

Pneumonia and sepsis due to carbapenem-resistant *Klebsiella Pneumoniae* after transrectal prostate biopsy

Emine Kübra Dindar Demiray¹, Mehmet Durğun², Özgür Paşa³, Erdinç Eren⁴

¹Department of Infectious Disease, Bitlis State Hospital, Bitlis, Turkey

²Department of Chest Diseases and Tuberculosis, Bitlis State Hospital, Bitlis, Turkey

³Department of Microbiology, Bitlis State Hospital, Bitlis, Turkey

⁴Department of Internal Medicine, Bitlis State Hospital, Bitlis, Turkey

ABSTRACT

Transrectal ultrasound-guided prostate biopsy (TRUSPB) with local anesthesia and prophylactic antibiotics is the most commonly used diagnostic method for prostate cancer today. Even though TRUSPB has a low complication rate, infective complications may arise on occasion. Despite the fact that prophylaxis is controversial to prevent infective complications after TRUSPB, quinolones (ciprofloxacin, ofloxacin, levofloxacin) and trimethoprim-sulfamethoxazole are the most frequently preferred antibiotics in prophylaxis. However, as with many antibiotics today, there is an increase in resistance to trimethoprim-sulfamethoxazole and quinolones. This report describes a case of sepsis due to carbapenem-resistant *Klebsiella pneumoniae* and pneumonia following transrectal prostate biopsy.

Keywords: Carbapenem-resistant *Klebsiella pneumoniae*, sepsis, transrectal ultrasound-guided prostate biopsy.

The most commonly used diagnostic method for prostate cancer is a transrectal ultrasound-guided prostate biopsy (TRUSPB), which is performed in urology using local anesthesia and prophylactic antibiotics. During this procedure, the biopsy needle enters the prostate tissue from the rectal mucosa and carries the rectal flora to the prostate tissue. Although prophylaxis to prevent infective complications after TRUSPB is controversial, quinolones (ciprofloxacin, ofloxacin, levofloxacin) and trimethoprim-sulfamethoxazole are the most commonly used antibiotics in prophylaxis. After oral administration, these antibiotics concentrate in the colorectal region, urine, kidney, prostate, and feces and have long-term

urinary bactericidal activities. However, as with many antibiotics today, there is an increase in resistance to trimethoprim-sulfamethoxazole and quinolones.^[1-3]

Healthcare-associated infections (HCAIs) are a global threat with high morbidity and mortality. One of the most serious threats to public health is antimicrobial resistance, especially among Gram-negative (GN) bacteria.^[4] *Klebsiella pneumoniae* strains account for 3-8% of all HCAIs and are the most common cause of urinary tract infection, pneumonia, and bacteremia.^[4-6] According to the results of a multicenter study examining antibiotic resistance in HCAIs in 2015-2018 from our country; there was a significant increase (60-72%) in quinolone resistance for *K. pneumoniae*.^[7] Carbapenem-resistant *K. pneumoniae* (CRK) is a global current problem that results in treatment failure. Chronic renal failure, diabetes mellitus, immunosuppression, malignancy, history of the cerebrovascular event, history of surgery, trauma, invasive procedures (foley catheter, central catheter, mechanical ventilation, etc.),

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Correspondence: Emine Kübra Dindar Demiray, MD.
e-mail: e.kubradindar@hotmail.com

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use of antimicrobial therapy are all risk factors for CRK.^[4]

This report describes a case of sepsis due to carbapenem-resistant *K. pneumoniae* and pneumonia following transrectal prostate biopsy.

CASE REPORT

A 75-year-old male patient was admitted to the emergency room with complaints of fever, anorexia, cough, and general discomfort that lasted three days. The patient's history was unremarkable except for a transrectal ultrasound-guided prostate biopsy performed approximately seven days ago in the patient's history, who did not have any chronic disease other than complaints of prostatism. A written informed consent was obtained from the patient.

It was learned that ciprofloxacin 500 mg tablet prophylaxis was administered to the patient before the procedure and the patient was discharged after no complications developed as a result of the procedure. On physical examination, the fever was 38.7°C, the blood pressure was 80/40 mmHg, and the heart rate was 138/min. The patient in the follow-up was conscious and had basal rales in both lungs. Other system examinations were normal. In his laboratory tests; hemoglobin: 11.3 g/dL, platelets (PLT): 85,000/ μ L, white blood cell: 23,300/ μ L (neutrophils: 19,300/ μ L), blood urea nitrogen: 114 mg/dL, creatinine: 2.1 mg/dL, AST: 114 U/L, ALT: 103 U/L, CRP: 239 mg/dL, sedimentation: 96 mm/h, procalcitonin: 26.15 ng/mL. The patient was hospitalized with a preliminary diagnosis of sepsis and pneumonia. Following the collection of blood and urine cultures, empiric intravenous (IV) renal-dose meropenem 2 \times 1 g treatment was started. In addition, hydration and other medical support treatments were administered to the patient due to sepsis. The patient, however, whose metabolic acidosis persisted, was transferred to a different facility, to the intensive care unit. The blood culture taken on the third day of hospitalization revealed carbapenem-resistant *K. pneumoniae* growth. In the patient's urine culture, there was also CRK growth with the same antibiogram. To identify isolates grown in cultures and perform antibiotic susceptibility tests, the VITEK 2

Compact (bioMérieux, Craponne, France) automated system was used. The antibiotic susceptibility results were interpreted using the EUCAST (European Committee on Antimicrobial Susceptibility Testing) values. The intensive care unit was informed about the arrangement of meropenem 2 \times 1 g dose IV+colistin methanesulfonate 2 \times 150 mg IV antibiotic treatment based on the results of the culture antibiogram. The patient was admitted to our service on the seventh day of his hospitalization after his metabolic findings improved, his septic condition regressed, and his need for intensive care was eliminated. The patient was discharged with full recovery after receiving 14 days of combined antibiotic therapy and improving clinical and laboratory parameters.

DISCUSSION

Although transrectal ultrasound-guided prostate biopsy is a reliable diagnostic method with a very low complication rate, infective complications such as pyuria, prostatitis, epididymitis, or life-threatening urosepsis can occur afterward. The most common bacterial agents of these infective complications are *Escherichia coli* (*E. coli*), *K. pneumoniae*, and other Gram-negative bacilli.^[1,2] Bacteremia following a prostate biopsy is usually asymptomatic and often undetectable. Many symptomatic infections are induced by *E. coli*. Other pathogens that have been reported include Enterococci, *Klebsiella* spp., *Bacteroides fragilis*, and *Clostridium* spp.^[3,8] Carignan et al.^[9] reported that while the rate of sepsis after TRUSPB was 0.52% in 2002-2009, it increased to 2.15% in 2010-2011 in their series of 5,798 patients. According to a study conducted in Saudi Arabia, seven (5%) of 139 patients who underwent TRUSPB were hospitalized due to complications, and four (2.8%) of patients were hospitalized due to an uncomplicated urinary tract infection.^[10] According to the literature, the rate of serious (major) complications having followed prostate biopsy is 1%, and these complications include meningitis and sepsis.^[9,11] In the presented case, sepsis due to CRK developed after TRUSPB.

In their study, Henry et al.^[12] reported that the average time to develop an infection after the transrectal prostate biopsy was one day.

Dede et al.^[13] noted that the patients' complaints began on the day of the procedure and that they applied to the health center within 0-2 days. According to Simsir et al.,^[14] patients should be monitored for five days after the procedure for infective complications. In the presented case, the complaints began three days after the biopsy, and the patient took the ciprofloxacin at home for two days before being admitted to the hospital five days later.

In a transrectal prostate biopsy, antibiotic prophylaxis recommendations differ. In a multicenter study involving 144 hospitals in Europe, 48 different treatment protocols were determined to be used for prophylaxis, with fluoroquinolones (81%) and oral metronidazole (55%) being the most preferred antibiotics.^[15] Ciprofloxacin prophylaxis was also used in the presented case.

Ciprofloxacin, as in the case presented, is widely used in TRUSPB antibiotic prophylaxis. AlKhateeb et al.^[6] reported ciprofloxacin resistance in 90.9% of *E. coli* and *K. pneumoniae* strains grown in cultures taken from patients who developed infective complications after TRUSPB. According to Taylor et al.,^[16] ciprofloxacin resistance was 19.0% in rectal swab samples from 865 patients who underwent TRUSPB, the rate of infective complications was 3.6%, and 48% of those who developed infective complications had ciprofloxacin resistance. The grown CRK strain was also found to be ciprofloxacin-resistant in our study.

Due to the increasing antibiotic resistance rates in *E. coli* and *K. pneumoniae* strains, several studies have reported that 3 g oral fosfomycin can be used for TRUSPB.^[17-19] This issue, however, is still controversial.

In conclusion, we believe that antibiotic treatments used for prophylaxis in prostate biopsy performed with transrectal ultrasonography under antibiotic prophylaxis should be reconsidered in view of rising antibiotic resistance.

Declaration of conflicting interests

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