

## *Chryseobacterium gleum* Isolated from a Case of Blood Stream Infection and Pneumonia: A Rare Isolate

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DOI: 10.36347/sjmcr.2019.v07i01.019

| Received: 16.01.2019 | Accepted: 25.01.2019 | Published: 30.01.2019

### Abstract

### Case Report

*Chryseobacterium gleum* is a gram negative, non-fermentative, catalase and oxidase positive organism emerging as multidrug resistant pathogen in health care setting especially in cases of Blood stream infection, UTI, Pneumonia. Very few cases by *Chryseobacterium* species have been reported so far. Considering high mortality caused by these pathogens, rapid and accurate identification methods guide therapy for better patient care. In this paper we report a case of Blood stream infection and Pneumonia in a 60-year-old female patient who is a k/c/o CKD/ Type 2 DM/ HTN/ CAD, admitted to Emergency room for high grade fever since 10 days and breathlessness since 3 days. 2 paired blood cultures and ET culture isolated *Chryseobacterium gleum* showing identical susceptibility patterns of resistance to Cephalosporins, Carbapenems and Colistin and susceptibility to Levofloxacin, Cotrimoxazole and Minocycline. The patient improved clinically on Levofloxacin therapy. Simultaneous isolation of a rare isolate '*Chryseobacterium gleum*' from Blood Stream and Lower Respiratory Tract is very rare. Due to inherent resistance to Carbapenems and Colistin, there is a need for early laboratory identification for guiding appropriate antibiotic therapy, thereby preventing the risk of health care associated infections.

**Keywords:** *Chryseobacterium gleum*, Blood stream infection, Pneumonia, Levofloxacin, Drug Resistance.

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## INTRODUCTION

Health care associated infections are a threat for patients and clinicians when environmental organisms ubiquitous in soil, water and food sources emerge as pathogenic organisms causing nosocomial infections [1,2]. *Chryseobacterium* species, formerly known as *Flavobacterium* belong to the family Flavobacteriaceae. *Chryseobacterium indologenes*, *Chryseobacterium gleum* and other strains are grouped under CDC IIB [1,3]. They are aerobic, yellow pigmented, catalase and oxidase positive, non-motile, non-fermenting Gram Negative Bacilli which are inherently resistant to antibiotics like Carbapenems and Colistin, but sensitive to fluoroquinolones and macrolides [3].

*C. gleum* have been isolated from a wide variety of infections ranging from respiratory tract infections, UTI, pyonephrosis, septicaemia, meningitis, wound infections, peritonitis and ocular infections [1,4]. Though these strains have been reported in various countries like Hungary, Qatar, Saudi Arabia, Taiwan, Italy, and India, simultaneous isolation of the organism from various samples from a single patient is rare. In addition to that, these strains encode Class A

Carbapenemases and Class B metallo-beta-lactamases conferring resistance to all  $\beta$  lactam antibiotics. Such high resistance and high mortality caused by these pathogens creates a need for early and accurate identification for preventing spread of such strains and controlling nosocomial infections [4,5].

## CASE REPORT

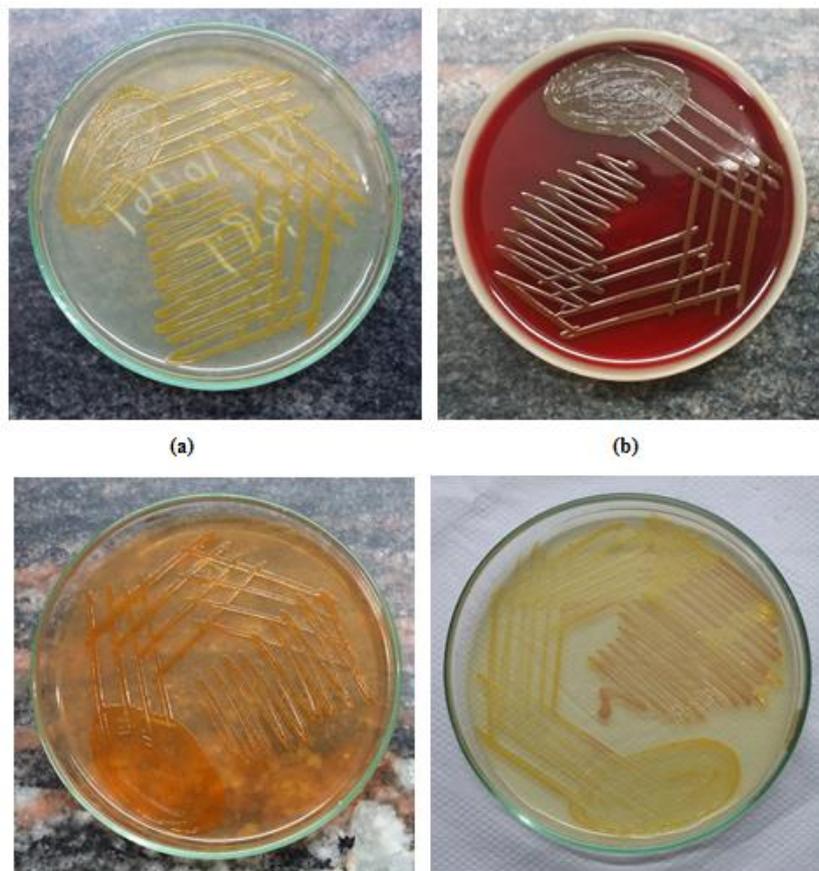
A 60-year-old female patient, a k/c/o Chronic kidney disease on haemodialysis / Type 2 DM/ HTN/ CAD, was brought to Emergency Department, Narayana Medical College, Nellore on 27<sup>th</sup> June 2018 for high grade fever with chills since 10 days and difficulty in breathing since 3 days. She was admitted in Nephrology Department with a suspicion of Lower Respiratory Tract Infection.

On examination, patient was hemodynamically stable with Blood pressure of 140/90mmHg, Temperature 99<sup>o</sup>F. Her CBC revealed leucocytosis (24,100 cell/cumm) with raised neutrophils (84%) and reduced lymphocytes (16%). On day 2, patient condition deteriorated and patient became unresponsive. She was put on mechanical ventilation with vasopressor support and shifted to ICU. 2D ECHO revealed LV

dysfunction. She was administered imipenem and linezolid as empirical therapy. Chest X ray revealed patchy infiltrates in lower respiratory tract. On day 3, 2 paired blood cultures and ET tube aspirate was sent for culture and sensitivity to Microbiology Laboratory. Both blood cultures and ET aspirate were culture positive with Gram Negative bacilli with growth on Nutrient agar, Blood agar (pure yellow pigmented), Chocolate agar and Mac Conkey agar [Figure 1 (a, b, c)]. The organisms were plated onto Mueller Hinton agar wherein yellow colonies turned red immediately on addition of 10% KOH [Figure 1 (d)]. These bacilli were confirmed as *Chryseobacterium gleum* by

automated microbial identification and susceptibility system VITEK 2 (bioMerieux, Durham, NC).

The bacteria were resistant to most of the antibiotics including Carbapenems, Piperacillin – Tazobactam and Colistin, but susceptible only to Levofloxacin, minocycline and TMP/SMX. Susceptibility testing was performed based on CLSI guidelines. Following levofloxacin therapy, fever reduced and the patient responded well and improved. She came off vasopressors and was transferred back to Nephrology ward. The patient was discharged home in a stable state.



**Fig-1: (a) Nutrient agar, (b) Blood agar, (c) Mac Conkey agar, (d) Mueller Hinton agar**

## DISCUSSION

Among the 21 species of *Chryseobacterium*, *C. indologenes* and *C. gleum* are most commonly isolated species [4]. Predisposing factors like indwelling catheters, invasive interventions, immunocompromised state have been reported for acquisition of *Chryseobacterium* [2]. *C. gleum* has emerged as a medically relevant pathogen with its multidrug resistant

property to contributing for its survival in hospital environment [7]. As described first by the SENTRY study, *Chryseobacterium* constitutes 0.27% of NFGNB from various clinical specimens across 16 countries [6]. Since there are no CLSI or EUCAST guidelines for antimicrobial susceptibility testing for *Chryseobacterium*, the choice of antibiotic agent for treatment is not well established [1].

**Table-1: Reported cases of chryseobacterium gleum infections**

S.No	Infection course	Sample	Comorbidities	Age/ Sex	Susceptibility of tested drugs	Year
1.	Cystic Fibrosis	Sputum	NA	3 female pts	TMP/SMX, levofloxacin, ciprofloxacin	2007 [5]
2.	Nephrotic syndrome	ET tube aspiration	Nil	6 months/ male	TMP/SMX, Levofloxacin, minocycline,	2016 [1]
3.	Chronic Granulomatous Disease	Lung abscess aspirate	Nil	Infant	Cotrimoxazole, Piperacillin – Tazobactam	2017 [8]
4.	Temporal bleed, post Road Traffic Accident	Blood and Tracheal aspirate	HTN, DM, CKD, CABG	62yrs / male	Ciprofloxacin, levofloxacin, amikacin, TMP/SMX, Piperacillin – Tazobactam, Minocycline	2017 [2]
5	CKD	Urine	HTN, DM, RA	73yrs/ Female	Ceftriaxone, Piperacillin – Tazobactam	2018 [4]
6	Renal stone disease (RSD)	Urine	Nil	38yrs / male	Minocycline	2018 [4]
7.	CKD + RSD + ureteric calculi	Urine	Nil	42yrs / female	TMP/SMX	2018 [4]
8.	Fever + SOB + haemodialysis	Blood & ET tube aspirate	CKD, HTN, DM, CAD	60yrs / Female	Levofloxacin, minocycline, TMP/SMX	Present study

Though the susceptibility to TMP/SMX and newer generations of quinolones like levofloxacin, gatifloxacin is similar to the SENTRY study, the resistance to Piperacillin – Tazobactam and susceptibility to minocycline is contradictory [1,6]. Such multidrug resistance mechanism is enhanced by antimicrobial selection pressure requiring the need for continual epidemiological survey [5].

## CONCLUSION

Critically ill patients admitted in ICUs are more at risk of health care associated infections especially with such emerging pathogens like *Chryseobacterium gleum*. The inherent resistance to Carbapenems and colistin, requires the rapid and accurate identification by automated methods for guiding therapy [9]. We report the rare case of isolation of *Chryseobacterium gleum* from blood stream and ET aspirate with sensitivity to TMP/SMX, levofloxacin and minocycline. Our case highlights the increasing emergence of environmental organisms as opportunistic pathogens in patients with comorbidities. Further work is required to identify the bacteria's etiological role, mode of transmission, disease spectrum and treatment modalities [10].

## Acknowledgements

The authors are deeply indebted to the patient for allowing them to present the details of her case.

## REFERENCES

- Baha Abdalhamad, Nasreldin Elhadi, Khaldoun Alsammah, Reem Aljindan. *Chryseobacterium gleum* pneumonia in an infant with nephrotic syndrome. ID cases 5 (2016): 34 – 36
- Vidhi Jain, Nayani Amrin Fatema Afzal Hussain, Tasneem Siddiqui, Chinmoy Sahu, Malay Ghar and Kashi Nath Prasad. Simultaneous isolation of *Chryseobacterium gleum* from bloodstream and respiratory tract: first case report from India. JMM Case Report 2017: 1 – 4
- Bernadet JF, Nakagawa Y, Holme B. Subcommittee on the taxonomy of F. Cytophaga like bacteria of the International Committee on Systematics of P. Proposed minimal standards for describing new taxa of the family Flavobacteriaceae and emended description of the family. Int J Syst Evol Microbiol. 2002; 52: 1049 – 70
- Kaur H, Mohan B, Hallur V, Raj A, Basude M, Mavuduru RS, Taneja N. Increased recognition of *Chryseobacterium* species as an emerging cause of nosocomial urinary tract infection following introduction of matrix-assisted laser desorption/ionisation-time of flight for bacterial identification. Indian journal of medical microbiology. 2017 Oct 1;35(4):610.
- Lambiase A, Del Pezzo M, Raia V, Sepe A, Ferri P, Rossano F. *Chryseobacterium* respiratory tract infections in patients with cystic fibrosis. Journal of Infection. 2007 Dec 1;55(6):518-23.
- Kirby JT, Sader HS, Walsh TR, Jones RN. Antimicrobial susceptibility and epidemiology of a worldwide collection of *Chryseobacterium* spp. report from the SENTRY Antimicrobial Surveillance Program (1997-2001). Journal of clinical microbiology. 2004 Jan 1;42(1):445-8.
- Lo HH, Chang SM. Identification, characterization, and biofilm formation of clinical *Chryseobacterium gleum* isolates. Diagnostic microbiology and infectious disease. 2014 Jul 1;79(3):298-302.

8. Rawat A, Vignesh P, Sharma A, Shandilya JK, Sharma M, Suri D, Gupta A, Gautam V, Ray P, Rudramurthy SM, Chakrabarti A. Infection profile in chronic granulomatous disease: a 23-year experience from a tertiary care center in North India. *Journal of clinical immunology*. 2017 Apr 1;37(3):319-28.
9. Chang YC, Lo HH, Hsieh HY, Chang SM. Identification, epidemiological relatedness, and biofilm formation of clinical *Chryseobacterium indologenes* isolates from central Taiwan. *Journal of Microbiology, Immunology and Infection*. 2015 Oct 1;48(5):559-64.
10. Shabnum M, Vasundhara P, Sreenivasulu Reddy P. *Cedacea Davisae* from ET culture – A rare isolate. *Sch. J. Med. Case Rep.*, Mar 2018; 6 (3): 165 - 167