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Pleural effusion due to *Chryseobacterium indologenes*: Case report and review of literature

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Abstract:

Chryseobacterium indologenes is found ubiquitously in the environment; it rarely causes human disease. Hence, we report a case of *C. indologenes*-associated pleural effusion in a patient with aortic dissection. Postoperatively, the patient developed massive right-sided pleural effusion with underlying consolidated lung. Culture of the pleural fluid yielded pure growth of *C. indologenes* which was susceptible to cotrimoxazole, minocycline, and tigecycline. Therapy was modified; tigecycline and cotrimoxazole were started following which the patient showed improvement, and subsequent cultures of the pleural fluid were sterile. This report promotes awareness of this organism as an emerging pathogen in lung infections and emphasizes the importance of targeted therapy.

Keywords:

Aortic dissection, *Chryseobacterium indologenes*, pleural effusion

Introduction

Chryseobacterium indologenes is a nonfermenting Gram-negative bacillus which is ubiquitously found in the environment. Recently, an upsurge of *C. indologenes* nosocomial infections has been reported because of the advances in newer diagnostic modalities, which have made identification of rare nonfermenters easier.^[1] We describe a case of *C. indologenes*-associated pleural effusion in a patient with aortic dissection.

Case Report

A 42-year-old male patient presented to the emergency department with complaints of acute onset of severe chest pain and shortness of breath. There was no trauma or injury to the chest. The patient had no underlying history of

diabetes, immunosuppression, or any other comorbid condition apart from a past history of aortic regurgitation. There was no recent history of hospitalization, indwelling catheters, or invasive procedures. On initial examination, the patient was conscious and well oriented with heart rate of 124/min, blood pressure of 190/71 mmHg, respiratory rate of 24/min, and 72% SpO₂. Respiratory examination revealed bilateral vesicular breath sounds. All other organ systems were normal on examination. The hematological investigations were normal. Computed tomography aortic angiography revealed Type A aortic dissection with intimal flap extending from the aortic root proximally up to the left common iliac artery distally, and a large entry tear was present in the ascending aorta. The patient underwent a modified Bentall procedure with hemiarch repair and Alfieri mechanical valve (MV) repair for Type A aortic dissection. An initial regimen of meropenem, ofloxacin, and metronidazole was started.

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The patient was readmitted after 2 weeks of surgery with high-grade fever (102°F). Laboratory tests revealed leukocytosis (15,000/mm³) and raised erythrocyte sedimentation rate (40 mm at the end of first hour (AEFH)). Blood cultures were sterile. A normally functioning MV was seen on echocardiogram. The patient was started empirically on meropenem and ceftriaxone for possible culture-negative endovascular infection. Within 24 h, the patient developed respiratory difficulty, and ultrasound chest revealed a massive right-sided pleural effusion with underlying consolidated lung. An intercostal drainage was performed, and pleural fluid was sent for bacterial culture.

Culture of the pleural fluid yielded convex, circular, and yellow-colored colonies on 5% sheep blood agar. Gram stain showed Gram-negative bacilli, which were nonmotile, catalase positive, oxidase positive, indole positive, and glucose nonfermenting. The isolate was further confirmed as *C. indologenes* by MALDI-TOF MS system (VITEK MS™; bioMérieux, France) with 99.9% confidence value of identification. Samples from the patient's surroundings including swabs from the dressing trolley, bed railing, mattress, in-use antiseptic solutions, and intravenous fluids were tested to determine the source of infection. However, all samples were negative for *C. indologenes*.

Despite antimicrobial therapy, leukocytosis and fever persisted. Susceptibility testing was performed using VITEK I automated system (BioMérieux Vitek, Inc.),

and the isolate was susceptible to cotrimoxazole, minocycline, and tigecycline and resistant to aminoglycosides, fluoroquinolones, piperacillin/tazobactam, cefoperazone-sulbactam, third-generation cephalosporins, and carbapenems. Treatment was modified, and tigecycline and cotrimoxazole were started and continued for 10 days. The patient improved, and follow-up cultures of the pleural fluid were sterile. The patient was discharged at the end of the treatment period.

Discussion

Majority of the infections caused by *C. indologenes* have been associated with certain predisposing conditions such as immunodeficiency, malignancies, presence of indwelling catheters, and invasive devices.^[2,3] Our patient was immunocompetent. Surgical intervention could be the predisposing factor for acquisition of this infection. Isolation of this organism from a sterile site, absence of other pathogens, and response to treatment suggest that *C. indologenes* was responsible for pleural effusion in this case. Environmental screening failed to detect the source of infection. Although the biological sequence of events is unknown, the organism was possibly inoculated through a breach in the skin at the time of the surgery, possibly giving rise to a transient bacteremia and seeding into the pleural cavity.

C. indologenes presents with a high rate of resistance against commonly used antibiotics such as aminoglycosides, chloramphenicol, penicillins, aztreonam, cephalosporins,

Table 1: Respiratory system infections caused by *Chryseobacterium indologenes* in adult patients

Years	Country	Age/sex	Possible predisposing condition	Sample	Outcome	References
2018	India	68/female	Connective tissue disorder, interstitial lung disease	ET aspirate	Expired	Agarwal <i>et al.</i> , Indian J Crit Care Med 2018 ^[6]
2017	Turkey	69/male	COPD	Sputum	Improved	Soydan <i>et al.</i> , Drug Discov Ther 2017 ^[7]
2017	Japan	64/female	Adult T-cell leukemia/lymphoma	Sputum	Expired	Imataki and Uemura Clin Case Rep 2017 ^[8]
2016	Spain	NA	NA	NA	NA	Chiscano-Camón <i>et al.</i> , Med Clin (Barc) 2016 ^[9]
2016	Spain	63/female	Parietal oligodendroglioma postsurgery, chemotherapy, radiotherapy	BAL	Improved	Peñasco <i>et al.</i> , Med Intensiva 2016 ^[10]
2015	Turkey	82/male	NA	Transtracheal aspirate	Improved	Nemli <i>et al.</i> , Case Rep Infect Dis 2015 ^[11]
2015	Tunisia	NA	NA	NA	NA	Ben Salah <i>et al.</i> , Rev Pneumol Clin 2015 ^[12]
2014	India	42/male	Gastric non-Hodgkin's lymphoma	Sputum	Improved initially	Shahul <i>et al.</i> , BMJ Case Rep 2014 ^[13]
2013	USA	66/male	Trauma	BAL	Improved	Monteen <i>et al.</i> , Ann Pharmacother 2013 ^[14]
2013	USA	32/female	Metastatic breast cancer	Tracheal aspirates	Expired	Yasmin <i>et al.</i> , J Med Case Rep 2013 ^[15]
2010	Brasil	30/male	Idiopathic medullary aplasia, febrile neutropenia	Tracheal aspirate	NA	Ferreira Rde <i>et al.</i> , Rev Bras Ter Intensiva 2010 ^[16]
2007	France	NA	NA	NA	NA	Reynaud <i>et al.</i> , Med Mal Infect 2007 ^[17]

COPD=Chronic obstructive pulmonary disease, BAL=Bronchoalveolar lavage, ET aspirate=Endotracheal aspirate, NA=Data not available

and carbapenems. Since the *C. indologenes* isolate was multidrug resistant, our patient did not respond to the empirical antibiotic therapy. The most often found active agents are newer fluoroquinolones, minocycline, cefepime, and cotrimoxazole.^[3-5] Our patient responded well to a combination of tigecycline and cotrimoxazole.

We searched the PubMed database for infections of the respiratory system caused by *C. indologenes* in adults and found 12 case reports [Table 1] and four studies.^[5,18-20] To the best of our knowledge, this is the first report of pleural effusion due to *C. indologenes* in an immunocompetent individual with preexisting heart disease. This case further expands the clinical spectrum of this opportunistic pathogen. The choice of empirical therapy in such conditions also becomes important since most of these pathogens are multidrug resistant.

Conclusion

Our report suggests that the pathogenicity and clinical significance of *C. indologenes* should not be underestimated. Prompt, appropriate-targeted antimicrobial therapy ensures a favorable outcome. Identification of the source of infection should be attempted wherever possible, as this will have implications for infection control.

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.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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