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Case Report

Microbiology Section

# *Chryseobacterium Indologenes* Pneumonitis in an Infant: A Case Report

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## ABSTRACT

*Chryseobacterium indologenes,* a non-fermentative Gram-negative bacilli distributed widely in nature, is an emerging nosocomial pathogen, inherently resistant to a wide range of antibiotics. There is limited number of *C. indologenes* infections reported from India. We report a case of *C. indologenes* associated pneumonia in a three-month-old infant with congenital heart disease. This case highlights the importance of prompt diagnostic workup and targeted antibiotic therapy for its effective management.

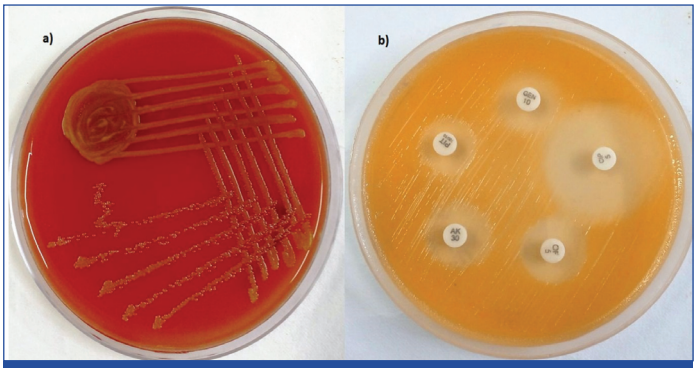
**Keywords:** Drug resistance, Nosocomial infection, Pneumonia, Tachypnoea

## CASE REPORT

A 10-week-old female infant suffering from complete balanced atrioventricular canal defect with severe hyperkinetic pulmonary arterial hypertension was transferred to our institute from a nearby private health care center with respiratory distress. She was being managed as a case of congestive cardiac failure with mechanical ventilation, broad spectrum antibiotics (injectable cefotaxime), anti-failure medications and supportive measures over past two weeks without much improvement. Multiple attempts to wean her off from the ventilatory support were unsuccessful. Clinical examination on arrival at our facility showed irritable child with tachycardia (146/min), tachypnoea (36/min), raised rectal temperature (38.9°C) and oxygen saturation ($SpO_2$) of 94%. Laboratory investigations revealed microcytic anaemia (Hb = 8.9 gm/dL), polymorphonuclear leukocytosis (WBC = 12 x $10^3$ cells/µl with neutrophils = 76%), and raised acute-phase reactants (C-reactive protein = 20 mg/dL). Chest radiograph also showed new asymmetric bilateral pulmonary infiltrates suggestive of pneumonic consolidation in addition to features of congestive cardiac failure.

Blood, urine, Cerebrospinal Fluid (CSF) and endotracheal aspirate were sent to microbiology laboratory for bacteriological culture and she was continued on the same management. In view of ventilator dependency and refractory cardiac failure, emergency surgery for total surgical correction of the cardiac anomaly was performed on the second day of admission. During postoperative period, her ventilator and inotropic requirements were high and total leukocyte count increased further (WBC = 18.4 x $10^3$ cells/µl) with predominance of neutrophils (82%). Meanwhile, the Gram stained smears from thick endotracheal aspirate revealed Gram-negative bacilli with numerous polymorphonuclear leucocytes in the background. Endotracheal aspirate culture on blood agar grew yellow pigmented colonies on aerobic incubation at 37°C for 24 hours [Table/Fig-1]. These colonies were non-lactose fermenting on MacConkey and triple sugar iron agar. The organism was non-motile, positive for cytochrome oxidase activity and indole production. The isolate was identified as *Chryseobacterium indologenes* by VITEK 2 ID-AST (bio Merieux, France) fully automated bacterial identification system. Antibiotic susceptibility testing was also performed by VITEK 2 system and susceptibility breakpoints were interpreted based on Clinical and Laboratory Standards Institute (CLSI) recommendations for other non-Enterobacteriaceae [1]. The isolate was susceptible to ciprofloxacin, trimethoprim/sulfamethoxazole (TMP/SMX) and cefepime. Tigecycline showed intermediate susceptibility. The details of minimum inhibitory concentration for various antimicrobial agents are shown in [Table/Fig-2].

The antibiotics were changed to injectable cefepime on third postoperative day. She responded favourably with improvement of oxygen saturation and resolution of high grade fever after 72 hours of treatment. Repeat endotracheal aspirate culture performed 72 hours after initiation of antibiotic therapy was negative for *Chryseobacterium*. Blood, CSF and urine culture remained sterile throughout. She was weaned off from ventilatory support at the end of one week and the antibiotic therapy was continued for 14 days. Written informed consent was obtained from the parents for publication of the case and patient photographs are not used in this case report.




**[Table/Fig-1]:** a) Yellowish orange pigmented colonies of *Chryseobacterium indologenes* on blood agar; b) The pigment is more obvious on Mueller Hinton agar.

## DISCUSSION

*Chryseobacterium indologenes* has gained attention in past few years as an emerging multidrug resistance nosocomial pathogen [2]. The spectrum of infection includes meningitis, infections of respiratory tract, urinary tract, surgical sites, soft tissue, prosthetic valve, catheter and blood stream infection [3,4]. *C. indologenes* belongs to the family Flavobacteriaceae. The other clinically important species of this family are *C. meningosepticum* and *C. odoratum*. These are Gram-negative, non-motile, aerobic, glucose non-fermentative, oxidase-positive bacilli. *C. indologenes* is easily identifiable in culture due to production of a distinct yellow to orange pigment called flexirubin [4]. There is scanty data on *C. indologenes* isolation from clinical specimen and its resistance profile from India [5-10]. We report a case of *C. indologenes* as a cause of ventilator associated pneumonia in a three-month-old infant, who was benefitted by timely institution of targeted antibiotic therapy. The Gram stained smear of endotracheal aspirate showed inflammatory cells and it was the only pathogen isolated in our case. Use of

| S.No | Antibiotic | MIC | Interpretation |
|---|---|---|---|
| 1. | Ampicillin | ≥ 32 | R |
| 2. | Amoxycillin/Clavulanic acid | ≥ 32 | R |
| 3. | Piperacillin/Tazobactum | ≥ 128 | R |
| 4. | Cefuroxime | ≥ 64 | R |
| 5. | Ceftriaxone | ≥ 64 | R |
| 6. | Cefoperazone/Sulbactum | ≥ 64 | R |
| 7. | Cefepime | 8 | S |
| 8. | Colistin | ≥ 16 | R |
| 9. | Imipenem | ≥ 16 | R |
| 10. | Meropenem | ≥ 16 | R |
| 11. | Amikacin | ≥ 64 | R |
| 12. | Gentamicin | ≥ 16 | R |
| 13. | Ciprofloxacin | 1 | S |
| 14. | Trimethoprim/Suphamethoxazole | ≥ 20 | S |
| 15. | Nalidixic acid | 4 | S |
| 16. | Tigecycline | 4 | I |

**[Table/Fig-2]:** *Chryseobacterium indologenes* minimum inhibitory concentration values for various antimicrobial agents, as determined by VITEK 2 system (bioMérieux).
Abbreviations: MIC - Minimum Inhibitory Concentration (µg/ml), R - Resistant, I - Intermediate, S - Susceptible.

invasive medical devices, broad-spectrum antibiotics, underlying diseases and primary or acquired immunosuppressive conditions are the known risk factors for hospital acquired infection. Complete atrioventricular canal defect with congestive cardiac failure, prolonged hospital stay and mechanical ventilation were important predisposing factors in our patient.

Unless diagnosed, the choice of an appropriate antibiotic for the empirical treatment is difficult. Chen FL et al., have indicated significant 14 days survival benefit following targeted antibiotic therapy [11]. *Chryseobacterium* species exhibit multidrug resistance due to production of class A and class B-lactamases and are susceptible to quinolones, TMP/SMX and piperacillin–tazobactum (PIP/TAZ) combinations [2]. Our strain was resistant to PIP/TAZ, aminoglycosides, carbapenems, colistin and second/third generation cephalosporins, which are the antibiotic of choice for empirical treatment of severe Gram-negative infections. The susceptibility to vancomycin was not tested and there is increasing trend of vancomycin resistance being reported [2,11,12]. The present isolate was susceptible to ciprofloxacin, TMP/SMX and cefepime. Injectable cefepime was initiated considering its safety and efficacy in respiratory tract infection. The patient responded favourably with improvement in oxygen saturation and general condition.

*Pseudomonas, Acinetobacter* and *Stenotrophomonas* are the commonest non-fermenters isolated in clinical laboratory. Species level identification of other non-fermenting bacilli by conventional technique is cumbersome. Isolation of a pigmented, non-motile, oxidase-positive and non-fermenting organism should raise suspicion among clinical microbiologist about possibility of *C. indologenes*. Newer fluoroquinolones and TMP/SMX are valuable antibiotics in such cases for empirical therapy till individualized susceptibility reports are available. Availability of automated culture and antibiotic susceptibility test techniques has improved isolation of non-fermenters. *C indologenes* resists chlorination and is adapted to survive in hospital environment. It can colonize medical equipments like respiratory tubing and prosthetic devices [2,11,13]. Isolation of such rare pathogen also warrants implementation of strict hospital infection control measures to limit its further spread.

## CONCLUSION

*C. indologenes* is an emerging nosocomial multidrug resistance pathogen causing variety of infections among individuals of extremes of age and immunocompromised patients. Early diagnostic workup and targeted antibiotic therapy are essential for its effective management.

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