

Four Cases of Dermatomycosis: Superficial Cutaneous Infection by *Alternaria* or *Bipolaris*

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Invasive dermal infections in immunosuppressed patients by a wide variety of opportunistic fungi are well described in the literature; however, superficial infections (dermatomycosis) are more rarely described. We report 4 cases of dermatomycosis by Alternaria or Bipolaris species. All but one of the patients had predisposing conditions including topical corticosteroid use, atopic or seborrheic dermatitis, and nail dystrophy. All 4 patients were otherwise immunocompetent. These cases represent some of the very few reports of Bipolaris in a primary stratum corneum infection and the first report of Bipolaris in an otherwise healthy person. We also describe what may be the first report of Bipolaris onychomycosis. All of our patients responded to topical or oral imidazole antifungal therapy. We discuss the significance of Alternaria and Bipolaris as contaminants or irrelevant organisms grown in some cultures of skin scrapings.

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Dermatomycosis is defined as nondermatophyte superficial fungal infection of the stratum corneum, hair, or nails as opposed to deeper infections in the dermis or subcutaneous tissue. Infection by the true tinea (the dermatophytes *Epidermophyton*, *Microsporum*, and *Trichophyton*) is not included in the definition of dermatomycosis. Pityriasis versicolor (also called tinea versicolor

due to the nondermatophyte *Malassezia furfur*) and candidiasis are well known causes of dermatomycosis. Tinea nigra, an infection caused by *Hortaea werneckii* (formerly *Cladosporium* or *Phaeoannellomyces*), is the best-known example of dermatomycosis due to a pigmented (dematiaceous) fungus. The related term *phaeohyphomycosis* is defined as infection of tissue (usually dermis, subcutaneous, or soft tissue) by budding yeast or by hyphal forms of dematiaceous fungi. From when Borsook¹ reported the first case of dermatomycosis in 1933 until Ajello² coined the term *phaeohyphomycosis* in 1974, few cases of this infection were recognized. The phaeohyphomycotic organisms generally are considered to be saprophytic and commensal. *Alternaria*, for example, is a soil saprophyte and common plant pathogen that was once considered significant only for its ability to elicit human inhalant allergy. However, the phaeohyphomycotic organisms now are recognized as causes of both visceral and cutaneous infections. Systemic infections have included peritonitis, endocarditis, granulomatous lung disease, and cerebral abscess.³ Organisms can be either disseminated to cutaneous structures from deep tissue infections or introduced into the dermis by trauma. Involvement limited to the epidermis, however, has been described only rarely.

The majority of phaeohyphomycosis infections occur in immunocompromised patients, particularly in those who have received a transplant or in those who take systemic or topical corticosteroids. The increased susceptibility of these patients is generally well accepted. There is increasing evidence, however, that suggests the dematiaceous fungal infections also may occur in otherwise healthy individuals. In the healthy population, especially those with a superficial presence of the organism, cultures that test positive traditionally have been considered contaminants. Nonetheless, a few cases of superficial stratum corneum infections in healthy patients have been reported. We

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report 4 cases of superficial infection by *Alternaria* or *Bipolaris*.

Case Reports

Patient 1—A 4-year-old white boy with a medical history of asthma was referred for persistent redness and scaling of his right ear 2 months after supposedly being bitten by a playmate. He had undergone 2 courses of oral antibiotic therapy and topical corticosteroid treatment without improvement before he was referred to a dermatologist. Physical examination revealed scaly erythematous plaques covering most of the right pinna (Figure 1). Specimens examined by a potassium hydroxide (KOH) preparation test revealed numerous nonpigmented hyphae. A culture later revealed *Bipolaris* organisms. The patient was cured after 2 months of therapy with topical ketoconazole 2% cream applied twice daily.

Patient 2—A 38-year-old otherwise healthy Hispanic woman with a long history of severe seborrheic dermatitis unresponsive to treatment presented to our clinic because of increased pruritus and scaling of her scalp and face. Her current medications included triamcinolone acetonide spray, sodium sulfacetamide 10% and sulfur 5% lotion, hydrocortisone ointment used twice daily, and oral ketoconazole 200 mg daily. Physical examination revealed erythema and scaling that was mild on the scalp but severe and disfiguring on the central face and perioral areas. Test results were negative for antinuclear antibodies, rheumatoid factor, rapid plasma reagin, and human immunodeficiency virus types I and II. A fungal culture of facial scales later revealed *Bipolaris* as the sole organism. The patient was given itraconazole 100 mg twice daily for one week. At 2-month follow-up, the exacerbation of her condition had subsided. She continues to have recalcitrant seborrheic dermatitis.

Patient 3—A 43-year-old otherwise healthy white woman was referred for nail dystrophy. She reported the use of acrylic artificial nails. Previous therapies consisted of halobetasol propionate 0.05% cream, betamethasone valerate cream, fluocinonide acetonide cream, and a triple antibiotic ointment containing neomycin, polymyxin, and bacitracin. Physical examination revealed bilateral nail dystrophy and paronychia of 5 fingers. Slight erythema and scaling were present in the periungual area of the involved nails. A KOH preparation test was not performed. A nail culture grew *Bipolaris*. The patient was given itraconazole 100 mg twice daily for one week each month for 6 months. Her nail dystrophy cleared after this



Figure 1. Scaly erythematous plaque of the ear that failed treatment with topical corticosteroid cream. A potassium hydroxide preparation test revealed hyphae, and a culture grew *Bipolaris*.

treatment. Results of a subsequent culture of her nails and periungual area were negative.

Patient 4—A 6-year-old healthy white boy was referred for a persistent scaly erythematous plaque on the cheek (Figure 2). Specimens examined by a KOH preparation test revealed 6 typical *Alternaria* spores per high-powered field without hyphae. The patient was unresponsive to desonide 0.05% cream but responded to econazole cream and fluconazole oral suspension.

Comment

We believe our patients had bona fide superficial infection by *Alternaria* (Figure 3) or *Bipolaris* (Figure 4) and that the organisms grown in culture were not contaminants. Fungal cultures from all of our patients demonstrated either *Alternaria* or *Bipolaris*. Of the 2 organisms, *Alternaria* is more commonly reported as a pathogen. Several classifications have been used for *Alternaria* infection.^{4,7}

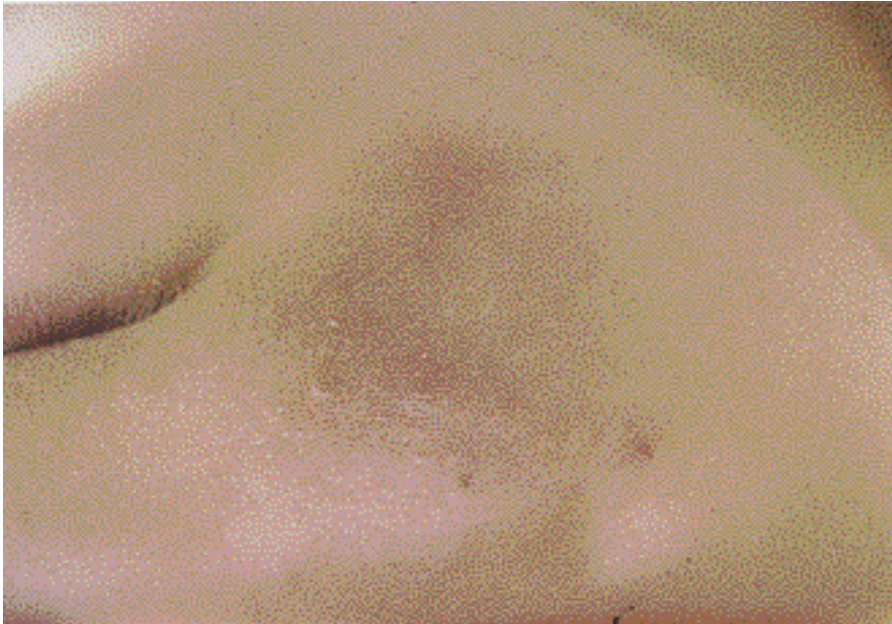


Figure 2. Scaly erythematous plaque on the cheek that failed treatment with topical corticosteroid cream. A potassium hydroxide preparation test revealed *Alternaria* spores. The patient responded to topical and oral antifungal therapy.

Categories include superficial, dermal, subcutaneous, and systemic infections. Some classification systems also include infections of the sinuses, cornea, respiratory tract, brain, bone, and peritoneal cavity.^{4,5,8} Male and Pehamberger⁹ categorized infections as: (1) exogenous infections due to trauma, (2) endogenous infections due to dissemination of the organism after inhalation, and (3) dermatopathic infections due to colonization of preexisting lesions.

Although *Alternaria* is a relatively well-described superficial fungal pathogen, reports of cutaneous *Bipolaris* infections are rare. A literature search revealed only 5 reports of primary cutaneous *Bipolaris*.^{3,10-13} Additionally, only 2 of these reports describe fungal elements limited to the stratum corneum. In one, a 28-year-old man with acquired immunodeficiency syndrome presented with brown plaques on the scrotum that resembled seborrheic keratosis. A culture from this patient grew a combination of *Bipolaris* and *Curvularia*.¹³ In the other report, a 46-year-old immunocompromised woman presented with black verrucous lesions on her nasal conchae.¹² Scraping of the nasal mucosa revealed hyphal elements, and a culture was positive for *Bipolaris*. Notably, these cases of *Bipolaris* involved either a mixed infection or a mucosal surface. We believe our cases may represent the first description of an unmixed superficial *Bipolaris* infection of the epidermis.

Because of their ubiquitous nature, both *Alternaria* and *Bipolaris* frequently are considered

contaminant organisms. Unless supported by microscopic examination of scrapings or biopsies or therapeutic evidence, it is reasonable to assume that mixed cultures of the dematiaceous organism with other dermatophytes are contaminants. True infection should be considered in all patients from whom a pure culture is obtained and in all patients who respond appropriately to antimycotic therapy. The presence or absence of brown pigment in the hyphae is not diagnostic. Hyphal elements of dermatomycosis can be either golden or dark brown; thus, superficial infections may or may not be darkly pigmented (KOH preparation test results showed nonpigmented hyphae in patient 1 and pigmented spores in patient 4). A review of 12 other cases of positive *Alternaria* or *Bipolaris* cultures from our clinic in the past year revealed 4 patients who had *Alternaria* or *Bipolaris* clinical isolates grown in a mixed culture and 8 patients who had a single isolate cultured but who either did not respond to antifungal therapy or were lost to follow-up. These cases are not presented because we are not convinced that the organism that grew was relevant. However, we believe the 4 cases presented here represent true infection by these organisms.

Patients 1 through 3 fall into one of the categories for infection used by Male and Pehamberger.⁹ Patient 1 had either a primary infection by *Bipolaris* or a secondary infection. If the infection was secondary, it could have represented secondary infection of dermatitis on a traumatized ear. Others have reported

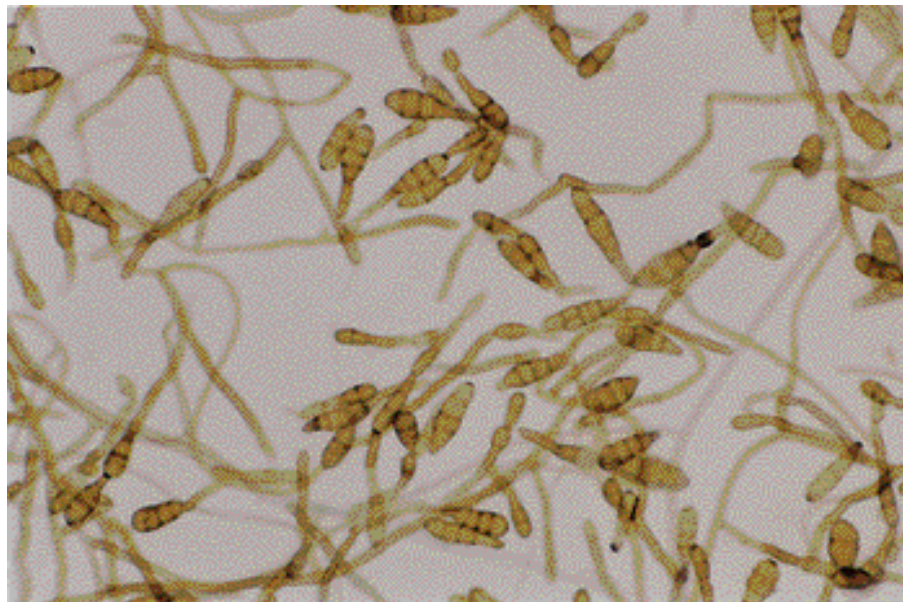


Figure 3. A microscopic preparation from a culture of *Alternaria* with typical pigmented "hand grenade"-shaped spores with both transverse and longitudinal septa (original magnification $\times 100$).

infection by these organisms after traumatic injury. Romano et al¹⁴ reported cutaneous alternariosis in a gardener who received a slight traumatic injury to his lower legs. Duffill and Coley¹⁵ reported a similar case in a gardener with infection secondary to rose thorn pricks. Similarly, Estes et al¹⁰ described phaeohyphomycosis in a 5-year-old child due to *Bipolaris spicifera* (formerly *Drechslera*) secondary to trauma from adhesive tape. A search of our database revealed a 14-year-old white boy with a pigmented rash under occlusive bandages. A fungal culture grew *Alternaria* and a KOH preparation test showed typical *Alternaria* spores. However, this patient was lost to follow-up and response to treatment could not be verified.

Patient 2 had several possible predisposing factors. First, she had psoriasiform lesions on her face. This would be similar to a patient described by Chalet et al¹⁶ with *Bipolaris* infection superimposed on vesicular herpetic lesions in which the epidermis also was disrupted. Second, patient 2 was actively using topical corticosteroids. Machet et al¹⁷ discussed the role of corticosteroid-induced cutaneous fragility in cutaneous alternariosis. This case differs from ours, however, in that our patient had *Bipolaris* and fungal elements that were present primarily in the epidermis.

Trauma and immunocompetence are not necessary components for dermatomycosis. Indeed, most patients with dematiaceous onychomycosis have been immunocompetent. However, damage to the nail is common and might be sufficient to introduce



Figure 4. A microscopic preparation from a culture of *Bipolaris*. Brown conidia usually have 3 to 5 septa, and the conidiophore bends at the insertion point of each conidium (original magnification $\times 400$).

the fungus (as in patient 3, who used artificial nails). Several cases of onychomycosis attributable to *Alternaria* have been described; however, we could find no cases of onychomycosis due to *Bipolaris* in our review of the literature.

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We describe one case of superficial cutaneous *Alternaria* and 3 cases of superficial *Bipolaris* infection. Reports of these cases are relatively rare in the literature. Our report may represent the first description of *Bipolaris* as a sole superficial fungal pathogen and the first description of *Bipolaris* in onychomycosis. Finally, prior to this report, cutaneous *Bipolaris* had been described only in patients with predisposing medical conditions. Based on these and similar cases, physicians may want to reconsider the importance of contaminant fungal cultures, especially in patients who are unresponsive to usual therapies. Also, testing with fungal cultures or KOH preparations may be helpful in some cases of refractory dermatitis and nonhealing wounds. Dermatomycosis is an easily managed infection that may otherwise go untreated.

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