

Cedecea lapagei in a Patient with Multiple Injuries: Report of a Rare Case

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Abstract

Cedecea lapagei (*C. lapagei*) is an opportunistic pathogen in old patients with many comorbid diseases and the immunosuppressed. It is a gram-negative, facultative anaerobe bacterium of the *Enterobacteriaceae* family. We present a rare case of a patient with multiple injuries, *C. lapagei* was found from the exudate of the wound, what's more, the *Proteus vulgaris* was also found in blood culture medium at the same time. According to the available literature, this is the first case of simultaneous infection of two bacteria including *C. lapagei* and *Proteus vulgaris* from the exudate of the traumatic wound.

Keywords

C. lapagei, Cedecea, Proteus vulgaris, Exudate

¹ 1. Introduction

The genus *Cedecea* belongs to the family *Enterobacteriaceae*. *Cedecea* consists of six species and three of these species are known human pathogens: *Cedecea davisae*, *Cedecea lapagei*, and *Cedecea neteri* [1]. Although discovered in 1977, it was not until the year 2006 that the species *C. lapagei* became known as a pathogenic bacterium [2]. It has been isolated in sputum, BAL specimen, blood, etc. [3] [4], but it has not been found in exudate until now. A strain of *C. lapagei* was detected in the exudate from the wounded inpatient by clinic laboratory of our hospital. More important, it's a mixed infection with *Pro-*

teus vulgaris.

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2. Case Report

The male patient, 42 years old, a worker, was sent to our hospital due to a motorcycle fall 6 hours ago. In the emergency department, he was admitted to our hospital's hand and foot surgical ward with "multiple injuries, multiple open fractures and dislocations of the right foot, multiple rupture of blood vessels, nerves and tendons of the right foot, skin and soft tissue defects of the right foot, pelvic fracture, hematoma of the right ilium, and fracture of the right fibula head". The patient has clear mind, poor spirit, no obvious abnormality in heart and lung, and no water intake. He used to be in good health and had a personal history of 20 cigarettes/day for 20 years, 200 gram/day alcohol consumption for 10 years.

There was no family genetic disease or infectious history. On the day of admission, the patient was given surgical treatment. After the operation, the patient was treated with anti-bacterial, detumescence, fracture promotion, wound healing, anticoagulation, antispasmodic, and heat preservation with baking lamp. Although the wounds were well matched, there was some more liquid exudation. The patient was given iodophor disinfection, aseptic auxiliary material replacement, and the exudate was taken for bacterial culture and drug sensitivity test. Informed consent was obtained from the patient.

3. Bacterial Culture and Identification

The exudate was inoculated into blood culture medium and Chinese blue culture medium, and cultured in 36°C incubator for 24 hours. There were small round colonies with gray white, moist and smooth edges, without hemolytic ring. The microscopic examination showed Gram-negative bacteria. In addition, there were migratory membrane colonies in the blood culture medium. The round colonies and membranous colonies were identified as *C. lapagei* and *Proteus vulgaris* by VitekTM 2 compact system (BioMérieux, France) following the manufacturer's instructions.

4. Drug Sensitivity Test

Antimicrobial susceptibility testing was determined by the automated Vitek^m 2 compact system using AST-GN13 susceptibility cards. One hundred and forty-five microliter bacterial suspension of a 0.5-McFarl and turbidity was mixed with 3 mL 0.45% NaCl solution. The AST-GN13 card filled with the mixture was used. The *E. coli* ATCC25922 was used as quality control. Drug sensitivity test showed that *C. lapagei* was resistant to Ampicillin, cefazolin, imipenem and Sulfamethoxazo. It was mediated to ampicillin/sulbactam, gentamycin, tobramycin, ciprofloxacin and levofloxacin (see **Table 1**). The drug sensitivity test of *Proteus vulgaris* showed that it was resistant to ampicillin, cefazolin, imipenem, amikacin, gentamicin, ciprofloxacin, sulfamethoxazo and sensitive to piperacillin/tazobactam, cefotaxime, ceftazidime, cefatriaxone, cefepime, aztreonam, ertap nan, levofloxacin (see **Table 2**).

No.	Antibiotics	S/R/I (MIC, µg/ml)
1	Ampicillin	R (≥32)
2	Ampicillin/sulbactam	I (16)
3	Piperacillin/tazobactam	S (≤4)
4	Cefazolin	R (≥64)
5	Cefotaxime	S (≤4)
6	Ceftazidime	S (4)
7	Cefatriaxone	S (≤1)
8	Cefepime	S (≤1)
9	Aztreonam	S (≤1)
10	Ertap Nan	S (≤0)
11	Imipenem	R (4)
12	Amikacin	I (≤2)
13	Gentamicin	I (8)
14	Tobramycin	I (8)
15	Ciprofloxacin	I (2)
16	Levofloxacin	I (4)
17	Sulfamethoxazo	R (≥32)

 Table 1. Drug sensitivity test of C. lapagei.

Note: MIC, minimum inhibitory concentration ($\mu g/ml$); R, resistant; S, susceptible; I, intermediate.

No.	Antibiotics	S/R/I (MIC, µg/ml)
1	Ampicillin	R (≥32)
2	Ampicillin/sulbactam	R (≥32)
3	Piperacillin/tazobactam	S (≤4)
4	Cefazolin	R (≥64)
5	Cefotaxime	S (≤4)
6	Ceftazidime	S (≤1)
7	Cefatriaxone	S (≤1)
8	Cefepime	S (≤1)
9	Aztreonam	S (≤1)
10	Ertap Nan	S (≤0)
11	Imipenem	R (4)
12	Amikacin	R (≥64)
13	Gentamicin	R (≥16)
14	Tobramycin	I (8)
15	Ciprofloxacin	R (≥4)
16	Levofloxacin	S (2)
17	Sulfamethoxazo	R (≥32)

Table 2. Drug sensitivity test of *Proteus vulgaris.*

Note: MIC, minimum inhibitory concentration (μ g/ml); R, resistant; S, susceptible; I, intermediate.

5. Prognosis and Outcome

After changing fresh dressing for the wound once a day and constant anti-infection treatment with the addition of levofloxacin, the exudate of the wound was continuously reduced apparently. After three days, the subsequent bacterial culture and identification showed that there was no bacterial growth in the exudate. The patient was well recovered and discharged soon afterwards.

6. Discussion

C. lapagei is a member of the *Enterobacteriaceae* family and is an uncommon opportunistic pathogen. Its susceptible population is individuals with low or suppressed immune function, such as patients with granulocytopenia, tumor chemotherapy, organ transplantation, large-scale surgery or trauma [2] [5], such as it can follow cement-related chemical burn injury [6]. There are very few reports of isolation of this organism from human biological samples; it is also found to be a pathogen in elderly or otherwise life-threatening conditions [7], for example in a patient with chronic obstructive pulmonary disease [8]. Biswal *et al.* presented a rare case of a patient with underlying malignancy of buccal mucosa, who developed an oral ulcer superinfected with *C. lapagei* and this is the first case of *C. lapagei* from India detected in a cancer patient [9]. *C. lapagei* can also cause ventilator-associated pneumonia and sepsis in Neonatal Intensive Care Unit [10].

We presented the first rare case of simultaneous infection of two bacteria including *C. lapagei* and *Proteus vulgaris* from the exudate of the traumatic wound in the world. But their relevance between *C. lapagei* and *Proteus vulgaris* has yet to be elucidated. It was reported that *C. lapagei* can produce New Delhi metallo- β -lactamase-1 (NDM-1) in some certain areas [11]. NDM-1 is a carbapenemase able to hydrolyze nearly all available β -lactam antibiotics, endangering efficacious antibacterial treatments [12]. Further studies are needed to understand its biology characteristics and the role in the mode of transmission, the spectrum of infection, and treatment options. There is a great need for physicians to cognize the emerging pathogens and know their antibiotic resistance profiles.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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