Case study

Cedecea Lapagei an Extremely Rare Uropathogen: A Case Report and Review of the Literature

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: The treatment of *Cedecea* lapagei infections represents a challenging issue due to its multi-drug resistant resistance pattern to a variety of antimicrobial classes. *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:

Background:

Urinary tract infections (UTIs) are recognized to be the most common community and hospital-acquired bacterial infections. 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 (1). *Cedecea* is an opportunistic multidrug-resistant pathogen that is capable to colonize and cause acute infections in immunocompromised patients with pre-existing medical conditions (2). Three *Cedecea* species are known human pathogens: Cedecea davisae, Cedecea lapagei, and Cedecea neteri (3). 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(4). 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, antihypertensive medications, and diabetic medications. Post-treatmenturine cultures due to recurrent urinary tract infections did not show any recurrence with this unusual uropathogen.

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* (5). 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 *C. lapagei* that swiftly evolved into septic shock and abrupt death (3). Nosocomial pneumonia and sepsis in 35 days preterm low birth weight male infant caused *C.* lapagei was reported by Ramaswamy VV, et.al. Michael E Duperret reported the first documented case of sinusitis in a 45-year-old man caused by *C. lapagei* (7). 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 anuropathogen *is* documented in the world for the second time.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. 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(8). 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.

Conclusıon

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.

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		✔