

## *Case study*

### ***Cedecea Lapagei* an Extremely Rare Uropathogen: A Case Report**

**Running Title:** *Cedecea Lapagei*

#### **Abstract**

**Background:** Centers for Disease Control (CDC) Laboratories discovered *Cedecea lapagei* in 1977, and the first case of *Cedecea lapagei* in humans was reported in 2006. A literature search revealed only one case report of prior isolation of *Cedecea lapagei* from urine culture, and this is the second case of *Cedecea lapagei* as an uropathogen reported in the world.

**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; the *Cedecea lapagei*. *Cedecea lapagei* identification has 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 revealed antimicrobial resistance against *Ceftriaxone*, *Cephazolin*, *Ceftazidime*, *Cefixime*, *Ampicillin*, and *Amoxicillin-Clavulanic Acid* while *Carbapenems*, *Fluoroquinolones*, *Aminoglycosides*, and *Trimethoprim-Sulfamethoxazole* showed a higher sensitivity rate.

**Conclusion:** This is the second case of *Cedecea lapagei* as an uropathogen reported in the world. *Cedecea lapagei* is a rare bacterial infection in humans and has an emerging antimicrobial resistance. Antimicrobial treatment should be aligned with the culture findings once available.

**Keywords:** *Cedecea Lapagei*; Urinary Tract Infections; Antibiotics; Urosepsis; Case Report.

## Introduction:

Urinary tract infections (UTIs) are recognized to be the most common community and hospital-acquired bacterial infections (1). Immunosuppressed patients such as 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. Centers for Disease Control (CDC) Laboratories discovered *Cedecea lapagei* in 1977, and the first case of *Cedecea lapagei* in humans was reported in 2006. They are Gram-negative, lipase positive and non-spore-forming bacilli *Enterobacteriaceae*. *Cedecea* genus was isolated from human clinical specimens including sputum, blood, Ulcer, and urine (2). *Cedecea* is an opportunistic multidrug-resistant pathogen that is capable to colonize and cause acute infections in immunocompromised patients with pre-existing medical conditions (3). Three *Cedecea* species are known human pathogens: *Cedecea davisae*, *Cedecea lapagei*, and *Cedecea neteri* (4). A literature search revealed one case report of prior isolation of *Cedecea lapagei* from urine culture reported by Y. Çekin et al and this is the second case of *Cedecea lapagei* as an uropathogen reported in the world (5). 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.

## Case presentation

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), *Leukocytosis* (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. A clean catch midstream urine sample was obtained from the patient and the urine culture was isolated, an extremely rare uropathogen; 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 pattern. 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 showed antimicrobial resistance against *Ceftriaxone*, *Cephazolin*, *Ceftazidime*, *Cefixime*, *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 patient was discharged home with routine dialysis, *Levofloxacin* tab, Anti-hypertensive medications, and diabetic medications. Post-treatment urine cultures due to recurrent urinary tract infections did not show any recurrence with this unusual uropathogen.

## Discussion:

*Escherichia coli* (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* (6). 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. Herrera VR and associates reported a catastrophic death secondary to a soft tissue hemorrhagic bullae infection caused by *Cedecea lapagei* that swiftly evolved into septic shock and abrupt death (7). Nosocomial pneumonia and sepsis in 35 days preterm low birth weight male infant caused *Cedecea lapagei* was reported by Ramas wamy VV, et.al. Michael E Duperret reported the first documented case of sinusitis in a 45-year-old man caused by *C. lapagei* (8). There is only one case report of prior isolation of *Cedecea lapagei* from urine

culture in the literature reported by Y. Çekin et al. in a 40 years old male patient with spinal cord injury and this case of *Cedecea lapagei* as an uropathogen is documented in the world for the second time(5). This case report described an extremely rare case of clinically significant urinary tract infections caused by *Cedecea lapagei*. *Cedecea lapagei* is a rare bacterial infection in humans and has an emerging antimicrobial resistance.

*Cedecea Lapagei* has been identified a sample of ascitic fluid taken from 55 years old liver transplant patient reported at the Veterans Medical Center, Center for Health Sciences, University of Tennessee and was successfully managed with Vancomycin and Gentamicin, As well as Ceftazidime Added to the Peritoneal Dialysis Solution(9). Another case involved a patient who had bacteremia as a result of cement chemical burns and type II diabetes mellitus. Bacteremia and wound infection have been effectively managed with Cefotaxime and Amikacin (10) A Turkish patient with chronic obstructive pulmonary disease and subarachnoid hemorrhage became the third case to develop Pneumonia caused by *Cedecea lapagei*, most likely as a result of secretion aspiration from the upper respiratory tract. The patient responded well to Meropenem and Amikacin therapy but eventually died because of the subarachnoid hemorrhage(11).

The treatment of *Cedecea* species infections represents a challenging issue due to its multi-drug resistant resistance pattern to a variety of antimicrobial classes, as the present case have been noticed. 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.

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.

## **Conclusion**

This is the second case of *Cedecea lapagei* as an uropathogen reported in the world. *Cedecea lapagei* is a rare bacterial infection in humans and has an emerging antimicrobial resistance. Antimicrobial treatment should be aligned with the culture findings once available.

## Abbreviations

*CDC: Centers for Disease Control and Prevention*

*EMB: Eosin Methylene blue agar*

*UTI: Urinary Tract Infection*

**Ethics approval and consent to participate:** case reports are not required for any ethical approval in our institution, and the patient received a written informed consent.

**Availability of data and material:** Data included in the manuscript.

## COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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**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	✓