

Cedecea lapagei An Extremely Rare Uropathogen: A Case Report and Review of the Literature

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Case report

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Abstract

Background: Gram-negative *enterobacteria* are the most common cause of urinary tract infections. *Cedecea* is a new separate genus in the family *enterobacteriaceae*, and it is a very rare pathogen that was primarily found in the respiratory tract. *Cedecea lapagei* is a very rare pathogen of urinary tract infections. To the best of our knowledge, this is the first case report in the world reported in English literature.

Case presentation: A 55 years old man with chronic renal failure, poorly controlled diabetes mellitus, and hypertension presented with acute exacerbations of renal failure and irritative voiding symptoms. After stabilization and empirical antibiotic therapy with Ceftriaxone, the patient's condition was not improved and deteriorated progressively. After the request of urine culture, the culture was isolated, an extremely rare uropathogen recently recognized by the Centers for Disease Control and Prevention (CDC); the *Cedecea lapagei*. *Cedecea lapagei* identification had been done using Eosin methylene blue agar (EMB). Gram-negative lipase positive bacteria with bacillus in shape, motile in nature that is non-spore-forming, and non-encapsulated enterobacteria with the final result of >100,000 colony-forming units per ml of *Cedecea lapagei* were isolated. Mueller-Hinton agar had been used to perform antimicrobial sensitivity and resistance. The pathogen was extensively resistant to the extended-spectrum beta-lactamases antibiotics and extended-spectrum beta-lactam inhibitors while carbapenems, fluoroquinolones, aminoglycosides, and Trimethoprim-sulfamethoxazole showed a higher sensitivity rate.

Conclusion: The treatment of *Cedecea lapagei* infections represents a challenging issue due to its multi-drug resistant and extensive drug resistance patterns to a variety of antimicrobial classes, such as extended-spectrum beta-lactamases, cephalosporins, and beta-lactam inhibitors. Antimicrobial treatment should be aligned with the culture findings once available.

Introduction

Urinary tract infections (UTIs) are recognized to be the most common community and hospital-acquired bacterial infections. Chronic renal failure patients with uncontrolled diabetes mellitus are vulnerable to recurrent urinary tract infections and urosepsis caused by the usual and rare opportunistic uropathogens. Gram-negative *enterobacteria* are the most common cause of urinary tract infections. *Cedecea* is a new separate genus in the family *enterobacteriaceae*, and it is a very rare pathogen that was primarily found in the respiratory tract. Its name is an abbreviation for the Centers for Disease Control (CDC) Laboratories in 1981, where the initial group isolates "Enteric Group 15". They are Gram-negative, lipase positive and non-spore-forming bacilli. *Cedecea* genus was isolated from human clinical specimens including sputum, blood, Ulcer, and urine (1, 2). *Cedecea lapagei* a rare bacterial infection in humans and has an emerging antimicrobial resistance. First case of *Cedecea lapagei* was reported in 2006 and most of the *Cedecea* species have been isolated from the respiratory tract. A literature search revealed no reports of prior isolation of *Cedecea lapagei* from urine culture and this is the first case of *Cedecea lapagei* as an uropathogen in the world reported in English literature. We report an extremely rare case of clinically

significant urinary tract infection caused by *Cedecea lapagei* in a 55 years old dialysis patient with chronic renal failure and 2 years follow up for the patient did not show any recurrence of the isolate.

Case Report

A 55 years old man with chronic renal failure, uncontrolled diabetes mellitus, and hypertension presented with acute exacerbations of renal failure and irritative voiding symptoms. Laboratory investigations revealed creatinine (13.43mg/dl), urea (177mg/dl), low hemoglobin (6.9mg/dl), marked leukocytosis (WBC: 11,15), high blood sugar (436mg/dl), hyperkalemia, and metabolic acidosis. Ultrasound of the abdomen showed grade 2 parenchymal disease, and other organs were unremarkable. The patient was admitted to the intensive care unit and underwent several dialysis occasions, blood transfusions, prompt blood sugar, and blood pressure control, and adequate fluid resuscitation. Empirical antibiotic therapy with ceftriaxone was initiated, but unfortunately, the patient's condition was not improved and deteriorated progressively day by day according to the general condition of the patient and laboratory investigations. A clean catch midstream urine sample was obtained from the patient and the urine culture was isolated, an extremely rare uropathogen recently recognized by the Centers for Disease Control and Prevention (CDC); the *Cedecea lapagei*. *Cedecea lapagei* identification had been done using eosin methylene blue agar (EMB). Gram-negative lipase positive bacteria with bacillus in shape, motile in nature that is non-spore-forming, and non-encapsulated enterobacteria with the final result of >100,000 colony-forming units per ml of *Cedecea lapagei* were isolated. Mueller-Hinton agar had been used to perform antimicrobial sensitivity and resistance. Antimicrobial sensitivity and resistance pattern of the pathogens was performed under standard protocols. The antibiotic susceptibility of uropathogens was studied against imipenem 10mcg, ertapenem 10mcg, amikacin 30mcg, cefazolin 30ug, ceftazidime 30ug, trimethoprim/sulfamethoxazole 1.25/23.75 mcg, ciprofloxacin 5mcg. The pathogen was extensively resistant to the extended-spectrum beta-lactamases antibiotics, and extended-spectrum beta-lactam inhibitors (*Cephalosporins* including *ceftriaxone*, *cephazolin*, *Ceftazidime*, *Cefixime*, and *ampicillin and amoxicillin-clavulanic acid*). The pathogen showed a higher sensitivity pattern against Carbapenems (*imipenem and ertapenem*), Fluoroquinolones (*ciprofloxacin, levofloxacin*), aminoglycosides (*amikacin and gentamicin*), and *Trimethoprim-sulfamethoxazole*. Levofloxacin 500mg flacon once daily was initiated after culture results became available. Table 1 demonstrates the antimicrobial profile of the microorganism. The condition of the patient was improved, and the return of urine culture did not show any bacterial growth. The patient was discharged home with routine dialysis, *levofloxacin* tab, antihypertensive medications, and diabetic medications. The patient did not show any recurrence with this unusual uropathogen for two years following up with routine dialysis.

Discussion

E.coli is the most common cause of bacterial urinary tract infections in both community and hospital-acquired UTIs and both gender and age groups followed by *Klebsiella pneumonia*. Furthermore, rare opportunistic microorganisms included *Enterobacter cloacae*, *Enterococcus faecium*, *Streptococcus*

species, Citrobacter freundii, Staphylococcus haemolyticus, Candida, and other rare pathogens are prevalent in immunocompromised patients as the current case demonstrated an immunocompromised patient with a very unusual case of urinary tract infection caused by *Cedecea lapagei* (3). In the medical literature, there are very few cases caused by different species of the *Cedecea* genus such as pneumonia, soft tissue infections, and sepsis. Perkins SR and colleagues reported that most of the *Cedecea* species have been isolated from the respiratory tract, and *Cedecea davisae* were the most commonly reported species caused by all of the cases (4, 5). No previous reports of prior isolation of *Cedecea lapagei* from urine culture in the literature and this case of *Cedecea lapagei* as an *uropathogen is* documented in the world for the first time. This case report described an extremely rare case of clinically significant urinary tract infections caused by *Cedecea lapagei*. The treatment of *Cedecea* species infections represents a challenging issue due to its multi-drug resistant and extensive drug resistance patterns to a variety of antimicrobial antibiotics, such as extended-spectrum beta-lactamases, cephalosporins, and beta-lactam inhibitors as the present case have been noticed(6). The patient responded well with levofloxacin after drug adjustment due to the preexisting azotemia. The antimicrobial choices of such chronic renal failure patients are debating and should be adjusted according to the renal function, the efficacy of the drug, and minimize the worsening of preexisting antimicrobial resistance.

Conclusion

The current case recognized that *Cedecea lapagei* were sensitive to a variety of antimicrobial classes including carbapenems but antimicrobial sensitivity and resistance pattern differs from case to case. Antimicrobial treatment should be aligned with the culture findings once available. Full attention should be given in immunocompromised patients not responding to the initial empirical therapy.

Declarations

Disclosure of potential conflicts of interest

The authors declare no conflict of interest for the study.

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Ethics committee and informed consent to publish

case reports are not required for any ethical approval in our institution, and the patient was received a written informed consent.

Availability of supporting data

not applicable.

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Table

Table 1:

Antimicrobial sensitivity and resistance pattern against the pathogen

Medications	Resistant	Sensitive
Ceftriaxone	☒	
Cephazolin	☒	
Ceftazidime	☐	
Cefixime	☒	
Ampicillin	☐	
amoxicillin-clavulanic acid	☐	
Imipenem		☒
Ertapenem		☒
Ciprofloxacin		☒
Levofloxacin		☐
Amikacin		☒
Gentamicin		☒
Trimethoprim-sulfamethoxazole		☐