Case Report

Hypersensitivity Pneumonitis Caused by *Trichoderma viride*

Alicia Enríquez-Matas, a, b Santiago Quirce, a Noelia Cubero, b Joaquín Sastre, a and Rosario Melchor b

a Departamento de Alergia, Fundación Jiménez Díaz, Madrid, Spain
b Departamento de Neumología, Fundación Jiménez Díaz, Madrid, Spain

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**Abstract**

Hypersensitivity pneumonitis (HP) can be induced by exposure to indoor molds contaminating humidifiers and heating or ventilation systems. A 54-year-old woman with dyspnea, cough, chest pain, and fever was seen in the emergency room. A chest radiograph revealed interstitial infiltrates and blood tests showed leukocytosis with neutrophilia and severe hypoxemia. A diagnosis of HP was made by a combination of clinical, radiologic, physiologic, and immunologic studies. *Trichoderma viride* was isolated in cultures of water samples from an ultrasonic humidifier installed in the patient’s home a year earlier. Precipitating immunoglobulin G antibodies to *T. viride* were detected in the patient’s serum by enzyme-linked immunosorbent assay. The patient remained symptom free after the humidifier was removed from her home. Our findings strongly suggest that the patient developed HP due to *T. viride* from the humidifier. To our knowledge, this is the first report of such a case.

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**Resumen**

Las neumonitis por hipersensibilidad (NH) pueden producirse debido a la exposición a hongos ambientales por contaminación de humidificadores y sistemas de calefacción. Describimos el caso de una paciente que acudió a urgencias por disnea, tos, dolor torácico y fiebre. Presentaba infiltrados intersticiales en la radiografía de tórax y leucocitosis con neutrofilia e hipoxemia grave en la analítica sanguínea. Un diagnóstico de NH fue establecido mediante la realización de exploraciones clínicas, radiológicas y fisiológicas, así como de pruebas inmunológicas. Se detectaron anticuerpos precipitantes de IgG contra *T. viride* en el suero de la paciente. Tras retirar el humidificador, la paciente permaneció asintomática. Nuestros hallazgos sugieren que la paciente desarrolló NH debido a *T. viride* en el humidificador. A nuestro conocimiento, este es el primer caso descrito de NH por *T. viride*.

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**Introduction**

Although molds are a well-known cause of occupational hypersensitivity pneumonitis (HP), domestic exposure to fungal spores is not generally implicated, 1 except in Japan, where summer-type HP due to home contamination by *Trichosporon* species is common. 2 However, reports of mold-induced HP in other parts of the world in relation to home reservoirs such as contaminated humidifiers or heating and ventilation systems 3 have been increasing.

**Case Description**

A 54-year-old woman, a nonsmoker and a dressmaker by profession, came to the emergency room reporting a 2-month history of progressive dyspnea. She also reported having had cough and fever over the past 15 days. She had been examined by a pulmonologist...
for persistent cough a year earlier, and at that time her chest radiograph had been normal. She had not been exposed to any obvious source of organic dust, except pigeons nesting on balconies near her house. She had kept a canary for years and had installed an ultrasonic humidifier in her home a year earlier.

Physical examination revealed bilateral crackles. Blood tests showed leukocytosis (white cell count, 18,280/mL) with neutrophilia (90%) and severe hypoxemia (PaO₂, 44 mmHg). Chest radiographs revealed interstitial infiltrates. The patient was admitted to the intensive care unit for 5 days and was treated with noninvasive mechanical ventilation. Marked improvement was observed within a few days of treatment with antibiotics, oxygen therapy, and bronchodilators. A high-resolution computed tomography scan showed bilateral diffuse micronodular infiltrates and ground-glass opacities. Pulmonary function tests revealed a forced expiratory volume in 1 second (FEV₁) of 63% of predicted, a forced expiratory volume in 1 second (FEV₁/FVC) of 56% of predicted, and a ratio of FEV₁ to FVC of 75%. The diagnosis was HP due to T. viride from the humidifier water. The patient has remained symptom-free since the device was removed from her home a year ago.

Discussion

The diagnosis of HP was based on clinical, radiologic, physiologic, and immunologic findings that strongly suggested that the clinical picture was related to T. viride contamination of an ultrasonic humidifier in the patient's home. The evidence supporting the diagnosis included her excellent response to avoidance of exposure, with removal of the contaminated ultrasonic humidifier, and the detection of precipitating IgG antibodies to T. viride.

T. viride is the most common of the Trichoderma species, which are saprophytic filamentous fungi found around the world. They are widely used in industry to obtain mold-derived enzymes and in agriculture they serve as biofungicides. Only a few cases of infection due to Trichoderma species and T. viride in particular have been reported. There are also 2 reports of eosinophilic pneumonia with precipitating antibodies against Trichosporon cutaneum and T. viride. Finally, T. viride has been found in high concentrations in dust collected in the bedrooms of children with asthma living in water-damaged homes.

To the best of our knowledge, this is the first report of HP due to T. viride contamination of a domestic ultrasonic humidifier.

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References