








Pulmonary sporotrichosis in immunocompetent patient: case report

Esporotricose pulmonar em paciente imunocompetente: relato de caso

Isabela Dias Lauer¹; Victor Adalberto Machado Nascimento¹; José Eduardo Palacio Soares¹; Marcelle Amaral de Matos¹; Kathleen Emerick Paiva Faria¹; Luiz Paulo Arreguy Nogueira²; Guilherme Cardoso Parreiras²

ABSTRACT

The pulmonary extracutaneous form of sporotrichosis, an infection caused by genetically distinct species of a dimorphic fungus of the genus *Sporothrix*, is rare, with few cases reported in the literature. This is a case of a 55-year-old woman, resident of the Barreiro region in Belo Horizonte/ Minas Gerais, who sought the infectious disease service of a public hospital in Belo Horizonte with a history of weight loss, dyspnea at small efforts, chronic cough and three-year-old vespertine chills. She was treated for bacterial pneumonia on five occasions without clinical improvement. He presented computed tomography of the chest with residual cavitation and excavated pulmonary lesions. The patient was hospitalized with dyspnea on small efforts, cough and purulent sputum, and her sputum culture was positive for *Sporothrix* spp. The gold standard treatment for pulmonary sporotrichosis was instituted, initially with itraconazole, 200 mg twice a day, however, after 10 months, the clinical and radiological improvement was not satisfactory and the administration of intravenous amphotericin B lipid complex 4 mg/kg/day was chosen. In less than 1 month the patient presented worsening of the condition and died, despite receiving 2g of accumulated dose of amphotericin B lipid complex.

Keywords: Pulmonary fungal infection; Sporotrichosis; Fungal infection.

RESUMO

A forma extracutânea pulmonar da esporotricose, uma infecção causada por espécies geneticamente distintas de um fungo dimórfico do gênero *Sporothrix*, é rara, com poucos casos relatados na literatura. Trata-se de um caso de uma mulher de 55 anos, residente da região do Barreiro de Belo Horizonte/Minas Gerais, que buscou o serviço de infectologia de um hospital público de Belo Horizonte com história de emagrecimento, dispnéia aos pequenos esforços, tosse crônica e calafrios vespertinos de três anos de evolução. Foi tratada para pneumonia bacteriana, em cinco ocasiões, sem melhora clínica. Apresentou tomografia computadorizada de tórax com cavitação residual e lesões escavadas pulmonares. A paciente foi internada com quadro de dispnéia aos pequenos esforços, tosse e expectoração purulenta, sendo sua cultura de escarro positiva para *Sporothrix* spp. Foi instituído o tratamento padrão ouro para esporotricose pulmonar, inicialmente, com itraconazol, 200 mg, duas vezes ao dia, entretanto, após 10 meses, a melhora clínica e radiológica não foi satisfatória e optou-se pela internação a administração de anfotericina B complexo lipídico endovenosa 4 mg/kg/dia. Em menos de 1 mês a paciente apresentou piora do quadro e evoluiu a óbito, apesar de ter recebido 2g de dose acumulada de anfotericina B complexo lipídico.

Palavras-chave: Pulmonares Fúngicas; Esporotricose; Infecções fúngicas.

¹Universidade José do Rosário Vellano – UNIFENAS. Belo Horizonte, MG – Brasil.

²Hospital Júlia Kubitschek. Belo Horizonte, MG – Brasil.

Associate Editor Responsible:

Alexandre Moura

Corresponding Author:

Victor Adalberto Machado Nascimento

E-mail: victoradmnasci@gmail.com

Conflict of interest:

There is not.

Received on: 05/03/2021.

Approved on: 08/21/2021.

Publication Date: 11/22/2021

DOI: 10.5935/2238-3182.2021e31415

INTRODUCTION

Sporotrichosis is a granulomatous infection caused by genetically distinct species of the dimorphic fungus of the genus *Sporothrix*, which can present in subacute or chronic forms and can affect animals and humans^{1,2,3}. It was first described in 1898 by Benjamin Schenck at the Johns Hopkins Hospital in Baltimore, United States⁴.

The pulmonary extracutaneous form of sporotrichosis is rare, with few cases reported in the literature⁵. Some risk factors are associated with the extrapulmonary form of the disease, especially smoking and immunosuppression^{6,7}. In general, patients have a good response to the gold standard treatment with itraconazole, 200 mg, twice a day, for 12 months or intravenous amphotericin B lipid complex, 3 to 5 mg/kg/day, for one to two weeks, followed by oral itraconazole, 200 mg, for 12 months.^{8,9,10,11,12} The present report deals with a rare case of pulmonary sporotrichosis in a immunocompetent patient who failed the gold standard treatment.

CASE DESCRIPTION

A 55-year-old female patient, from the home, resident of the Barreiro region in Belo Horizonte/Minas Gerais, sought the infectious disease service of a public hospital in Belo Horizonte with a history of weight loss, dyspnea at small efforts, chronic cough and three-year-old vespertine chills. In 2012, the patient underwent a computed tomography (CT) of the chest demonstrating extensive cavitary lesion in the right upper lobe, with thickened walls, and two small contralateral cavities associated with bronchiectasis and bilateral peribronchial thickening (Figure 1.a). This examination was performed after an incidental finding of pulmonary cavitations on chest X-ray performed for preoperative evaluation for perineoplasty. In 2015, she presented chest CT with very affected lungs, with large residual cavitation and excavated lesions in the left lung, mainly at the apex (Figure 1.b). The initial investigation since that time was focused only on tuberculosis with negative results. Additionally, she presented serology for HIV negative and blood count with global leukocytes without alterations.

She reported treatment for bacterial pneumonia on five occasions in early 2017, without improvement of symptoms. The patient could not inform the drugs used in this treatment. Several sputum tests with research of negative acid-fast bacilli (AFB) were performed at all times. She denied contact with cats and other animals, exposure to gardens, vegetable gardens, agricultural pesticides, treatment for previous dermatomycosis, and use of any corticoids or other immunosuppressants. She also stated that she did not have other comorbidities and did not use any medications. She denied drug addiction, chronic alcoholism and reported cessation of smoking habit five years ago, with a smoking load of approximately 35 pack-years. She had adequate living conditions in a region with basic sanitation.

She was hospitalized in November 2017, complaining of dyspnea due to small efforts, coughing and purulent sputum. Initially, the possibility of secondary infection in pulmonary sequelae was suggested with initiation of piperacillin/tazobactam treatment, 4g/500mg every 6 hours, showing no improvement in symptoms. Collections of four sputum

samples were carried out with research for tuberculosis and fungi. AFB test was negative in all samples, as was the rapid molecular test for tuberculosis. In the two samples collected, the culture for fungi was performed and there was growth of *Sporothrix spp.* Double radial immunodiffusion serology for histoplasmosis and aspergillosis were also performed and were negative. Besides, a new chest CT was performed and the cavitary lesion worsened (Figure 1.c). A limitation of this report is that it is not possible to verify whether the transmission of the disease was zoonotic or saprophytic, since molecular identification of the species was not obtained.



Figure 1. (a, b and c). Chest tomography in axial section. a) Chest CT performed in 2012 demonstrating cavitary lesion in the right lung and two small contralateral cavities. b) Chest CT performed in 2015 demonstrating large residual cavitation and excavated lesions in the left lung, mainly at the apex. c) Chest CT performed in 2017 demonstrating worsening of the cavitary lesion.

After confirmation of pulmonary sporotrichosis by culture, treatment with itraconazole 200 mg was started twice daily. The patient evolved with good tolerance to the established treatment, with no adverse reactions or hepatotoxicity to the drug. The patient reported improvement in dyspnea, appetite, expectoration and general status after the onset of medication and remained in outpatient follow-up with good clinical evolution initially. However, after 10 months of treatment, clinical and radiological improvement were not satisfactory and hospitalization and prescription of intravenous amphotericin B lipid complex, 4 mg/kg/day, was chosen. After seven days, the patient presented sudden worsening of the respiratory pattern, with hypotheses of pulmonary thromboembolism, infectious exacerbation or disease progression, being initiated antibiotic therapy with cefepime hydrochloride, 2g, every 8 hours and therapeutic anticoagulation with enoxaparin were initiated. The patient was referred to the Intensive Care Unit (ICU) and died eleven days later due to respiratory failure. This case report was approved by the ethics committee of the Fundação

Hospitalar do Estado de Minas Gerais (FHEMIG), through opinion number 2,810,036.

DISCUSSION

Sporotrichosis is a subacute or chronic fungal infection affecting humans and other animals, caused by genetically distinct species of the dimorphic fungus *Sporothrix spp.*, among them: *S. brasiliensis*, *S. schenckii*, *S. globosa*, *S. mexicana* e *S. luriei*^{1,2,3,13}. The fungus is found in decompositional vegetation, rose thorns and humus-rich soil worldwide, with Asia and the Americas being the regions with the highest prevalence of the disease^{1,2,5,13}. In Brazil, there is currently an outbreak in progression associated with *S. brasiliensis*, related to exposure to contaminated cats¹.

The infection is usually acquired by traumatic skin inoculation (scratches from infected cats) and by contact with soil, plants and organic matter contaminated with the fungus^{5,8}. Apparently the patient in question did not present any of these exposures. Subacute and chronic involvement of the skin and subcutaneous tissues is the most common manifestation of sporotrichosis in immunocompetent hosts⁸. In patients with underlying risk factors (HIV infection, alcoholism, diabetes mellitus, organ transplant recipients and use of immunosuppressive drugs or corticosteroids), the disseminated form of the disease with visceral, osteoarticular, meningeal and pulmonary presentation may occur^{6,7}. This was not the case of the reported patient.

The disseminated form of the disease affects about 1% of the reported cases of sporotrichosis and the dissemination occurs hematogenously, especially in immunosuppressed patients, such as those infected with HIV⁵, a picture discarded in the patient in question. Pulmonary sporotrichosis is acquired via inhalation of aerosol with conidia from soil and vegetation^{1,7}, with few reported cases of this condition in the literature¹⁰. Since 1998, Brazil has shown an increase in the number of cases of sporotrichosis, from an outbreak initially recognized in the state of Rio de Janeiro that has already spread to several states, including Minas Gerais¹⁴. In 2016, an outbreak of sporotrichosis occurred in the Barreiro region of Belo Horizonte¹, where the reported patient had lived since her childhood.

Pulmonary involvement is related to some risk factors such as male gender, underlying lung disease, alcoholism, diabetes mellitus and immunosuppression^{6,7}. Between 1998 and 2015, 682 (87.2% of the total) hospitalizations for the disease were recorded in Brazil in 302 municipalities (5.4% of the municipalities in Brazil). In 612 (89.7%), sporotrichosis was the primary diagnosis, of which 220 (35.9%) cases by pulmonary form¹⁴.

Pulmonary infections may occur alone as occur in primary pulmonary sporotrichosis or in the context of multiorgan involvement, defined as multifocal or disseminated sporotrichosis. Primary pulmonary infection often exhibits a cavitory pattern, while multifocal infection presents as a non-cavitory disease¹⁰. Pulmonary sporotrichosis is also classified as chronic and acute type. The chronic type is the most common, being generally asymptomatic in 98% of affected people and presents with limited cavities, as presented in this case, indistinguishable from tuberculosis; in which symptomatic cases manifest with little cough, sputum and pneumonia¹².

The diagnosis of sporotrichosis is made by cultures of exudative lesions, tissue fragment, scar and blood, for example, and are the gold standard for the definition of the disease^{6,8,12,15}. The culture is very sensitive and the visible growth of *Sporothrix spp.* can be seen within 1 week. No validated serology or polymerase chain reaction (PCR) is currently accessible for diagnosis^{9,12}. The differential diagnosis is made with pulmonary tuberculosis and other chronic fungal infections⁷, such as histoplasmosis¹². The patient performed nine AFB tests, rapid molecular test for tuberculosis, double radial immunodiffusion serology for histoplasmosis and aspergillosis, and all negative.

The treatment of choice is itraconazole, and should be used for twelve months at the dosage of 200 mg, once to twice a day, depending on the severity of the disease and whether there is relapse or there is involvement of different skin or lymph tissue, and its efficacy is limited in pulmonary sporotrichosis^{7,8,10,13}. In severe cases, amphotericin B lipid complex (3 to 5 mg/kg/day) is recommended as initial therapy for one to two weeks intravenously; but it depends heavily on the severity of the disease and the clinical condition of the patient, followed by consolidation therapy with oral itraconazole for twelve months^{7,8,10,13}. Patients with cavitory alterations may benefit from resection surgery in addition to medical therapy^{6,7}.

The patient reported only had an epidemiological history because she lived in a region where a recent outbreak of sporotrichosis occurred; however, she had no history of exposure compatible with the diagnostic suspicion of the disease and did not fit into classical groups at risk for its pulmonary manifestation. This contributed to the delay in the diagnosis of the disease and, consequently, to the extensive destruction of the pulmonary parenchyma, thus presenting a terminal organ, which probably made the patient irrecoverable.

CONCLUSION

Although the pulmonary extracutaneous form of sporotrichosis is rare, it is a possible differential diagnosis in the face of cough, sputum and pneumonia, associated with a history of favorable exposure. It should be emphasized that, even in immunocompetent patients and without this typical history of exposure, if they do not show a good response to the treatment for the symptoms presented, this disease should be suggested. This is due to the fact that in the current context of the outbreak of sporotrichosis in the country, it is very important that medical teams are attentive to this diagnostic possibility, including extracutaneous forms of the disease, so that it can be recognized and started treatment early, thus contributing to the therapeutic success of patients.

COPYRIGHT

Copyright © 2020 LAUAR ID et al. This is an Open Access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original article is properly cited.

AUTHORS' CONTRIBUTION:

All authors participated significantly in the design of the study, in the analysis and interpretation of data, in the preparation, review and translation of the manuscript. Additionally, the author José Eduardo Palacio Soares was also responsible for answering the reviewers and updating the manuscript, when requested. Finally, the author Isabela Dias Lauar was responsible for the orientation and final approval of the manuscript.

REFERENCES

1. Prefeitura de Belo Horizonte. Esporotricose: Protocolo de enfrentamento da doença em Belo Horizonte. Belo Horizonte, 2018. 3-15 p.
2. Barreiros G, Ramos-e-Silva M, Ferreira TA, Trope BM, Quintela DC. Atypical Manifestation of Disseminated Sporotrichosis in an AIDS Patient. *Case Rep Dermatol.* 2018;10(3):231-7.
3. Lopes-Bezerra, L. Human serum factors impact the interaction of *Sporothrix* spp. With human macrophages. *Medical Mycology.* 2018; 56 (Supplement 2): S126-143.
4. Schenck BR. On refractory subcutaneous abscesses caused by a fungus possibly related to the sporotricha. *Johns Hopkins Hosp Bul.* 1898; 93:286-90.
5. Rojas FD, Fernández MS, Lucchelli JM, Lombardi D, Malet J, Vetrivano ME, et al. Cavitory Pulmonary Sporotrichosis: Case Report and Literature Review. *Mycopathologia.* 2017;182(11-12):1119-23.
6. Farooqui SM, Youness H. The Infection Returns: A Case of Pulmonary Sporotrichosis Relapse after Chemotherapy. *Case Rep Med.* 2018; 2018:1-4.
7. Gold JAW, Derado G, Mody RK, et al. Sporotrichosis-associated hospitalizations, United States, 2000-2013. *Emerg Infect Dis.* 2016;22(10):1817-20.
8. Marchiori E, Zanetti G, Penha D, Menna Barreto M, Marchiori E. Endemic pulmonary fungal diseases in immunocompetent patients: an emphasis on thoracic imaging. *Expert Rev Respir Med.* 2019;13(3):263-77.
9. Salzer HJF, Burchard G, Cornely OA, Lange C, Rolling T, Schmiedel S, et al. Diagnosis and management of systemic endemic mycoses causing pulmonary disease. *Respiration.* 2018;96(3):283-301.
10. Aung AK, Teh BM, McGrath C, Thompson PJ. Pulmonary sporotrichosis: Case series and systematic analysis of literature on clinico-radiological patterns and management outcomes. *Med Mycol.* 2013;51(5):534-44.
11. Silva RF, Bonfitto M, da Silva Junior FIM, de Almeida MTG, da Silva RC. Sporotrichosis in a liver transplant patient: A case report and literature review. *Med Mycol Case Rep.* 2017; 17:25-7.
12. Bonifaz A, Tirado-Sánchez A. Cutaneous Disseminated and Extracutaneous Sporotrichosis: Current Status of a Complex Disease. *J Fungi.* 2017;3(1):6.
13. Paiva MT, Regina M, Salvato S, Lecca LO, Ferreira L, Saraiva LHG. Guia Prático para enfrentamento da Esporotricose Felina em Minas Gerais. *Revista V&Z Em Minas.* 2018; 137:16-27.
14. Falcão EMM, Filho JBL, Campos DP, Valle ACF, Bastos FI, Gutierrez-Galhardo MC, et al. Hospitalizações e óbitos relacionados à esporotricose no Brasil (1992-2015). *Cad. Saúde Pública.* 2019;35(4):1-7.
15. Hassan K, Turker T, Zangeneh T. Disseminated sporotrichosis in an immunocompetent patient. *Case Reports Plast Surg Hand Surg.* 2016;3(1):44-7.

