

Table 2. Recommendations for Antimicrobial Therapy of Infections Caused by Black Fungi

Clinical entity	First-line therapy	Second-line therapy	Options for refractory infections
Chromoblastomycosis	Itraconazole (oral 200-400 mg daily) for 2 - 3 months or longer	Partial surgical resection and/or cryotherapy combined with itraconazole (200 - 600 mg daily) or voriconazole (400-600mg daily) until 2 - 3 months after apparent mycologic cure	Repeated surgical resection; itraconazole and flucytosine; amphotericin B and flucytosine; ketoconazole; ketoconazole and flucytosine; itraconazole and terbinafine
Mycetoma	Itraconazole (200-400 mg daily) for 2 - 3 months or longer	Partial surgical resection combined itraconazole (200 - 600 mg daily) or voriconazole (400-600mg daily); until 2 - 3 months after apparent mycologic cure	Repeated surgical resection; amphotericin B; ketoconazole and flucytosine; itraconazole and flucytosine; amphotericin B and flucytosine; itraconazole and terbinafine
Subcutaneous phaeohyphomycosis Immunocompetent hosts	Itraconazole (200-400 mg daily) for 2 - 3 months; if organisms are contained within a cyst, adjunctive antifungal therapy is not needed	Partial surgical resection combined with itraconazole (200 - 600 mg daily) or voriconazole (400-600mg daily) until 2 - 3 months after apparent mycologic cure	Repeated surgical resection; amphotericin B; ketoconazole; addition of flucytosine or terbinafine to medical regimen
Immunocompromised hosts	Itraconazole (200 - 400mg daily), or amphotericin B (1 mg/kg/day) until 2 - 3 months after apparent mycologic cure	Partial surgical resection combined with itraconazole (200 - 600 mg daily), voriconazole (400-600mg daily), amphotericin B (1 mg/kg/day), or ketoconazole (300 - 400 mg daily) until 2 - 3 months after apparent mycologic cure	Repeated surgical resection; addition of flucytosine or terbinafine to medical regimen
Cutaneous phaeohyphomycosis Dermatomyces, onychomycosis	Itraconazole (200 mg daily) until 2- 3 months after apparent mycologic cure	Voriconazole (400mg daily)	Terbinafine; Ketoconazole
Keratomycosis	Natamycin (5% solution) topically	Topical natamycin or amphotericin B (0.15%) combined with flucytosine (1% aqueous solution); topical itraconazole, ketoconazole, or miconazole; oral itraconazole (400 mg daily); oral voriconazole (400mg daily); oral ketoconazole (400 mg daily)	Prior therapy with penetrating keratoplasty
Sinusitis Allergic fungal sinusitis	Surgical drainage and debridement, combined with postoperative corticosteroids; postoperative nasal saline irrigations and regular surveillance endoscopy	Itraconazole (200-400mg daily); voriconazole (400mg daily)	Allergen immunotherapy to decrease IgE production
Fungus ball	Resection of fungus ball, with aeration of sinuses	In cases of local invasion of bone, itraconazole or amphotericin B are indicated as adjunctive therapy	Voriconazole

Allergic bronchopulmonary mycosis	Corticosteroids	Corticosteroids with itraconazole (200-400mg daily) or voriconazole (400mg daily)	
Pneumonia	Itraconazole (400mg daily) or amphotericin B (1mg/kg daily) for severe disease	Voriconazole (400-600mg daily)	Amphotericin B with flucytosine
Central nervous system infection	Surgical resection (brain abscess) with high dose itraconazole (400-600mg daily) or voriconazole (400-600mg daily) + lipid amphotericin B +/- flucytosine	Repeated surgical resection with high dose azole + echinocandin +/- flucytosine	
Disseminated infection	High dose lipid amphotericin B (>5mg/kg daily) with intravenous itraconazole (400-600mg daily) or voriconazole (400-600mg daily) +/- echinocandin; colony stimulating factors if neutropenic	High dose lipid amphotericin B with azole +/- echinocandin +/- flucytosine; colony stimulating factors if neutropenic	