Corynebacterium mucifaciens in an immunocompetent patient with excavated pneumonia

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ABSTRACT

*Corynebacterium mucifaciens* has been mainly isolated from skin, blood and from other normally-sterile body fluids. It has rarely been described as a human pathogen since its description. We report a rare case of excavated pneumonia due to *C. mucifaciens* in an immunocompetent man returning from Maghreb.

1. Introduction

Pathogenic manifestations of infection by *Corynebacterium* species have been mainly described occurring during *C. diphtheriae* infection, both among children or adult individuals. Indeed, other strains belonging to the *Corynebacterium* group remain rarely recognized as human pathogens, mainly in immunocompromised patients. Here, we report the case of an excavated pneumonia associated with *C. mucifaciens* isolation from blood cultures made from an adult immunocompetent male patient.

2. Case report

A 50-year-old man was referred to our clinic with a concurrent 10-day history of high-grade fever accompanied with severe dyspnea, dry cough and thoracic pain. He is Moroccan in origin and was living in France (Paris and then Bordeaux) for 20 years with a yearly 2- to 4-week stay in his genuine country. Indeed, he was staying in Morocco at the onset of illness. At admission, the patient had general status impairment with a 12-kg emaciation, body temperature at 39.5°C and crepitant wheezes in the left hemi-thorax. Blood investigations showed a WBC count of 21 700/µL (neutrophils, 81%), an ESR of 111mm/h (normal, <15), a fibrinogen of 10 g/L (normal, 2-4) and a C-reactive protein (CRP) of 280 mg/L (normal, <5). HIV infection was ruled out and the patient was not immunocompromised (CD4+T cell
count, 1355/ µL). A chest roentgenogram and a thoracic computerized axial tomography revealed a left-upper-lobe excavated infiltrate with pleural effusion (Fig. 1).

Blood cultures were drawn twice and became positive after three days of incubation in an aerobic medium (Bactec plus aerobic/F-Becton Dickinson (BD) France) revealing diphteroïd, occasionally coccoïd non-motile gram-positive bacilli. The organism was sub-cultured on Columbia agar supplemented with 5% plain sheep blood (BD France) in aerobic and nutritive agar atmosphere at 37°C. Colonies produced in 24h incubation were circular, mucoïd, slightly yellowish and about 2 mm (Fig. 2). Physiologic tests realized in the API corynesystem (bioMérieux-F) strips were catalase positive, showed a positive reaction for pyrazinamidase, pyrolidonyl arylamidase, phosphatase alkaline, and acid production from glucose and maltose, were negative for oxydase, nitrate reduction, and urease. By this time, the attempt to identify the organism gave the numerical code 6100125 which corresponded, according to the system’s database with the identification of \textit{Corynebacterium striatum/amycolatum} with 88.7% similarity. Moreover, the alternative diagnosis of \textit{Rhodococcus equi} was not definitely ruled out considering both the mucoid colony morphology, the clinical presentation as cavitary pneumonia, and the recent direct exposure to premises used to house horses as consistent environmental reservoir of the latter organism.

On this behalf, DNA purification, polymerase chain reaction (PCR) amplification conditions, and DNA sequencing of approximately full-length 16S rRNA gene sequences were performed as previously described.\textsuperscript{3} Besides, the antimicrobial susceptibility pattern showed the strain was susceptible for β-lactams, amino-glycosides and glycopeptides. Treatment was initiated with rifampicin-spiramycin combination. Indeed, it was not changed even when the coryneform bacterium identification was later moved to \textit{Corynebacterium mucifaciens}, using biochemical characters (numerical code: 6100104) and 16S rRNA gene sequence analysis results (GenBank accession no.Y11200 in phylogenetic tree of AlignCoryn/2) (Fig. 3).
patient improved in the general condition after four weeks but the treatment was continued for three additional months.
3. Discussion

Many new species of Coryneform bacteria have been recently discovered and old species renamed, especially after molecular biology techniques were introduced. For many years, these organisms were disregarded as skin contaminants. However, they have been recognized as important human pathogens, often acting as opportunistic pathogens in immunocompromised or severely-ill patients with symptoms compatible with bacteremia and without presence of other pathogenic organism. Thus, eight strains of one of these new species had previously been isolated from human relevant clinical material. Concurrently, electron microscopy and comparative 16 S rRNA gene sequence analysis revealed that those formerly unknown coryneform bacteria belonged to a new subline within the genus corynebacterium and the name *C. mucifaciens sp.* was proposed. More recently, five strains were identified from specimens of middle ear effusion cultures made from patients with otitis media with effusion, and four other strains were isolated from the nasal polyps and nasal discharge of patients with chronic sinusitis.

Although Coryneform bacteria are commonly part of the normal flora of skin and their pathogenicity still remains to be assessed, these organisms have been increasingly implicated in serious infections. Indeed, a fatal case of bacteremia due to an atypical strain of *C. mucifaciens* has been recently reported. Thereby, potential critical issue is stressing the importance for rapid and accurate laboratory identification and susceptibility testing of such unusual pathogens that might improve treatment and outcome of associated infection. In the case reported, the investigation was supported by a reference laboratory to confirm identification and provide molecular typing analysis of patient isolate.

In summary, the strain isolated in our case showed the most morphological and biochemical characters for *C. mucifaciens* identification: Gram staining revealing Gram-positive bacilli, circular, glistening mucoid and yellow colonies, consistent physiologic characters and
molecular results, such as analysis of 16S rRNA gene sequences. The strain identified was linked to a case of excavated pneumonia that occurred in an immunocompetent man returning from Maghreb with horse contact and equine premises exposure, although the source of contamination and the transmission could not be formerly established.
References


FIGURE LEGEND

**Fig. 1.** Left-upper-lobe excavated infiltrate with pleural reaction in thoracic computerized axial tomography in a 50-year-old immunocompetent man.

**Fig. 2.** Appearance of *Corynebacterium mucifaciens* colonies obtained in 24 h of incubation: circular, mucoïd, slightly yellowish and about 2 mm rods.

**Fig. 3.** Neighbor-joining phylogenic analysis derived from patient isolate. Multiple sequence alignments were performed by using Clustal x version1.83 software.