

# Pneumonia Due to a Rare Bacteria: *Chryseobacterium Indologenes* Infection in a Paediatric Patient

Nadir Bir Bakteriye Bağlı Pnömoni:  
Pediatrik Bir Hastada *Chryseobacterium Indologenes* Enfeksiyonu

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## Özet

*Chryseobacterium indologenes* is a non-fermentative yellow-pigmented Gram-negative bacillus and is widely distributed in nature. *Chryseobacterium spp.* can easily grow on wet surfaces and they are resistant to sanitation with chlorine to some degree, which causes them to colonize in hospital environments. *C. indologenes* is rarely isolated from human infections and is an emerging multi-drug resistant microorganism. In this report, we present a rare microorganism, *C. indologenes*, isolated from tracheal secretions of a paediatric patient.

Anahtar Kelimeler *Chryseobacterium indologenes*, bacteremia, pneumonia

## Abstract

*Chryseobacterium indologenes*, non-fermentatif, sarı pigmentli, Gram negatif basıldır ve doğada yaygın olarak bulunur. *Chryseobacterium* türleri, ıslak zeminlerde kolayca çoğalabilir ve bir dereceye kadar klor ile sanitasyona dirençli olmaları hastane ortamlarında yerleşmelerine neden olur. *C. indologenes*, nadiren insan enfeksiyonlarından izole edilir ve çoklu ilaca dirençli bir mikroorganizmadır. Bu yazıda, pediatrik bir hastanın trakeal sekresyonlarından izole edilen nadir bir mikroorganizma olan çoklu ilaç dirençli *C. indologenes* sunulmaktadır.

Keywords *Chryseobacterium indologenes*, bakteriyemi, pnömoni

## INTRODUCTION

*Chryseobacterium indologenes* is a non-fermentative, catalase and oxidase positive, non-motile, yellow-pigmented Gram-negative bacillus<sup>1,2</sup>. It is widely distributed in nature especially in soil and water environments<sup>1,3</sup>. *C. indologenes* was belonging to Flavobacterium genus but recently it is classified as a member of *Chryseobacterium genus*<sup>2</sup>. *Chryseobacterium* can easily grow on wet surfaces and they are resistant to sanitation with chlorine to some degree, which causes them to colonize in hospital environments. They have been isolated as the etiologic agent of meningitis, pneumonia, bacteraemia, endocarditis, soft tissue infections and so on<sup>4</sup>. Infections due to the use of medical devices (respirators, humidifiers, incubators, etc.), which have contaminated fluids inside, have also been reported<sup>5,6</sup>. Vast majority of the published cases of infections due *C. indologenes* have been described in paediatric age group who were immunocompromised patients with severe concomitant diseases or with indwelling devices<sup>1,7</sup>. Virulence capability of *C. indologenes* is often attributed to protease activity and biofilm production. However the other virulence factors and the complete mechanism pathogenicity still needs to be discovered<sup>8,9</sup>.

In this report, we present a rare microorganism, *C. indologenes*, isolated from tracheal secretions of a paediatric patient.

## CASE REPORT

A 18-month-old male patient admitted to emergency clinic due to drowning in ornamental pool. He was intubated at the time of admission. He was unconscious and his eyes were fixed dilated. He had no spontaneous respiration. There upon he immediately transferred to paediatric intensive care unit where he was plugged to the mechanical ventilator and was monitored. Vital signs were as follows; temperature 36.1°C, arterial blood pressure 94/60 mm-Hg., White blood cell count 21800/ml, haemoglobin 14,9 gr/dl, erythrocyte sedimentation rate 3/hr, glucose 353 mg/dl detected as laboratory findings. Meropenem 60 mg/

kg/day was started empirically. At the seventh day of follow-up, the patient's fever raised up to 38.6 °C and he suffered from huge amount of pulmonary secretions. Blood, urine and tracheal aspiration samples were collected. Pulmonary samples yielded *Klebsiella pneumonia*, which was sensitive to carbapenems, and the antimicrobial treatment was continued as it was. However, on the seventeenth day of the treatment vital signs of the patient were deteriorated and the fever again raised up to 38.4°C with C-reactive protein 6.05. Blood and pulmonary samples were collected. Antimicrobial treatment was switched to tigecycline (3 mg/kg/day). Both blood and tracheal aspiration samples yielded *C. indologenes* which was resistant to carbapenems and tigecycline but sensitive to trimethoprim/sulfamethoxazole (TMP/SXT). Trimethoprim/sulfamethoxazole (10 mg/kg/day) was started. On the sixth day of TMP/SXT treatment, the treatment switched to tigesiklin after consulted to the infectious disease specialist. However, *C. indologenes* again yielded from tracheal secretions of the patient. The antimicrobial treatment was changed to levofloxacin (10 mg/kg/day). After ten days of treatment, infection due to *C. indologenes* was successfully treated. However the patient also suffered neurological disorders due to suffocation and transferred to other health care facility for further treatment.

## BACTERIAL METHODS

Two tracheal aspiration samples and three consecutive blood samples yielded *C. indologenes*. In Gram stain of the pulmonary specimens, Gram-negative bacilli and inflammatory cells were observed abundantly. Typical yellow pigmented colonies were observed on the sheep blood agar plates (Figure). "MALDI-TOF MS (Matrix-assisted laser desorption ionization-time of flight mass spectrometry, Biomerieux, France)" for antimicrobial susceptibility testing. All of the five isolates were resistant to ampicilline, ampicilline/sulbactam, ticarcilline/clavulonate, cephalosporins, cefuroxime, ceftriaxone, ceftazidime, gentamicin and amikasin, colistin, imipenem and meropenem. They were detected as positive for ESBL. They were susceptible to lev-

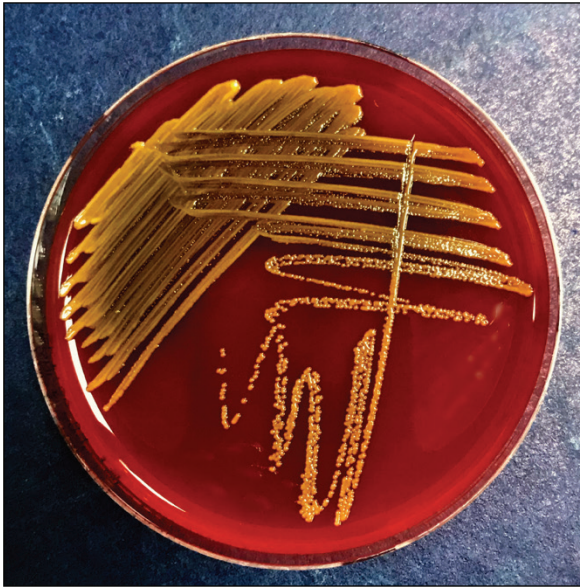


Figure: Typical yellow pigmented colonies of *C. indologenes* on 5% sheep blood agar plate.

#### DISCUSSION

*C. indologenes* is present in soil and is frequently isolated from wet surfaces in hospitals, but it is not a member of human microflora<sup>10</sup>. *C. indologenes* is accepted as a low virulent bacterium. In some experimental studies, *Chryseobacterium* can be rapidly eliminated by the host defence, when infused into the blood stream<sup>5,11,12</sup>. However, it has ability to survive in wet surfaces and it produces biofilm and proteases. It is also a multidrug resistant microorganism. All these factors cause this pathogen to cause life-threatening infections especially immune-compromised patients<sup>13-15</sup>. Bacteraemia, pneumonia, urinary tract infections, surgical wound infections, catheter-related infections, meningitis and peritonitis are most common infections that are caused due to *C. indologenes*<sup>16-20</sup>. Long-term indwelling catheters and devices, administration of long term antimicrobial therapy, immunodeficiency are the common risk factors detected in *C. indologenes* infections<sup>8</sup>. In this case mechanical ventilation, indwelling catheters, previous wide spectrum antimicrobial treatment and patient age can be listed as risk factors.

Increasing use of automated identification systems enables more easily the identification of rare species. We use mass matrix-assisted laser desorption ionization-time of flight (Maldi-Toff) for identification. In a recent study, it is reported that the Vitek MS and Bruker Biotyper systems are successful to identify *C. indologenes* at the rates of 98.7% and 100%, respectively. However both systems fails to determine the uncommon *Chryseobacterium* species other than *C. indologenes*<sup>21</sup>. Since *C. indologenes* is rarely isolated from human infections, very few data on antimicrobial susceptibility is present. The most reliable data about the antimicrobial susceptibility of the *C. indologenes* isolates are available from the SENTRY Antimicrobial Surveillance Program, which dates back to 1997-2001<sup>4</sup>. According to the SENTRY program, the quinolones (gatifloxacin and levofloxacin) were most effective antimicrobials with susceptibility rates of >95%, followed by sulfamethoxazole/trimethoprim (95%), and piperacillin/tazobactam (90%). Rifampicin, ceftazidim and cefepime displayed lesser but acceptable susceptibilities around 85%. Other beta-lactam antibiotics, glycopeptides, aminoglycosides, chloramphenicol, carbapenems and linezolid were reported as ineffective for treatment. The presented case was successfully treated with levofloxacin. Broth dilution method is recommended over disk diffusion methods for susceptibility testing because results of disk diffusion tests are not reliable<sup>4</sup>. According to these limited data, quinolones and sulfamethoxazole/trimethoprim are the most appropriate antimicrobial options for the initial empirical treatment of the *C. indologenes*.

There are few reports about *C. indologenes* in paediatric age group. This report highlights the *C. indologenes* as an emerging multi-drug resistant microorganism, especially in immunocompromised patients with additional risk factors such as indwelling catheters and prolonged antimicrobial treatment.

Conflict of interest: We attest that we have herein disclosed

any and all financial or other relationships that could be construed as a conflict of interest and that all sources of financial support for this study have been disclosed and are indicated in the acknowledgments. All authors of this report declare no conflict of interest.

The contents of this manuscript are our original work and have not been published, in whole or in part, prior to or simultaneous with our submission of the manuscript to the journal. The manuscript has been read and approved for submission by all authors. All persons listed as authors have contributed to preparing the manuscript and/or that International Committee of Medical Journal Editors (IC-MJE) criteria for authorship have been met, and that no person(s) other than the authors listed have contributed significantly to its preparation.

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