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A Rare Agent of Urinary Tract Infection: *Chryseobacterium indologenes*

Nadir Bir İdrar Yolu Enfeksiyonu Etkeni: *Chryseobacterium indologenes*

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Anahtar Kelimeler: Komplike üriner sistem enfeksiyonu, rifampin, levofloksasin, imipenem, meropenem

Dear Editor,

Members of the genus *Chryseobacterium*, formerly known as *Flavobacterium*, are not human flora members despite being commonly found in nature. They are a potential source of infection due to their ability to survive in chlorinated municipal water supplies and their presence in hospital water systems and tap water.

Chryseobacterium indologenes is an immobile, catalase-positive, oxidase-positive, indole-positive, Gram-negative non-fermenting bacillus^[1]. As this bacterium is not frequently detected in clinical specimens, its clinical significance has yet to be determined^[2]. It is rarely pathogenic in humans and most of the reported cases are hospital-acquired infections. It usually causes infection in immunocompromised patients and those with permanent catheters. It has been reported as the causative agent in cases of bacteremia, peritonitis, pneumonia, empyema, pyelonephritis, cystitis, meningitis, and central venous catheter-related infections^[1-9]. Herein, we present a patient who had a urinary catheter, was scheduled for a urological procedure, and whose urine culture yielded *C. indologenes*.

A 66-year-old woman had presented to another center one month earlier and inserted an indwelling urinary catheter due to complaints of dysuria and subsequent inability to urinate. Cystoscopy was performed during follow-up but evaluation could not be completed due to pain. Therefore, the patient

was recommended cystoscopy under anesthesia. Urine culture performed before the planned urologic procedure yielded 10⁵ colony-forming units (CFU)/ml of panresistant *Pseudomonas aeruginosa*, upon which she was admitted to the the Infectious Diseases and Clinical Microbiology Department for testing and treatment. The patient reported itching and pain at the entry point of the indwelling Foley catheter. She had no other complaints when questioned and physical examination revealed no other pathological findings. Her medical history showed that she had undergone mitral valve replacement twice. Laboratory tests revealed red blood cell count: 3,690,000/mm³, hemoglobin level: 12.6 g/dl, hematocrit: 36.2%, white blood cell (WBC) count: 5130/mm³, CRP: 0.44 mg/dl, aspartate aminotransferase: 27 U/l, alanine aminotransferase: 17 U/l, urea: 42 mg/dl, and creatinine: 0.74 mg/dl. At admission, the patient was started on parenteral meropenem 6 g/day and imipenem 2 g/day, and peroral rifampicin 600 mg/day for *P. aeruginosa*. Urine cultures obtained on day of admission (direct microscopy: 50 leukocytes/mm³) and the following day, when she developed a fever (direct count: 10 leukocytes/mm³) yielded 10⁵ cfu/ml *C. indologenes*. Blood culture obtained during the fever episode negative. Following this, two more consecutive catheter urine samples were taken from the patient and sent to the Microbiology Laboratory for culture. Direct microscopic examination of the samples revealed 50 WBC/mm³ and 3-4 red blood cells per field. Parenteral levofloxacin 1 g/day was added

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to the patient's antibiotic therapy because susceptibility testing indicated resistance to imipenem and meropenem. Follow-up urine cultures sent four and seven days after the initiation of levofloxacin were negative. On day six of clinical follow-up, the patient's fever relapsed (38 °C) and blood cultures were repeated. On day seven of inpatient treatment, while under antibiotherapy, she had a widespread rash and fever. Her CRP level increased to 10.93 mg/dl, another blood culture was performed. Dermatology department was consulted, and it was considered to be a drug reaction. Upon negative blood and urine cultures at the end of treatment, antibiotic therapy was discontinued after 10 days (imipenem and meropenem for 10 days, rifampicin for 11 days, levofloxacin for 9 days) and the patient was discharged. There was no relapse or reinfection at one-month follow-up.

In addition to direct microscopic examination (Fast Read 102°, Biosigma, Italy), urine samples from the patient's catheter were cultured by inoculating 5% sheep blood agar (SBA) and eosin methylene-blue agar (BioMerieux, France). Blood samples taken from the patient were inoculated into aerobic and anaerobic blood culture bottles and loaded into a BacT/ALERT (BioMerieux, France) automated hemoculture system. Colonies producing yellow pigment were observed in the SBA urine culture after 24–48 hours of incubation in an aerobic atmosphere in 36 °C incubator. These colonies were identified as *C. indologenes* using a MALDI-TOF MS (Vitek MS) (BioMerieux, France).

The gradient test method was used to investigate the antimicrobial susceptibility pattern of the *C. indologenes* isolates. To do this, a bacterial suspension with a McFarland turbidity of 0.5 was prepared from the colonies and passaged onto Mueller–Hinton agar (MHA) (BioMerieux, France). The minimum inhibitory concentration (MIC) values of the antimicrobials tested were determined using E-test strips (BioMerieux, France). Minimum inhibitory concentration was 16 mg/μl (resistant) for piperacillin-tazobactam, 0.5 mg/μl for ciprofloxacin (susceptible), 2 mg/μl for ceftazidime (susceptible), and >32 mg/μl for imipenem and meropenem (resistant). Susceptibility results were evaluated using EUCAST FK/FD (species-independent) breakpoint values. Minimum inhibitory concentration values for rifampicin, fosfomycin, vancomycin, and trimethoprim-sulfamethoxazole were determined as 0.25 mg/μl, 1024 mg/μl, 32 mg/μl, and 0.064 mg/μl, respectively. Since there were no breakpoint values for rifampicin, fosfomycin, vancomycin, and trimethoprim-sulfamethoxazole in the EUCAST FK/FD table for reference, only MIC values were reported to the ward^[10].

Although *C. indologenes* is common in soil, water, plants, and food, it is rarely pathogenic in humans^[3]. Its clinical significance has increased in recent years due to its ability to cause severe infections in patients who undergo invasive

permanent interventions, those with underlying disease, immunocompromised, and newborns^[1,5].

C. indologenes may survive in chlorinated water and its presence in hospital environments, water systems, and wet surfaces poses a potential source of infection. Patients may be colonized from contaminated medical devices involving fluids, such as respirator masks, intubation tubes, incubators, and refrigerators/freezers^[3]. Similarly, Bayraktar et al.^[5] demonstrated that bacterial infection was caused by contaminated distilled water in a hospitalized patient in whom *C. indologenes* was isolated in blood culture. Cases of bacteremia, meningitis, and tracheobronchitis associated with *C. indologenes* have been reported previously in Turkey, but no urinary tract infections^[1,3,6-8].

Chryseobacterium spp. are known to be resistant to aminoglycosides, tetracyclines, chloramphenicol, erythromycin, clindamycin, and teicoplanin. The most effective antimicrobials against these microorganisms are fluoroquinolones (garenoxacin, gatifloxacin, levofloxacin) and rifampicin. Trimethoprim-sulfamethoxazole, ciprofloxacin, and piperacillin-tazobactam are other antimicrobial agents with fair antibacterial activity. Vancomycin shows poor potential^[9]. The resistance profile of the strain isolated from our patient was similar to that of other *C. indologenes* strains reported in the literature. The patient was initially treated with imipenem, meropenem, and rifampicin for panresistant *P. aeruginosa*, after which levofloxacin was added to the regimen since *Chryseobacterium* spp. can be metallo-β-lactamase producers and the strain was found to be resistant to imipenem and meropenem.

In conclusion, bacteriological examination is important in patients who are immunocompromised, have underlying disease, and/or have prolonged use of invasive devices. These factors may lead to opportunistic infection by *C. indologenes*, albeit rarely. There is no optimal treatment regimen for *Chryseobacterium* spp. infections. Therefore, antimicrobial therapy should be based on MIC values of antimicrobial agents by correctly applied susceptibility tests^[9]. To the best of our knowledge, this is the first reported case of *C. indologenes*-associated urinary tract infection in Turkey.

Ethics

Informed Consent: Consent form was filled out by the reported case.

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions

Concept: O.R.S., F.Ç., Design: O.R.S., F.Ç., Data Collection or Processing: M.Y., Analysis or Interpretation: O.R.S., F.Ç., Literature Search: M.Y., Writing: O.R.S., F.Ç., M.Y.

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