OPEN ACCESS

Saudi Journal of Medical and Pharmaceutical Sciences

Abbreviated Key Title: Saudi J Med Pharm Sci
ISSN 2413-4929 (Print) | ISSN 2413-4910 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://saudijournals.com

Case Report **Clinical Bacteriology**

Chryseobacterium indologenes Bacteremia in a Pediatric Cardiac Surgery Patient: A Case Report and Literature Review

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DOI: https://doi.org/10.36348/sjmps.2025.v11i07.032 | **Received:** 02.06.2025 | **Accepted:** 21.07.2025 | **Published:** 31.07.2025

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Abstract

Chryseobacterium indologenes is a rare but emerging opportunistic Gram-negative pathogen, primarily isolated from hospital environments and associated with severe infections in immunocompromised or critically ill patients. We report the case of a 2-year-old girl with a history of recurrent bronchopulmonary infections and recent cardiac surgery for a subaortic membrane, who developed sepsis postoperatively.

Keywords: *Chryseobacterium Indologenes*, Bacteremia, Pediatric Infection, Cardiac Surgery.

INTRODUCTION

Chryseobacterium indologenes is an aerobic, non-motile, non-fermenting, oxidase-positive Gram-negative bacillus that produces a yellow-orange pigment on blood agar. Formerly known as *Flavobacterium indologenes*, it is widely distributed in environmental sources such as soil, water, plants, and food products. Though rarely part of the human microbiota, it can persist in hospital water systems and humid surfaces, exhibiting resistance to chlorination and disinfectants [1,2].

Clinical infections due to *C. indologenes* are uncommon and primarily occur in immunocompromised or hospitalized patients with indwelling devices or recent surgery [3,4]. The bacterium is intrinsically resistant to multiple antibiotics, including carbapenems, due to metallo-β-lactamase production [2-5]. Reports of pediatric infections remain rare, and literature regarding optimal treatment is limited. We report a pediatric case of *C. indologenes* bacteremia following cardiac surgery, with a review of its clinical and microbiological features.

CASE PRESENTATION

A 2-year-old girl was admitted for the surgical management of congenital heart disease, specifically a stenosing subaortic membrane. Her medical history included recurrent lower respiratory tract infections. One month prior, she underwent membrane resection under cardiopulmonary bypass. On admission, the patient was afebrile, with stable respiration, but presented with tachycardia and hypotension. Surgical wound examination revealed a clean, well-healed sternotomy scar with no signs of infection. Cardiac auscultation revealed regular heart sounds, and the pleuropulmonary examination was unremarkable.

Chest radiography showed a normal cardiac silhouette with clear pulmonary fields. Transthoracic echocardiography revealed a subaortic membrane tightly adherent to the aortic valve base, causing left ventricular outflow obstruction with mild aortic insufficiency. The left ventricle was of normal size and function.

Laboratory findings showed hemoglobin at 11.4 g/dL and a white blood cell count of 6,000/µL. Renal function was normal. Inflammatory markers were elevated, with a C-reactive protein of 22 mg/L and a procalcitonin of 2.46 ng/mL.

Following surgery, the patient developed signs of sepsis. Two sets of pediatric blood cultures were drawn at the fever peak. After 24 hours of incubation, both cultures were positive. Gram staining revealed Gram-negative bacilli. Subculture on blood agar and chocolate agar incubated at 37°C in a 5–10% CO_2 atmosphere yielded shiny, pigmented colonies. Identification using the API 20NE system confirmed *Chryseobacterium indologenes* (identification code: 2612004) (figure 1).

Figure 1: Image illustrating the characteristic growth of *Chryseobacterium indologenes* on blood agar

Antibiotic susceptibility testing was performed using the disk diffusion method on Mueller–Hinton agar, interpreted according to EUCAST 2022 guidelines. The isolate was resistant to ticarcillin, ticarcillin-clavulanic acid, aztreonam, aminoglycosides, imipenem, and meropenem. However, it was susceptible to ceftazidime, cefepime, piperacillin, piperacillin-tazobactam, levofloxacin, and trimethoprim-sulfamethoxazole.

The patient was treated with intravenous ceftazidime for 9 days, resulting in clinical and biological improvement. No complications were noted during follow-up.

DISCUSSION

Chryseobacterium indologenes is a Gram-negative, non-motile, non-fermenting, rod-shaped bacillus that is widely distributed in natural environments such as soil, water, and plants [3]. One of the key biochemical characteristics that differentiates it from the Enterobacteriaceae family is its oxidase positivity. Although it is not part of the normal human flora, this organism has been increasingly recognized as an opportunistic pathogen in hospital settings.

Its resilience in the environment is partly due to its ability to resist chlorination, allowing it to persist in municipal water supplies and healthcare facility plumbing systems [2]. In clinical settings, *C. indologenes* can colonize moist surfaces, including sink drains, humidifiers, and medical equipment. Notably, it has been frequently isolated from indwelling devices such as catheters and endotracheal tubes, particularly those containing fluid media [4]. These surfaces serve as potential reservoirs for transmission, especially in high-risk units such as intensive care or pediatric surgery wards.

The pathogen primarily affects immunocompromised individuals or patients with significant underlying conditions. Those with diabetes mellitus, malignancies, neutropenia, or those undergoing prolonged hospitalization and broad-spectrum antibiotic therapy are particularly susceptible. In this context, *C. indologenes* may transition from colonizer to invasive pathogen, causing severe infections such as bacteremia, pneumonia, and catheter-related bloodstream infections.

Although infections caused by *Chryseobacterium* species are relatively rare in clinical practice, they are likely underrecognized due to limited awareness and challenges in identification. This trend is also observed in our setting, where reports remain scarce. However, the organism's clinical significance should not be underestimated.

Despite its relatively low intrinsic virulence compared to other Gram-negative bacilli, *C. indologenes* has several factors that enhance its pathogenic potential. It is capable of forming biofilms on foreign materials,

such as prosthetic devices and catheters, which not only facilitates persistent colonization but also impairs antibiotic penetration. Additionally, the bacterium produces extracellular enzymes such as proteases, which contribute to tissue destruction and immune evasion, thus increasing its virulence [5].

Another critical concern is its multidrug resistance. *C. indologenes* often exhibits resistance to β-lactams, including carbapenems, due to the production of chromosomally encoded metallo-β-lactamases. Its susceptibility profile is unpredictable, necessitating individualized antimicrobial susceptibility testing to guide effective therapy. Empirical treatment is further complicated by the lack of standardized guidelines for this emerging pathogen.

Given its increasing clinical relevance, particularly in vulnerable patient populations, healthcare professionals must be vigilant in recognizing and managing infections caused by *C. indologenes*. Prompt identification, infection control measures, and targeted antimicrobial therapy are essential to improving outcomes and limiting nosocomial transmission.

CONCLUSION

C. indologenes bacteremia, though rare, should be considered in pediatric patients with sepsis following surgery or hospitalization, especially in environments where the organism may persist. Rapid identification and appropriate antibiotic therapy are essential to achieve good clinical outcomes, given its multidrug-resistant profile.

Acknowledgements

We would like to thank all the technicians of the Bacteriology Laboratory of the Mohammed V Military Hospital in Rabat for their contribution to the achievement of this study.

Funding: No funding was received for this study.

Consent for Publication: Not applicable.

Competing interests: The authors declare that they have no competing interests

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