

Primary cutaneous *Rhizopus* folliculitis in an immunocompetent woman



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INTRODUCTION

Mucormycosis (MCM) is a fungal infection from members of the Mucorales order of fungi found almost exclusively in immunocompromised patients.¹ The number of these infections seems to be increasing, presumably paralleling the increasing numbers of people with diminished immune surveillance. Primary cutaneous MCM in healthy patients is rare and, to our knowledge, the histologic presence of folliculitis has not been reported.

CASE REPORT

An afebrile 24-year-old white woman with no pertinent medical history was transported to the Vanderbilt University Medical Center in status epilepticus. A positron emission tomography/computed tomography scan found a fludeoxyglucose avid nodule in the right axilla. This lesion had been present for 5 days, was asymptomatic, and was unassociated with trauma. The nodule was 2 by 3 cm, pink, indurated, and without evidence of drainage (Fig 1). Two punch biopsies were performed, and tissue was sent for culture. Histologically, the dermis showed diffuse suppurative and granulomatous inflammation with dilated hair follicles containing keratogenous debris, inflammatory cells, and fungal hyphae (Fig 2). A periodic acid–Schiff (PAS) stain found fungal hyphae and spores within the hair follicles (Fig 3) and adjacent dermis. These hyphae showed variable wall thickness without appreciable septae and irregular branching suspicious for a zygomycotic infection. The tissue culture grew a *Rhizopus* species. The lesion was excised with clear margins, and the patient was placed on a 3-month course of oral itraconazole. To date, there has been

Abbreviations used:

MCM: mucormycosis
PAS: periodic acid–Schiff



Fig 1. Axillary lesion measuring 2 × 3 cm.

no recurrence. Her neurologists were unable to determine a definitive cause of her seizures.

DISCUSSION

The Zygomycetes fungal class is divided into 2 orders, Mucorales and Entomophthorales.^{2,3} The Mucorales order of the Zygomycetes fungal class comprises the *Mucor*, *Rhizopus*, *Rhizomucor*, *Absidia*, *Apophysomyces*, *Cunninghamella*, and *Saksena* genera. These saprophytes are found worldwide in soil and decaying vegetable matter. Infections with these organisms are found almost exclusively in immunocompromised patients when neutropenic after chemotherapy administration.¹

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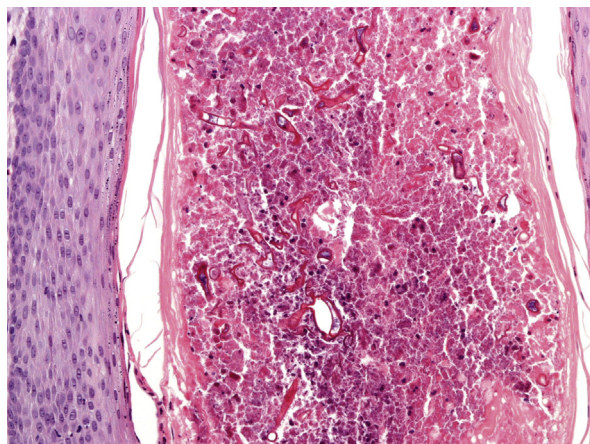


Fig 2. Dilated follicle ostia with keratogenous debris and inflammation. (Hematoxylin-eosin stain; original magnification: $\times 200$.)

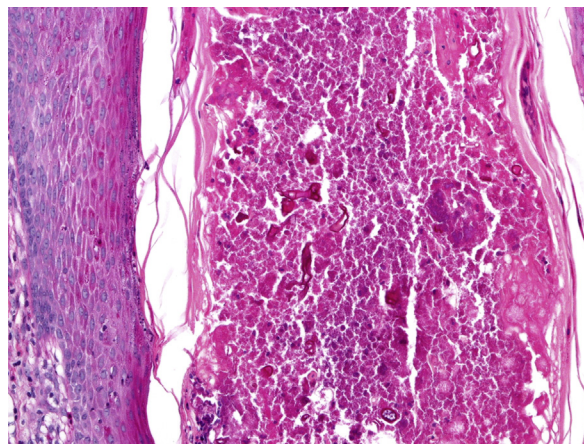


Fig 3. Intrafollicular fungal hyphae highlighted with a PAS stain. (Original magnification: $\times 200$.)

Rhizopus is the most frequently isolated fungal organism.³ Poorly controlled diabetes mellitus, underlying malignancies, organ transplantation, HIV infection, renal failure, malnutrition, high iron load, and trauma are risk factors for MCM.^{1,2,4} Five forms of infection exist: rhino-orbito-cerebral, disseminated, pulmonary, cutaneous, and gastrointestinal. Cutaneous MCM is the least common of these and the one most often found in immunocompetent patients.

Most purely cutaneous forms of MCM result from trauma including motor vehicle accidents, burns, contaminated trauma, bone fractures, surgery, insect bites, intravenous lines, abrasions, lacerations, and biopsy sites.² Infections affecting hospitalized patients usually involve the use of contaminated occlusive tape, tongue depressors, and cotton stockinettes.⁴ Lesions may appear as eschars, plaques, nodules, ulcers, pustules, blisters, and necrotizing cellulitis.^{2,4}

Histologically the organisms exhibit large, nonseptate hyphae with cylindrical, irregular, and distorted features.⁵ Hyphal branching is irregular, and the walls have varying thicknesses. They are strongly stained using PAS but only variably so with Gomori methenamine silver. These organisms are typically angioinvasive resulting in cutaneous thrombosis.

To our knowledge, no cases of human MCM folliculitis have been reported; however, Morgan et al⁶ did describe this entity in rabbits. They used corn grit to assess topical insecticide toxicity using a rabbit model. They noticed during the histologic evaluation of affected skin several of the animals showed evidence of a fungal folliculitis. A culture of the corn grit found the presence of a *Rhizopus* species.

Despite extensive questioning, we were unable to ascertain any plausible exposure in our patient. She had been participating in hot boxing, a form of exercise in which participants don boxing gloves and hit/kick suspended punching bags in a room heated to 95°F, making it possible she was exposed during one of these exercise sessions. We considered the possibility she might have transferred the fungus during shaving; however, she said that she disposes of the razor after 3 uses and had no memory of having nicked her skin in the recent past. In addition, she had borderline hyperferritinemia of unknown etiology, and given that hyperferritinemia is a risk factor for MCM, this may have predisposed her to the infection.

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