

A neurological exam performed in the emergency department found no signs of meningitis. As the doctors suspected encephalitis, a head CT scan was performed which showed no alterations. The CSF showed pleocytosis, with 514 leukocytes/mm³ (87% mononuclear), glucose 36 mg/dl and protein 87.6 mg/dl. Gram staining showed no microorganisms. Cultures were grown on blood agar, chocolate agar and thioglycollate broth, which were incubated at 35 °C with 5% CO₂ for 72 h. Treatment was started with ceftriaxone and vancomycin and the patient was admitted to the ICU.

In view of the CSF results (pleocytosis with negative Gram stain), the FilmArray Meningitis/Encephalitis Panel was used, which detected *Listeria monocytogenes*. The results were available within 1 h, which caused doctors to change the antibiotic treatment to a regimen of ampicillin and gentamicin. Over the next few hours, the patient remained haemodynamically stable with a good level of consciousness, and 24 h later, was moved to a ward, where he remained throughout the 19 days of treatment. After this period, he was discharged as he was asymptomatic. The CSF culture was negative.

L. monocytogenes is a gram-positive bacillus that causes meningitis and encephalitis, generally in very elderly and young patients and immunosuppressed patients. Clinical presentation among adults is similar to that caused by pneumococci or meningococci, although the duration of symptoms prior to presentation is longer.⁴

Gram staining and CSF cultures are still the reference techniques for bacterial meningitis, allowing the responsible microorganism to be identified in 70–85% of cases.⁵ However, culture results are not available for at least 24–72 h and may be negative in patients who have received antibiotics, as occurred in our case. In *Listeria* meningitis, CSF tends to show low pleocytosis and high protein levels,⁴ whereas both cell and protein counts are only slightly elevated in cases of encephalitis.⁶ Hypoglycorrhachia is only present in 21% of patients.⁷ These data may make diagnosis difficult due to the similarity of symptoms with a viral aetiology. The sensitivity of Gram staining in *Listeria* meningitis is low, ranging from 23% to 36% in both children and adults,^{4,8} and cultures may be negative, even in patients who have not received prior antibiotic therapy.⁹ In one recent article, the CSF culture was positive in only 83% of patients while blood cultures were positive in 64% of patients with *Listeria*¹⁰ meningitis, highlighting the need for more sensitive diagnostic tests. A false negative culture result or delayed diagnosis can result in inadequate treatment as third-generation cephalosporins (the antibiotics most commonly used for empirical treatment of meningitis) are not effective against this bacterium.¹ Inadequate empirical therapy was a risk factor for mortality in the aforementioned study of patients with *Listeria* meningitis.¹⁰

In our case, use of the FilmArray Meningitis/Encephalitis Panel, which detects the main pathogens responsible for meningitis, providing results within 1 h, allowed us to make a rapid diagnosis. This had repercussions on control and isolation measures (which were quickly withdrawn) and resulted in the patient being changed to the correct antibiotic treatment, which had a favourable impact on the patient's outcome.

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Ana Infante-Urrios*, Fernando Buñuel-Adan,
Gregoria Gázquez-Gómez, Victoria Ortiz de la Tabla-Ducasse

Servicio de Microbiología, Hospital Universitario San Juan de
Alicante, San Juan de Alicante, Alicante, Spain

* Corresponding author.

E-mail address: anaiu@hotmail.com (A. Infante-Urrios).

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Necrotising otitis externa due to *Scopulariopsis brevicaulis* in a patient without predisposing factors[☆]



Otitis externa necrosante causada por *Scopulariopsis brevicaulis* en un paciente sin factores predisponentes

This article studies the case of a 38-year-old male patient with no history of interest. He reported regular contact with farm

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animals and takes part in water sports. He came to the clinic with purulent otorrhoea and oedema of the left external auditory canal (EAC). He received topical empirical treatment with gentamicin and dexamethasone. After 10 months, he returned to the clinic due to still having painless otorrhoea. Examination with an otoscope revealed dermal and cartilaginous necrosis and non-marginal perforation of the eardrum, associated with indurated dermatitis of the auricle. He had non-tender lymphadenopathy in the left posterior triangle of the neck. He had no fever, dysphonia or weight loss. Human immunodeficiency virus screening and tests for autoimmune disorders were negative. Biopsies were taken from the EAC for microbiological and anatomical pathology testing and a computed axial tomography (CT scan) of the ear was ordered. The patient was treated with linezolid and oral ciprofloxacin. The CT scan showed opacification of the left epitympanic region,

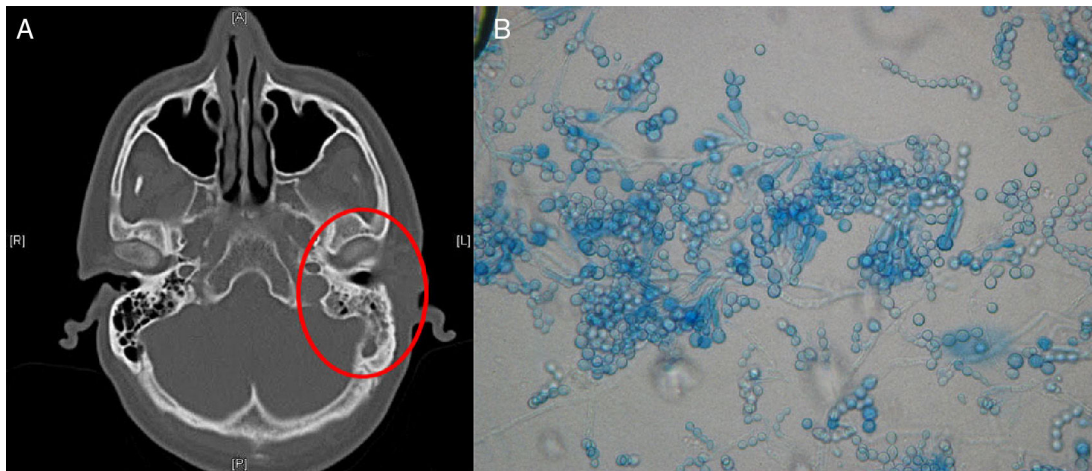


Fig. 1. Main diagnostic signs of otitis externa due to *Scopulariopsis brevicaulis*. (A) Head CT showing opacification of the mastoid cells and chondritis of the EAC, on the left side. (B) Lactophenol blue staining (40 $\times$) after 7 days of incubation: spherical conidia with truncate base in chains.

with a soft tissue mass in the internal and lateral portion, with opacification of the mastoid cells and tympanic cavity, secondary to the concomitant inflammatory process due to perforation of the eardrum which is consistent with the diagnosis of outer ear infection with integrity of the ossicular chain (Fig. 1A).

Anatomical pathology revealed hyperkeratosis and chronic inflammation of the soft tissue along with necrotic lesions with thrombotic phenomena. Periodic acid-Schiff and Grocott methenamine silver stains were negative as were microbiological cultures.

At a check-up performed one month later, no improvement was observed and areas of necrosis within the EAC had continued to spread; new specimens were sent for microbiological analysis.

A KOH test showed irregular hyphae and oval conidia in chains. Gram staining showed abundant hyphae. Yeast only grew in cultures after incubation for 48 hours at 37 °C. Colonies on Sabouraud agar plates were white, velvety and turned a brown colour at day five. Lactophenol blue staining ($\times 40$) of colonies showed septate hyphae, swollen conidiophores and spherical conidia with wide truncate base in chains, which are characteristic of the genus *Scopulariopsis* (Fig. 1B). Yeast were identified using MALDI-TOF (Bruker®) mass spectrometry, via total extraction of the isolate, revealing *Scopulariopsis brevicaulis* in the first 7 patterns reported. Although the score was 1.759, the result was deemed to be correct as it was consistent with the morphological identification.¹ The National Centre for Microbiology confirmed this identification by morphological analysis. Likewise, antifungal susceptibility tests were conducted based on recommendations of the *Subcommittee on Antifungal Susceptibility Testing of the European Committee for Antimicrobial Susceptibility Testing*, obtaining the following results, expressed in mg/l: amphotericin B, MIC >16; itraconazole, MIC >8; voriconazole, MIC >8; posaconazole, MIC >8; terbinafine, MIC >16, and caspofungin, MIC = 8. Although no antifungal susceptibility testing breakpoints have been defined for this microorganism, observed and expected *in vitro* activity was limited.^{2–6}

The patient's ear was cleaned surgically and voriconazole (300 mg/12 h) was administered. A major improvement with re-epithelialisation of the EAC was observed at 6 weeks and control cultures were negative. The same treatment was prescribed for another month without the patient visiting the clinic for a check-up or experiencing any recurrence.

Hennequin et al.⁷ and Besbes et al.⁸ reported two patients with otomycosis due to *S. brevicaulis* who had previously

undergone tympanoplasty and cholesteatoma surgery, respectively. Issakainen et al.⁹ studied 13 cases of otitis externa due to *Scopulariopsis* spp. and only 7 had underlying diseases.

The patient whose case we are presenting had no predisposing factors and the infection was considered to possibly be due to unperceived microtrauma to the EAC. The patient also showed no onychomycosis, an infection often caused by *S. brevicaulis*.¹⁰

The presence of *S. brevicaulis* in pure cultures and the patient's clinical outcome and response to treatment, with no other confirmed aetiology, affirmed that this microorganism was the causal agent.

A differential diagnosis of malignant otitis externa was performed, but the absence of osteolytic lesions and granulomas in the EAC ruled out this condition.

Invasive infection due to *S. brevicaulis* is uncommon and has been described mainly in immunocompromised patients, but may occur in immunocompetent individuals and tends to have a good prognosis.^{3–6} There is no established therapy, although some authors indicate voriconazole to be the most effective antifungal *in vivo* and it is a good therapeutic option in association with surgical debridement of the lesion.⁶

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Isabel de Miguel-Martínez^{a,*}, Pilar Michelle Hernández-Cabrera^b,
María Aser Armesto-Fernández^c,
Antonio Manuel Martín-Sánchez^a

^a *Servicio de Microbiología, Hospital Universitario Insular de Gran Canaria, Las Palmas de Gran Canaria, Spain*

^b *Unidad de Enfermedades Infecciosas, Hospital Universitario Insular de Gran Canaria, Las Palmas de Gran Canaria, Spain*

^c *Servicio de Otorrinolaringología, Hospital Universitario Insular de Gran Canaria, Las Palmas de Gran Canaria, Spain*

* Corresponding author.

E-mail address: imigmar@gobiernodecanarias.org
(I. de Miguel-Martínez).

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