Case Report

Severe Sepsis Due to *Chryseobacterium indologenes*, a Possible Emergent Multidrug-Resistant Organism in Intensive Care Unit-Acquired Infections

Sonika Agarwal, Barnali Kakati[1], Sushant Khanduri
Departments of CCM and [1]Microbiology, H.I.M.S, S.R.H.U., Dehradun, Uttarakhand, India

Abstract

Opportunistic infections in the intensive care unit are quite common which can cause devastating disease in many hospitalized and immunocompromised patients. *Chryseobacterium indologenes* is one such microorganism which is an emerging cause of nosocomial infections. Many cases had been reported from its infections, but the treatment protocol for its management is still not established. We present two cases of *C. indologenes* infections which were hospital acquired. The pandrug-resistant nature of the bacteria and the associated mortality were uncommon with these two cases.

Keywords: *Chryseobacterium indologenes,* hospital acquired infection, multidrug resistance

Introduction

Chryseobacterium indologenes is an uncommon human pathogen that has been rarely reported in the literature as a cause of infection because of its low virulence. Chryseobacterium indologenes has a potential to causes severe nosocomial infections, especially in immunocompromised, critically ill patients and has a multidrug resistant pattern. Infections due to Chryseobacterium spp. occurs more commonly in the elderly (>65 years old)patients with nosocomial pneumonia and bacteraemia being more common, sometimes associated with prolonge indwelling devices. In the hospital environment, this bacteria has ability to contaminate and persist in fluid-containing apparatuses.The infections caused by Chryseobacterium indologenes are on rise because of selection pressure and prolong ICU stay. We report two cases of hospital acquired Chryseobacterium sepsis with fatal outcome.

Case 1

A 61-year-old male who was a diagnosed case of carcinoma breast Stage 4 postoperative, postchemotherapy, and postradiotherapy with interstitial fibrosis on palliative chemotherapy was admitted in an emergency with fever, pain abdomen and respiratory distress from the past 5 days. The patient was intubated, resuscitated and transferred to the intensive care unit (ICU) in a shock state. All the relevant cultures were sent and broad-spectrum antibiotics started. His initial investigation showed leukopenia with serum procalcitonin (PCT) of 136 with a pneumonic patch on the chest X-ray. Ultrasonography abdomen showed normal study. All the cultures came negative but the shock did not improve, so empirically polymyxin B was added on the 5th day looking at our local microbiological sensitivity pattern. Cultures were resent and endotracheal (ET) tube aspirate showed growth *Stenotrophomonas maltophilia* sensitive to cotrimoxazole. Hence, cotrimoxazole was started and the other antibiotics decelerated. Percutaneous tracheostomy was done as it was difficult to wean the patient. The patient slightly improved with PCT of 34 but again developed fever and worsening of shock. All the relevant cultures were resent, and antifungal was added. The patient developed acute kidney

Access this article online

Quick Response Code:

Website: www.ijccm.org

DOI: 10.4103/ijccm.IJCCM_278_18

Address for correspondence: Dr. Sonika Agarwal, Department of CCM, H.I.M.S.S.R.H.U., Jolly Grant, Dehradun - 248 016, Uttarakhand, India.
E-mail: sonikakatiyar@srhu.edu.in

How to cite this article: Agarwal S, Kakati B, Khanduri S. Severe sepsis due to *chryseobacterium indologenes*, a possible emergent multidrug-resistant organism in intensive care unit-acquired infections. Indian J Crit Care Med 2018;22:817-9.

Table 1: Antimicrobial susceptibilities of isolated *Chryseobacterium indologenes*

Antibiotics tested	Case1 (MIC)	Sensitivity	Case 2 (MIC)	Sensitivity
Ticarcillin/clavulanic acid	≧128	R	≧128	R
Piperacillin/tazobactum	≧128	R	≧128	R
Ceftazidime	≧64	R	≧64	R
Cefoperazone/sulbactum	≧64	R	≧64	R
Cefepime	≧64	R	≧64	R
Aztreonam	≧64	R	≧64	R
Imipenem	≧16	R	≧16	R
Meropenem	≧16	R	≧16	R
Amikacin	≧64	R	≧64	R
Gentamicin	≧16	R	≧16	R
Ciprofloxacin	≧4	R	≧4	R
Levofloxacin	≧8	R	≧8	R
Tigecycline	≧8	R	≧8	R
Colistin	≧16	R	≧16	R
Trimethoprim/ sulfamethoxazole	80	R	≧320	R

MIC: Minimum inhibitory concentration, R: Resistant

injury (AKI) which was managed by dialysis. Blood culture from the central line and peripheral access yielded growth of *Chryseobacterium indologenes* by BaCT/ALERT 3D automated blood culture VITEK 2 (BioMerieux) system, and antibiotic sensitivity testing was performed using the panel negative MIC type 30 (MicroScan; Dade Behring, Inc., West Sacramento, CA, USA). Control strains were *Escherichia coli* ATCC 25922 and *Pseudomonas aeruginosa* ATCC 27853. The sensitivity of the isolate to the antimicrobial agents was determined by applying the Clinical and Laboratory Standards Institute susceptibility criteria used for *P. aeruginosa* which was pandrug resistant [Table 1]. The central line was changed and rifampicin was added, but the patient did not improve and expired after 24 days of ICU stay and mechanical ventilation.

Case 2

A 68-year-old female who was a known case of multiple connective tissue disorder with interstitial lung disease and hypertension came to the hospital with fever and respiratory distress. The patient was managed in the ward with antibiotics and noninvasive ventilation. On the 3rd day, the patient developed labored breathing and desaturation, so she was intubated and transferred to ICU. All the relevant cultures were sent, and antibiotics were stepped-up. ET aspirate grew *Pseudomonas* and was managed with meropenem and polymyxin, for which the bacteria were sensitive. Still, there was no improvement and antifungal was started, and ET aspirate cultures were resent which showed growth of *C. indologenes* which was pandrug resistant [Table 1]. Cotrimoxazole was started as bacteria showed MIC of 80. The patient developed AKI which was managed with dialysis. Repeat ET aspirate after 10 days also showed the same organism with the same pandrug-resistant pattern. The patient did not improve and expired after 20 days of hospital stay.

Cultures from the water sources from the ICU were sent to find the source, but the *C. indologenes* was not traceable.

C. indologenes, formally known as *Flavobacterium indologenes*, is a Gram-negative, oxidase-positive, nonglucose-fermenting bacillus.[1] It is usually found in plants, soil, food materials, and fresh and marine water sources.[2] They are normally not present in the human microflora, but they exist on water systems and wet surfaces which are even resistant to chlorination. In a hospital, they can get colonized to medical devices such as humidifiers, respirators, ET tubes, and tracheostomy tubes and serve as potential reservoirs of infection. In immunocompromised patients or in patients on prolonged broad-spectrum antibiotics, the contamination of surgically implanted devices such as intravenous catheters and prosthetic valves is also reported.[3] Bacteremia and pneumonia are the most commonly reported infections caused by *C. indologenes*.[4,5]

C. indologenes possesses chromosomal metallo-beta-lactamases, so it is naturally resistant to aminoglycosides. It typically exhibits resistance to multiple antibiotics with newer fluroquinolones, trimethoprim-sulfamethoxazole, and rifampin shows some sensitivity.[6] There is an increasing trend of *C. indologenes* infections after rise in colistin and tigecycline usage.[7] There are no established recommendations for the management of *C. indologenes* infections. Therefore, choosing an appropriate antibiotic therapy for this pathogen is very difficult.

Our case is unique due to the pandrug-resistant pattern of *C. indologenes* and the associated mortality. Our patients were elderly and were in the immunosuppressed state on the broad spectrum of antibiotics with invasive lines *in situ* and prolong ICU stay. Above findings also comply with the studies from Taiwan which showed increasing prevalence of *C. indologenes* infections in the recent past with increasing resistance pattern. These studies also showed that *C. indologenes* infections were associated with high mortality as in our cases, especially in bacteremic patients.[7,8] Our findings suggest that this pathogen should be included among the causes of ICU-acquired bacteremia, especially in patients with a prolonged stay in an ICU, and specific recommendations for its management should be established.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Lin YT, Jeng YY, Lin ML, Yu KW, Wang FD, Liu CY, *et al.* Clinical and microbiological characteristics of *Chryseobacterium indologenes* bacteremia. J Microbiol Immunol Infect 2010;43:498-505.
2. Calderón G, García E, Rojas P, García E, Rosso M, Losada A, *et al. Chryseobacterium indologenes* infection in a newborn: A case report. J Med Case Rep 2011;5:10.
3. Nulens E, Bussels B, Bols A, Gordts B, Van Landuyt HW. Recurrent bacteremia by *Chryseobacterium indologenes* in an oncology patient with a totally implanted intravascular device. Clin Microbiol Infect 2001;7:391-3.
4. Cascio A, Stassi G, Costa GB, Crisafulli G, Rulli I, Ruggeri C, *et al. Chryseobacterium indologenes* bacteraemia in a diabetic child. J Med Microbiol 2005;54:677-80.
5. Green BT, Nolan PE. Cellulitis and bacteraemia due to *Chryseobacterium indologenes*. J Infect 2001;42:219-20.
6. Chou DW, Wu SL, Lee CT, Tai FT, Yu WL. Clinical characteristics, antimicrobial susceptibilities, and outcomes of patients with *Chryseobacterium indologenes* bacteremia in an intensive care unit. Jpn J Infect Dis 2011;64:520-4.
7. Chen FL, Wang GC, Teng SO, Ou TY, Yu FL, Lee WS, *et al*. Clinical and epidemiological features of *Chryseobacterium indologenes* infections: Analysis of 215 cases. J Microbiol Immunol Infect 2013;46:425-32.
8. Hsueh PR, Teng LJ, Yang PC, Ho SW, Hsieh WC, Luh KT, *et al.* Increasing incidence of nosocomial *Chryseobacterium indologenes* infections in Taiwan. Eur J Clin Microbiol Infect Dis 1997;16:568-74.