Mycobacterium szulgai: a rare pathogen. Description of the first pulmonary case reported in Argentina

GUTIERREZ M*1,2, FEOLA M3, LENGE L3, REY R2, HOFFMAN M1

(1) Microbiology Unit. Hospital Enrique Tornú, Buenos Aires.
(2) School of Medicine. Fundación Barceló, Buenos Aires.
(3) Pulmonary Medicine, Hospital Carlos Durand, Buenos Aires.

*Corresponding author. Mailing address: Ameghino 2911, Sáenz Pena (1674), Prov. de Buenos Aires, Argentina. Phone: (54)11-47575436. Email: gutierrezm@sinectis.com.ar

ABSTRACT

Mycobacterium szulgai is a rare pathogen. Non-tuberculous mycobacteria usually produce disease to people with some kind of immunosuppression or another predisposing condition. A case of pulmonary Mycobacterium szulgai infection is described.

CASE REPORT

Seventy-year-old male patient living in the US for the last 30 years. He travels to Argentina and presents to our health center two months later due to weight loss, abdominal pain, cough with excessive production of mucus and asthenia. He explains that symptoms appeared some months before his journey to Argentina. He first presents due to increased symptom intensity, and refers abdominal pain. He was a heavy smoker (110 packs/year) and alcoholic, and had completed treatment for pulmonary tuberculosis two years before visiting our center. He had no diabetes, nor other comorbidities history. He worked as a car body painter for the last 25 years and lived in the suburbs of New York City and had no other
relevant history. Chest x-ray, routine lab tests and sputum smear were required. Blood tests evidenced: hemoglobin level: 11.1 g/dl (normal: 12-16 g/dl); white blood cell count: 27,600 x mm$^3$ (70% polymorphonuclear leukocytes). Enzyme-linked Immunosorbent Assay (ELISA) to both HIV-1 and HIV-2: non reactive. Chest x-ray revealed heterogeneous opacity on both upper fields and on left medium field. Positive smear for acid fast bacilli ++ (Auramine 0) was obtained in 3/3 sputum samples. Therefore, treatment with Isoniazid, Pyrazinamide, Ethambutol and Rifampicin (at habitual doses according to weight and age) was started, after presumed diagnosis of pulmonary tuberculosis. The patient is taken to the operating room, due to worsening of his abdominal pain. Neither bleeding nor tumor is evidenced during surgery. Only signs of intestinal inflammation are observed. A large intestine biopsy sample is taken. The patient is hospitalized for five days and is further discharged. However, outpatient treatment and follow up at surgery service and pulmonary medicine service is indicated. Sample biopsy revealed adipose fibroconnective tissue, with mononuclear inflammatory infiltrate and vascular congestion (unfortunately, biopsy material was not submitted to bacteriology laboratory). Twenty-five days after culture, the development of a scotochromogen mycobacterium was observed in the three sputum samples (MGIT 960 Becton Dickinson and Lowenstein Jensen). The mycobacteria was identified as *Mycobacterium szulgai* by biochemical tests: Nitrate reduction: (+), Tween 80 Hydrolysis: (+), Catalase 68ºC: (+), Urease: (+) (confirmed by Instituto Nacional de Enfermedades Infecciosas Dr. Carlos Malbrán, Buenos Aires). Adequate treatment for this mycobacterium was prescribed, including Clarithromycin 500 mg every 12 hs, plus Ethambutol 25 mg/kg/day, plus Rifampicin.
600 mg/day, since isolation was reported as sensitive to macrolides, and experts recommend treatment with three-drug regimens as the one herein indicated. In our case, good progression and treatment adherence was observed: clinical condition improved, as the patient gained weight and progressively stopped coughing. The culture became negative at six months. A Chest Computed Tomography, performed 7 months after treatment was initiated, showed minimal affectation of lingula air space in contrast to the first scan where a large compromise could be seen (figure 3). The patient was discharged twelve months later. He returned to U.S.A. as soon as he finished his treatment, so no follow up could be done after his departure.

Environmental mycobacteria have a wide distribution in the environment, with water being their main reservoir. These are non-pathogenic bacteria, provided that there is no mycobacterium-host interaction favoring disease development. Despite their ubiquitous distribution, spread from person to person has not been reported. Aerosolization entering through the respiratory tree is the most widely accepted type of transmission. The species of non-tuberculous mycobacteria most frequently cultured from clinical specimens are *Mycobacterium avium complex* and *Mycobacterium kansasii* (respiratory pathology).

*Mycobacterium szulgai* was described in 1972. Thereafter, very few cases have been reported in the literature. This rare pathogen may cause pulmonary disease in patients with a history of
alcoholism, cigarette smoking, obstructive pulmonary disease, any type of immunosuppression, etc. Our patient had a history of daily exposure to a constantly aerosolized environment (as a result of his job), which as it has been largely described in the literature, is suitable for the access of environmental mycobacteria to the respiratory tree, specially in immunocompetent patients. The authors have reported another case of an environmental mycobacteriosis in an immunocompetent patient with a work history of floor polishing. Pulmonary infection by this pathogen cannot be clinically distinguished from pulmonary tuberculosis. Therefore, the decision to indicate antituberculous treatment was, to our knowledge, wise, since 98% of positive sputum smear in our setting are associated with tuberculous infection (and its epidemiological implications).

Microbiologically, *Mycobacterium szulgai* is a unique pathogen. The production of its characteristic pigment depends on the incubation temperature. Thus, it is a scotochromogen (pigmenting when incubated in light and darkness) at 37°C, and it is a photochromogen (pigmenting only when exposed to light) when incubated at 25°C. This mycobacterium forms smooth or rough colonies in solid medium within the first three weeks of incubation. It is characterized by reducing nitrates into nitrites, by producing Tween 80 hydrolysis, and by having arylsulfatase activity, among other tests.

This case is consistent with the description reported in the scarce literature on the clinical management of pulmonary disease caused by this mycobacterium. Some questions remain unanswered: was the first episode of pulmonary disease by mycobacteria (which was diagnosed as pulmonary tuberculosis) really tuberculosis? Or was it already the manifestation of the pulmonary mycobacteriosis
we diagnosed at our service? Was the abdominal condition caused by mycobacterial disease itself?

Wide clinical suspicion and personal experience in the treatment of patients with mycobacteriosis is required in order to reach diagnostic suspicion for this type of low prevalence disorder. This is particularly so in HIV-negative patients, since in our setting there is the wrong belief that environmental mycobacterioses are only associated with AIDS. The state-of-the-art automatized culture systems, such as the one we have at our service, and the work of qualified mycobacteriologists, are of the utmost importance for reaching the diagnosis, since certainty diagnosis will be bacteriologic, as it happens with all the disorders caused by mycobacteria.
REFERENCES


FIGURES

Chest computed tomography: subpleural blebs in the biapical region, bronchiectasis in the posterior segment of the right upper lobe, cavitated image of thin walls in the left upper lobe (Fig 1, 2), as well as affected air space in lingula, with air bronchogram (Fig 3).