



Case report

Corynebacterium macginleyi: A cause of ventilator associated pneumonia in an immunocompromised patient



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ABSTRACT

Purpose and Importance: *Corynebacterium macginleyi*, a lipophilic diphtheroid from the genus *Corynebacteria*, is a known cause of conjunctivitis. It was recently reported as a cause of serious infections in immunocompromised individuals. It has never been reported as a cause of ventilator-associated pneumonia, that which carries a high burden and risk of mortality. Our report intends to increase awareness of a potentially lethal nosocomial bacterial infection.

Observations: This case reports on a 73 year old lady with metastatic lung adenocarcinoma on chemotherapy, who was hospitalized for dyspnea and diffuse pulmonary infiltrates in 2011. Trans-bronchial biopsies revealed cryptogenic organizing pneumonia. The patient improved with steroids. Failure to wean ensued with a bronchopleural fistula, increase in secretions, oxygen requirements, and appearance of new infiltrates. Two mini-BAL cultures yielded gram positive pleomorphic rods with palisade arrangement, diagnosed as *C. macginleyi*. Vancomycin therapy was initiated. She improved and was successfully extubated.

Conclusion and relevance: Non-diphtheria *Corynebacteria* usually form normal flora. If isolated, they are often dismissed as contaminants. *C. macginleyi* has emerged as a life-threatening nosocomial infection. Prompt identification and treatment are required. It is resistant to quinolones. Thus far, vancomycin is the preferred treatment.

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1. Introduction

The *Corynebacterium* species are aerobic gram positive pleomorphic rods. The most important for human health is *Corynebacterium diphtheriae*, the pathogen chiefly responsible for diphtheria. The majority of *Corynebacterium* species are innocuous and ubiquitous in nature. Some can be found on mucosa or on skin in humans. When isolated from clinical samples, past practice habits had been to consider them as contaminants. However, there have been reports of non-diphtheria *Corynebacteria* causing nosocomial infections in certain at-risk populations, such as immunocompromised patients, or those with indwelling devices [1].

Among these is *Corynebacterium macginleyi*, first described in 1995 by Riegel et al. and named in honor of Kenneth John McGinley [2]. It is a lipophilic diphtheroid [3] that has been mainly isolated

from ocular samples in conjunctivitis [4,5]. More recently, there have been reports of non-ocular infections: a urinary tract infection associated with an indwelling bladder catheter [6], an intravenous catheter-related blood-stream infection [7], a case of septicemia [8], a case of endocarditis [9], a case of pneumonia in an HIV infected individual [10], a tracheostomy site infection in a patient with laryngeal carcinoma [11], and a case of surgical site infection following orthopedic surgery [12].

We hereby report a case of *C. macginleyi* as an emerging cause of ventilator-associated pneumonia in an immunocompromised individual.

2. Case report

A 73-year-old lady with a 40-pack-year smoking history, COPD and metastatic left lung adenocarcinoma, recently treated with erlotinib, gemcitabine and radiation therapy, was admitted for progressive dyspnea. A PET/CT Scan showed interval decrease in the lung mass (indicating a partial response to therapy), but interval development of diffuse bilateral (right greater than left)

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hypermetabolic ground glass reticular infiltrates. These were thought to be related to an atypical infection, an inflammatory process, or acute interstitial pneumonitis. Levofloxacin, cefepime and vancomycin were started after cultures were sent, and later showed no growth. The patient's condition deteriorated, resulting in hypoxemic respiratory failure and mechanical ventilation. She underwent bronchoscopy, transbronchial biopsy and bronchoalveolar lavage (BAL). The procedure was complicated by a right-sided pneumothorax, for which a chest tube was placed. Pathology showed a cryptogenic organizing pneumonia, likely related to erlotinib. Cultures were negative. Prednisone was started, resulting in clinical improvement. However the patient remained intubated due to persistence of the pneumothorax with formation of a broncho-pleural fistula. Furthermore, she developed zoster which subsequently resolved with acyclovir.

While still intubated, there was an increase in secretions and oxygen requirements with leukocytosis. A chest X ray showed a new right middle lobe infiltrate (Fig. 1). A mini-BAL was submitted for culture and incubated for 24 h at 37 °C on 5% sheep blood agar and chocolate agar. Microscopic examination showed a few epithelial cells, many polymorphonuclear cells, and many gram positive rods in palisade arrangement (Fig. 2). The culture grew more than 10^5 of the lipophilic bacterium *C. macginleyi* solely, further identified with a 99.3% probability using the API Coryne System V3.0 (profile number 1100305; bioMérieux, France). Sensitivity testing was performed using the Etest, revealing susceptibility to vancomycin, but resistance to penicillins, cephalosporins and quinolones. These results were initially thought to represent contamination. No antibiotics were started. However, in view of continued worsening of the patient's respiratory status, another mini-BAL culture was sent two days later, yielding the same results. Hence a ten-day course of vancomycin was given and the patient improved clinically and radiographically. A subsequent mini-BAL culture, following the vancomycin course, was negative. The patient underwent a tracheotomy, was successfully weaned off of mechanical ventilation and was discharged to an extended-care facility.

3. Discussion

Ventilator associated pneumonias can be hard to treat, particularly in the immunocompromised host. They are an immense

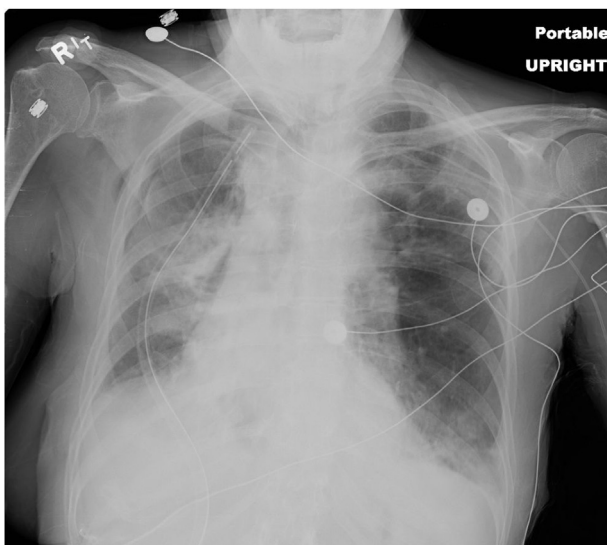


Fig. 1. Chest X ray showing the new right lung infiltrate.

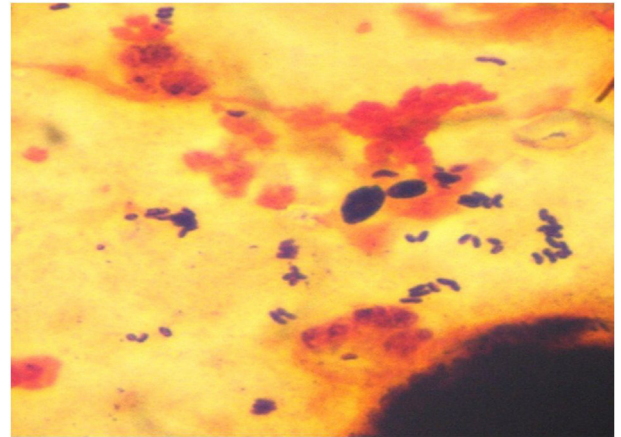


Fig. 2. Light microscopy of BAL specimen showing the organism in palisade arrangement.

burden on healthcare resources and a major cause of death. *C. macginleyi*, a gram positive pleomorphic rod is a normal inhabitant of mucous membranes. Although it had often been dismissed as a non-pathogenic contaminant, *C. macginleyi* has been more recently implicated in several cases of systemic infections. Furthermore, more recent and accurate identification methods using *rpoB* gene sequencing [13] have been enacted to improve detection (this was not available at our facility when this organism was discovered). This test separates *C. macginleyi* from *Corynebacterium accolens* with 100% certainty.

Nonetheless, neither *C. macginleyi* nor *C. accolens* has been reported as a cause of ventilator associated pneumonia in an immunocompromised host. A prior report demonstrated that *C. macginleyi* can cause pneumonia in individuals with HIV and advanced AIDS [10]. Another account implicated *C. macginleyi* as a cause of tracheostomy infection in a patient with laryngeal cancer [11]. In our patient, risk factors were lung cancer, prior treatment with chemotherapy and high dose steroids, radiation as well as lung inflammation from cryptogenic organizing pneumonia. To date, reports of ophthalmologic isolates have exhibited a high level resistance to antibiotics commonly used in the treatment of respiratory infections. For example high-level fluoroquinolone resistance has been seen in ophthalmic isolates [14], as well as in non-ocular cases [10]. The strain isolated in a previously reported urinary catheter-related infection was only sensitive to vancomycin, netilmycin and tetracycline [6]. In all the reported cases *C. macginleyi* has been sensitive to vancomycin while variably resistant to other antibiotics. In our account, the organism was exclusively sensitive to vancomycin, however it was not tested against linezolid or daptomycin.

The growing number of non-ocular infections with *C. macginleyi* in immunocompromised patients suggests this pathogen might be destined to be increasingly implicated in life-threatening infections. Therefore, rapidly dismissing it as a contaminant could be dangerous. In the absence of an alternative diagnosis, positive cultures from adequate samples in the appropriate host should be taken seriously and treatment should be promptly initiated. Given the limited data available in the literature, we recommend initiating therapy with vancomycin, and readjusting after susceptibility results become available.

Contributions

JK collected the data, reviewed it, performed literature search and wrote the manuscript. JM supervised the above process and

edited the manuscript. Both authors approved the final version.

Conflicts of interest

None to disclose; no funding was received for this work.

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