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Clinical Report

Community-acquired Pneumonia Caused by *Chryseobacterium gleum* in an Immunocompetent Patient

Cristian Amaral De Sousa*, Lara Bravo Quiroga, Darwin Feliz

Hospital Universitario Príncipe de Asturias, Alcalá de Henares, Madrid, Spain

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ABSTRACT

We report the first documented case of community-acquired pneumonia caused by *Chryseobacterium gleum* in an immunocompetent patient without typical risk factors. This gram-negative bacillus, historically associated with nosocomial infections in immunocompromised individuals, was identified as the etiological agent in a 73-year-old woman with respiratory sepsis. The ineffectiveness of the initial empirical treatment underscored the urgent need for precise microbiological identification. A sputum culture proved to be a crucial step, as it led to the isolation of *C. gleum* and revealed its resistance to several commonly used antibiotics. Guided by these findings, targeted therapy with levofloxacin proved successful, leading to the patient's complete recovery. This case demonstrates that *C. gleum* can be a primary pathogen in healthy individuals, underscoring the fundamental importance of obtaining microbiological cultures to guide appropriate treatment and achieve a favorable outcome, especially in infections caused by rare pathogens with intrinsic resistance profiles.

Neumonía adquirida en la comunidad por *Chryseobacterium gleum* en una paciente inmunocompetente

Palabras clave:
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Neumonía bacteriana
Infecciones del sistema respiratorio
Infecciones bacterianas por gramnegativos

RESUMEN

Presentamos el primer caso reportado de neumonía adquirida en la comunidad causada por *Chryseobacterium gleum* en una paciente inmunocompetente y sin factores de riesgo típicos. Este bacilo gramnegativo, asociado históricamente con infecciones nosocomiales en individuos inmunocomprometidos, fue identificado como el agente etiológico en una mujer de 73 años con sepsis respiratoria. La ineficacia del tratamiento empírico inicial subrayó la urgente necesidad de una identificación microbiológica precisa. Un cultivo de esputo demostró ser un paso crucial, ya que permitió el aislamiento de *C. gleum* y reveló su resistencia a varios antibióticos de uso común. Guiada por estos hallazgos, la terapia dirigida con levofloxacino demostró ser exitosa, llevando a la recuperación completa de la paciente. Este caso demuestra que *C. gleum* puede ser un patógeno primario en individuos sanos, lo que resalta la importancia fundamental de obtener cultivos microbiológicos para guiar un tratamiento apropiado y lograr un resultado favorable, especialmente en infecciones causadas por patógenos raros con perfiles de resistencia intrínsecos.

Clinical report

Chryseobacterium gleum, a non-fermenting gram-negative bacillus, first identified in 1984 from 12 different cultures, predominantly high vaginal swabs,[1] causes various infections, including those of the skin and soft tissue and eyes, meningitis,

* Corresponding author.
E-mail address: cristianamaraldesousa@gmail.com (C. Amaral De Sousa).

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Table 1
Laboratory test results on admission.

Analyte	Result	Units	Reference range
Hematology			
White blood cells	10.01	10^9/l	4.5–11
Neutrophils	81.9	%	50–70
Lymphocytes	8.7	%	20–40
Monocytes	7.1	%	4–10
Eosinophils	2.3	%	<4
Basophils	0	%	<1.5
Red blood cells	4.57	10^9/l	4.10–5.00
Hemoglobin	13.8	g/dl	12.0–16.0
Hematocrit	42.3	%	36.0–46.0
Mean corpuscular volume	92.7	fl	80.0–90.0
Mean corpuscular hemoglobin	30.3	pg	26.0–30.0
Mean corpuscular hemoglobin concentration	32.6	g/dl	31.0–34.0
Platelets	185	10^9/l	150–400
Hemostasis			
Activated partial thromboplastin time	29.4	s	23.2–38.2
Prothrombin time	17.9	s	11.0–17.0
International normalized ratio	1.39	(ratio)	0.90–1.22
Prothrombin activity	62	%	70.0–130.0
Biochemistry			
Glucose	93	mg/dl	74–106
Urea	61	mg/dl	18–46
Creatinine	1.36	mg/dl	0.55–1.02
Estimated glomerular filtration rate	38.64	ml/min/1.73 m^2	>60.00
Calcium	10.6	mg/dl	8.7–10.4
Alanine aminotransferase	40	U/l	10–49
Lactate dehydrogenase	170	U/l	120–246
Total bilirubin	0.66	mg/dl	0.30–1.20
Sodium	135	mmol/l	132–145
Potassium	3.2	mmol/l	3.5–5.3
Chloride	100	mmol/l	98–107
C-reactive protein	379.6	mg/l	<10.0
Procalcitonin	2.17	ng/ml	<0.10
Special tests			
Plasma lactate	2.8	mmol/l	0.4–2.0

endocarditis, pneumonia, and bacteremia. These primarily affect neonates and immunocompromised patients and often originate from fluid-containing medical devices, such as respirators, humidifiers, and syringes, through biofilm formation.[2,3]

While recent reports of *C. gleum* pneumonia typically involve immunosuppression, broad-spectrum antibiotic therapy or prolonged hospitalization,[4,5] no cases have been documented in immunocompetent individuals without risk factors. We report here such a case: a patient admitted to Hospital Universitario Príncipe de Asturias, Madrid, Spain, with respiratory sepsis secondary to community-acquired pneumonia. *C. gleum* was identified as the causative agent, and the patient was successfully treated with levofloxacin.

A 73-year-old woman with a medical history of passive smoking, dyslipidemia, vitamin D deficiency, glaucoma, gonarthrosis, and autoimmune hypothyroidism attended the emergency department on February 5, 2025. She reported a 4-day history of fever (40 °C), productive cough with mucopurulent sputum, dyspnea at rest, and pleuritic pain in her right hemithorax. Her symptoms had not improved despite symptomatic treatment.

Upon arrival at the emergency department, she was febrile with tachycardia and tachypnea. Physical examination revealed right basal crackles. Initial laboratory test results are detailed in Table 1. A posteroanterior and lateral chest X-ray revealed increased density with air bronchograms in the middle lobe and the base of the left upper lobe, along with blunting of both costophrenic angles (Appendix A.1).[6-12] Multiplex polymerase chain reaction tests for influenza, respiratory syncytial virus and COVID-19 were also performed, yielding negative results. Consequently, the patient was admitted to the respiratory medicine ward with a working diagnosis of community-acquired pneumonia. Treatment was initiated with oxygen therapy via nasal cannula at 2 g per minute and empirical antibiotic therapy consisting of ceftriaxone 2 g and azithromycin 500 mg every 24 h.

Due to indicators of severity (small right pleural effusion, Sequential Organ Failure Assessment (SOFA) score of 5), antibiotic treatment was escalated to ceftriaxone 2 g and levofloxacin 500 mg every 24 h, and a sputum culture was requested.

Forty-eight hours later, we observed significant clinical and laboratory improvement, with a decrease in acute phase reactants and normalization of renal function. The sputum culture results subsequently identified *C. gleum*, susceptible only to levofloxacin and sulfamethoxazole/trimethoprim. Based on these results and the patient's favorable progress, we discontinued ceftriaxone and continued targeted treatment with levofloxacin 500 mg every 24 h until February 12, 2025. At that point, the patient had achieved clinical and hemodynamic stability, remained afebrile, and no longer required supplemental oxygen. Infectious pleural effusion has also resolved, so she was discharged from the hospital.

This case represents a significant contribution to the medical literature, as it is the first reported instance of pneumonia caused by *C. gleum* in a patient without previously identified risk factors. Historically, this gram-negative bacillus has been primarily associated with nosocomial infections in vulnerable populations, such as neonates, immunocompromised individuals, or those with underlying comorbidities and prolonged hospitalizations. Environmental studies have shown that it can proliferate in chlorinated water and wet surfaces. Its typical habitats include moist hospital environments and water sources, where it can form biofilms on

medical devices, leading to infections such as bacteremia, meningitis, and infections of the skin, soft tissue, and eyes.

To date, only 12 cases of respiratory infections caused by *C. gleum* in patients with pre-existing risk factors have been reported (to facilitate the comparison of results, the sensitivity and treatment profiles corresponding to the 10 most recent cases are shown in Appendix B.2).[6–12] The clinical relevance of our report, therefore, lies in demonstrating that *C. gleum* can be a primary pathogen, capable of causing severe respiratory infections even in an immunocompetent host. This finding challenges the established view of its epidemiology and pathogenicity.

While the precise mechanism of infection in this community-acquired case was initially unclear, further investigation into the patient's lifestyle revealed a history of regular swimming. This is a compelling potential link, as it is well documented that *Chryseobacterium* species thrive in aquatic environments. Consequently, aerosolized exposure from contaminated water sources, such as swimming pools, emerges as a plausible route of infection.

Given the genus's intrinsic resistance to many commonly used antibiotics, including carbapenems, cephalosporins, and aminoglycosides, prompt and accurate microbiological diagnosis is crucial and the successful treatment with levofloxacin in this case highlights the importance of timely pathogen identification and targeted therapy.

Informed consent

Informed consent has been obtained from the patient for the publication of their clinical data and images.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the author(s) used Gemini (Google) to summarize and improve the readability of the original text and overall writing quality. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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Authors' contributions

- *Cristian Amaral De Sousa* made substantial contributions to the conception and design of the work, acquired and interpreted patient data, drafted the initial manuscript, and provided direct patient care during hospitalization.
- *Lara Bravo Quiroga* critically reviewed the manuscript for important intellectual content and approved the final version for submission.
- *Darwin Feliz* provided direct patient care during hospitalization, critically reviewed the manuscript for important intellectual content and approved the final version for submission.

Conflicts of interests

The authors declare that they do not have any conflicts of interest that influence the content of the manuscript directly or indirectly.

Appendix A. Supplementary data

Supplementary data associated with this article can be found in the online version available at https://doi.org/10.1016/j.opresp.2025.100503.

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