grew Extended-Spectrum-Lactamase (ESBL) *Escherichia Coli*, antibiotics were changed to amikacin according to the results of the bacterial susceptibility test. *Escherichia Coli* is the most common bacteria etiology in urinary tract infections, but ESBL *Escherichia Coli* only occurs in certain cases (12).

Extended-Spectrum- β -Lactamase (ESBL) is an enzyme produced by Gram-negative bacillus bacteria that may cause resistance. This enzyme is resistant to penicillin, cephalosporin, and monobactam. Several patients with various comorbidities, diabetes, older age, living in nursing homes, frequent use of antibiotics, recurrent UTIs, and male gender have been reported to be more susceptible to this infection (13). In addition, the use of prophylactic antibiotics, especially cephalosporin, has been reported as a risk factor for urinary tract infections caused by ESBL bacteria in hospitalized patients (14). Although the antibiotic commonly chosen for bacterial ESBL is carbapenem, other antibiotics may be considered (15). Amin *et al.*, reported that patients treated with carbapenem required a longer duration of hospital stay (16). Two retrospective studies in pediatrics with urinary tract infections caused by ESBL showed that empiric antibiotic therapy did not worsen the patient's condition, and concluded that

switching antibiotics after the susceptibility test result available was appropriate (17,18).

In this case, we did not initially suspect an infection caused by the pathogenic ESBL bacteria as we chose cephalosporin as empirical therapy. After the diagnosis of retroperitoneal abscess was established and the results of bacterial culture and susceptibility test were obtained, we changed the antibiotics with amikacin. Although the patient's clinical condition was improving, the consideration of appropriate empirical antibiotics requires further understanding. The increasing resistance to antibiotics makes empirical antibiotic administration more difficult. Infections complicated by ESBL organisms tend to lead to uncertain prognosis and a longer duration of hospitalization, especially in multi-drug-resistant organisms (19).

Thus, complicated infections with high suspicion of ESBL infection need to be treated with vigilance with empirical antibiotics such as aminoglycosides or carbapenems (13). Complicated infections with ESBL pathogenic bacteria require careful treatment, because the physician may not consider it when determining the empirical antibiotics. Bacteria that cause infection will usually be detected later after the results of bacterial cultures are available. The duration of antibiotic therapy requires comprehensive consideration of systemic signs and symptoms, local signs of infection, and laboratory test results.

Retroperitoneal infection is a serious condition that requires early diagnosis and prompt treatment. The clinician should suspect the possibility of a retroperitoneal abscess in patients who present atypical abdominal-related symptoms and have possible risk factors. The increasing number of infections caused by ESBL pathogenic bacteria is a challenge in terms of providing adequate therapy. Complicated infection with high suspicion of ESBL infection should be treated with vigilance in administering empirical antibiotics.

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