



Dematiaceous fungal infection in solid organ transplantation

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Disclosure

- There is no conflict of interest to declare.

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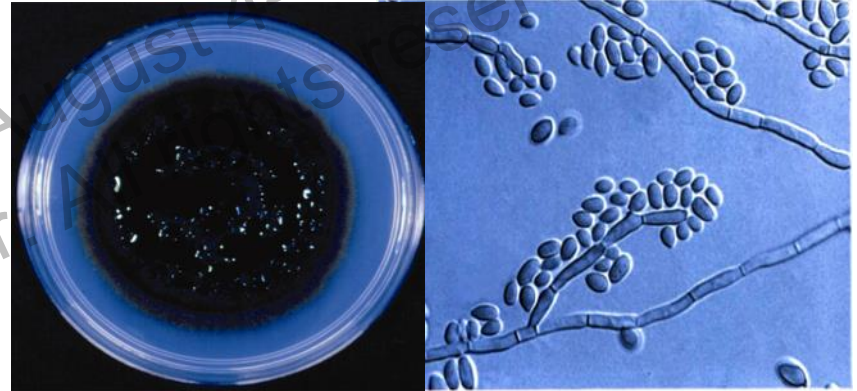
III

Summary

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Dematiaceous Fungi (black fungi)

- A large and heterogenous group of filamentous molds;
- With dark colored colonies and cell walls;
- Produce brown **melanin** or **melanin-like pigment** in the cell wall of their hyphae or conidia, or both;



Pathogenic dematiaceous fungi and taxonomy

Ascomycota

- **Chaetothyriales**

- Cladophialophora*, *Exophiala*, *Fonsecaea*, *Ochroconis*, *Phialophora* and *Rhinocladiella*

- **Dothideales**

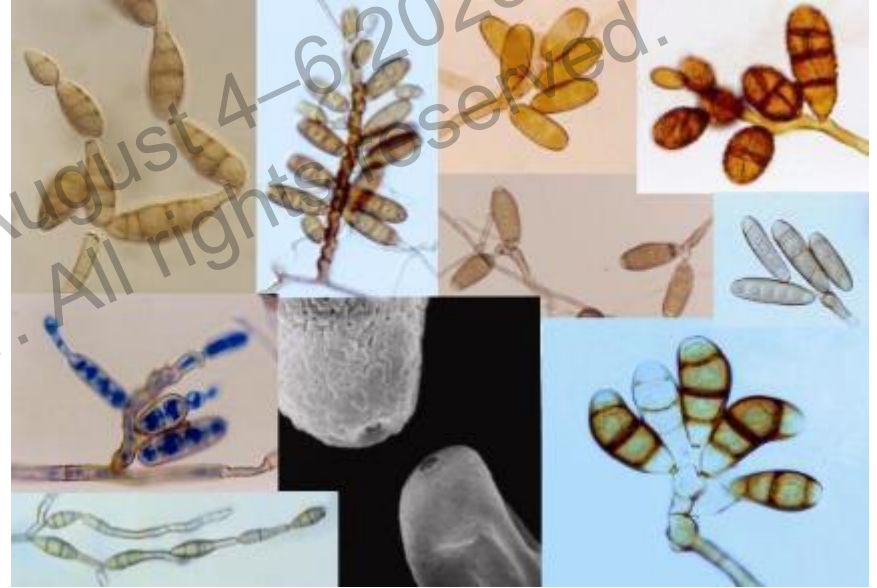
- Aureobasidium* and *Hormonema*)

- **Sordariales**

- Phaeoacremonium*, *Chaetomium*) and *Madurella*

- **Pleosporales**

- Alternaria*, *Bipolaris*, *Curvularia* and *Exserohilum*



Clinical diseases

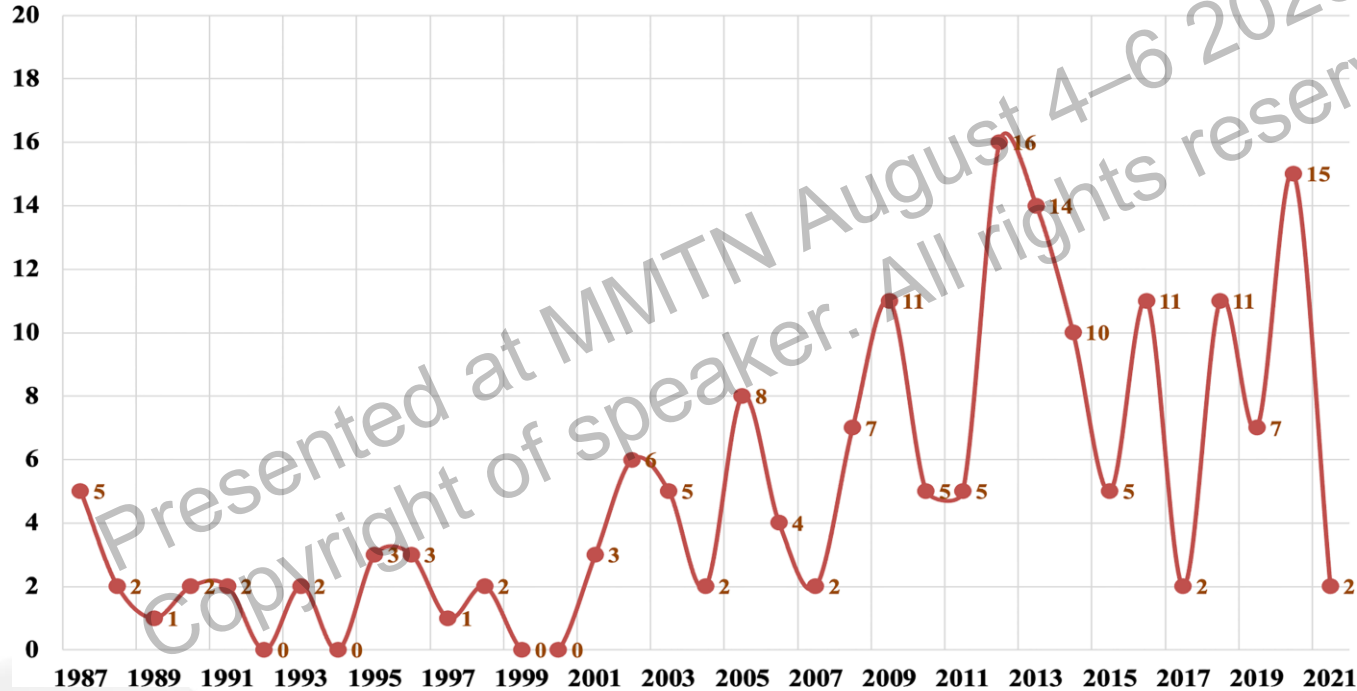
- * Chromoblastomycosis
- * **Phaeohyphomycosis**
- * Eumycotic mycetoma
- * Onychomycosis
- * Tinea nigra
- * Black piedra
- * Keratitis

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Phaeohyphomycosis in China

- 174 cases of proven phaeohyphomycosis reported in Chinese and English literature from 1987 to 2021 were reviewed according to the classification definitions;
- Epidemiology, species of dematiaceous fungi, MIC values, clinical features, treatments, and prognosis were analyzed;
- The most common risk factors were traumas (37%), diabetes (11%), and corticosteroid use (11%); CARD9 deficiency (7%), **kidney transplantations** (3%), were frequent risk factors in patients with disseminated, CNS, deep local, and pulmonary infections;
- The mortality of cerebral, disseminated and pulmonary phaeohyphomycosis are 55%, 36%, and 25%;
- The overall misdiagnosis rate of phaeohyphomycosis was 74%. Moderate to severe rashes are accounting for 82% of subcutaneous phaeohyphomycosis.;

Number of the cases since 1987 to 2021



Demographics & risk factors of phaeohyphomycosis

TABLE 1 | Demographics and risk factors of phaeohyphomycosis in China.

Infection type	Total	CNS	Disseminated	Pulmonary	Deep-local	Subcutaneous	Keratitis	Superficial
Demographics (Ratio %)	n=174	n=11	n=11	n=8	n=10	n=85	n=26	n=23
Male	107 (61%)	11 (100%)	5 (45%)	7 (88%)	6 (60%)	49 (58%)	16 (62%)	13 (57%)
Female	67 (39%)	0 (100%)	6 (55%)	1 (13%)	4 (40%)	36 (42%)	10 (38%)	10 (43%)
Age, mean (year)	48	29	26	54	61	51	57	37
Range (year)	2-89	4-73	9-56	10-89	45-75	2-89	22-79	2-87
Risk factor (Ratio %)								
Stem cell transplantation	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Heart transplantation	1 (1%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1%)	0 (0%)	0 (0%)
Lung transplantation	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Liver transplantation	2 (1%)	0 (0%)	0 (0%)	1 (13%)	1 (10%)	0 (0%)	0 (0%)	0 (0%)
Kidney transplantation	5 (3%)	0 (0%)	1 (9%)	1 (13%)	0 (0%)	3 (4%)	0 (0%)	0 (0%)
Graft vs host disease	1 (1%)	0 (0%)	1 (9%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Corticosteroid use	20 (11%)	0 (0%)	1 (9%)	1 (13%)	1 (10%)	14 (16%)	0 (0%)	3 (13%)

Demographics & risk factors of phaeohyphomycosis

TABLE 1 | Continued

Infection type	Total	CNS	Disseminated	Pulmonary	Deep-local	Subcutaneous	Keratitis	Superficial
Other immunosuppressants	9 (5%)	0 (0%)	0 (0%)	1 (13%)	1 (10%)	5 (6%)	0 (0%)	2 (9%)
Malignancy	9 (5%)	1 (9%)	1 (9%)	0 (0%)	2 (20%)	4 (5%)	1 (4%)	0 (0%)
Chemotherapy	3 (2%)	0 (0%)	1 (9%)	0 (0%)	1 (10%)	0 (0%)	1 (4%)	0 (0%)
Neutropenia	2 (1%)	0 (0%)	0 (0%)	1 (13%)	1 (10%)	0 (0%)	0 (0%)	0 (0%)
HIV/AIDS	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Primary T-cell immunodeficiency	1 (1%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1%)	0 (0%)	0 (0%)
CARD9 mutation	12 (7%)	1 (9%)	2 (18%)	0 (0%)	0 (0%)	9 (11%)	0 (0%)	0 (0%)
Malnutrition	10 (6%)	0 (0%)	2 (18%)	1 (13%)	1 (10%)	6 (7%)	0 (0%)	0 (0%)
Pregnancy	3 (2%)	0 (0%)	1 (9%)	0 (0%)	0 (0%)	2 (2%)	0 (0%)	0 (0%)
Trauma	65 (37%)	2 (18%)	5 (45%)	0 (0%)	4 (40%)	25 (29%)	22 (85%)	7 (30%)
Smoke	2 (1%)	0 (0%)	1 (9%)	1 (13%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Diabetes mellitus	20 (11%)	2 (18%)	1 (9%)	0 (0%)	4 (40%)	12 (14%)	0 (0%)	1 (4%)
Chronic liver disease	2 (1%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1%)	1 (4%)	0 (0%)
Chronic pulmonary disease	11 (69%)	0 (0%)	1 (9%)	2 (25%)	0 (0%)	8 (9%)	0 (0%)	0 (0%)
Chronic renal disease	4 (2%)	0 (0%)	0 (0%)	0 (0%)	1 (10%)	3 (3%)	0 (0%)	0 (0%)
Chronic heart disease	3 (2%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	3 (3%)	0 (0%)	0 (0%)
No risk factor	38 (22%)	3 (27%)	0 (0%)	2 (25%)	1 (10%)	19 (22%)	2 (8%)	11 (48%)

Solid organ transplantation

- **Solid organ transplantation (SOT)** is an established and practical definitive treatment option for patients with end-organ dysfunction;
- The evolution of SOT has seen the field progress rapidly over the past few decades with incorporation of a variety of solid organs—liver, kidney, pancreas, heart, and lung—into the donor pool;
- The SOT recipients are particularly **at risk of invasive infections** due to prolonged immunosuppression

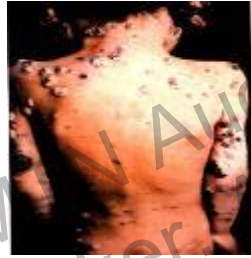
Radcliffe R. et al, *Transpl Infect Dis.* 2022;24:e13819.

Phaeohyphomycosis & pathogens

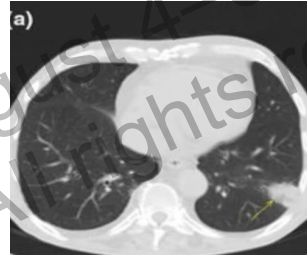
Different clinical types



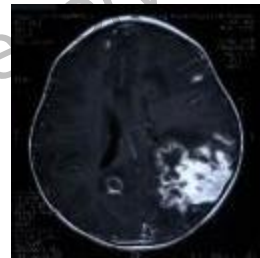
Cutaneous (SSTI)



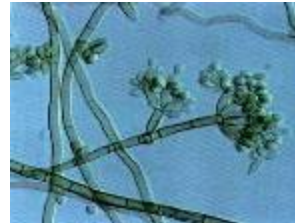
Disseminated



Pulmonary



CNS



A variety of pathogens

Guidelines of AST-IDCOP

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SPECIAL ISSUE-TRANSPLANT INFECTIOUS DISEASES

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Clinical TRANSPLANTATION
The Journal of Clinical and Translational Research

Emerging fungal infections in solid organ transplant recipients: Guidelines of the American Society of Transplantation Infectious Diseases Community of Practice

Shmuel Shoham¹ | Edward A. Dominguez² | on behalf of the AST Infectious Diseases
Community of Practice

Hsoham S. et al, *Clinical Transplantation*. 2019;33:e13525.



Review from 1973~2022

REVIEW



Dematiaceous fungal infections in solid organ transplantation: Systematic review and Bayesian meta-analysis

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Abstract

Background: Dematiaceous fungi cause a number of infectious syndromes referred to as phaeohyphomycosis among both immunocompetent and immunocompromised hosts. We performed a systematic review to characterize these infections in solid organ transplant recipients (SOTR).






Methods: We searched PubMed database (last searched 1/6/2022) for English-language reports on dematiaceous fungal infections in SOTR. Included reports needed individualized demographic, treatment, and outcome data; pediatric reports were excluded. A universally applicable bias assessment was performed on reports. Models

Case series & literature review



Review

Phaeohyphomycosis in Solid Organ Transplant Recipients: A Case Series and Narrative Review of the Literature

Davide Lo Porto ^{1,*}, Andrea Cona ¹, Francesca Todaro ¹, Elena De Carolis ², Francesca Cardinale ¹,
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Lo Proto D, et al. *J. Fungi* 2023, 9, 283. <https://doi.org/10.3390/jof9030283>



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1. Epidemiology and risk factors
2. Infection types
3. Microbiology and susceptibility results
4. Therapy and outcome

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Summary

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Epidemiology and risk factors

- A total of 149 reports on **201 cases** of dematiaceous fungal infections in SOT recipients published between 1973 and 2022. (94 cases published between 2011 and 2022)
- All transplant patients are at risk and infections can occur at all times along the post-transplant continuum.

	Total (n = 201)
Age (mean \pm SD)	54 \pm 12
Male (No., %)	144 (72%)
Transplant Organ	
Kidney	122 (61%)
Lung	25 (12%)
Heart	26 (13%)
Liver	8 (4%)
Pancreas or combination	
Time between transplant and infection (months, mean \pm SD)	31 \pm 42

Epidemiology and risk factors

- Development of infection requires that a susceptible host comes in **contact with the causative fungus** and that the fungus survives and thrives within the patient.
- Exposure to emerging fungi is generally due to direct cutaneous contact from the environment sources.

Reported exposure	
gardening	35
trauma	21

Infection types

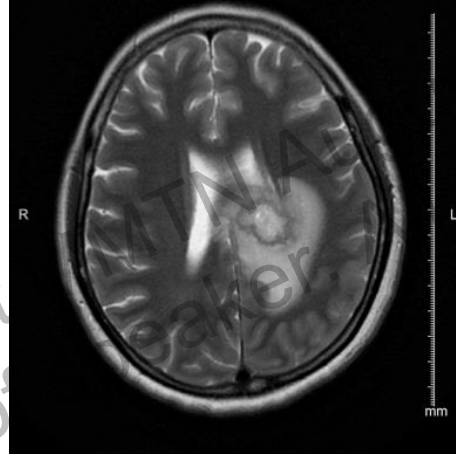
- **Skin and soft tissue infection (SSTI)** was the most common infection type (73%), followed by CNS (11%) and disseminated (11%) infections.

	Total (n = 201)
Transplant Organ	
SSTI (No.)	146 (73%)
central nervous system (CNS) infection (No.)	22 (11%)
Disseminated infection (No.)	22 (11%)
Pulmonary infection (No.)	11 (5%)

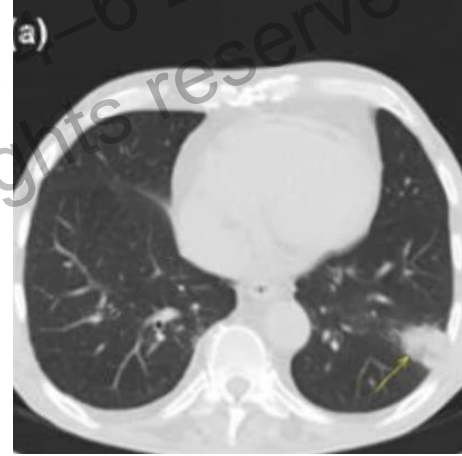
Infection types



SSTI



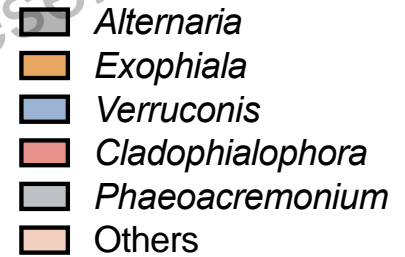
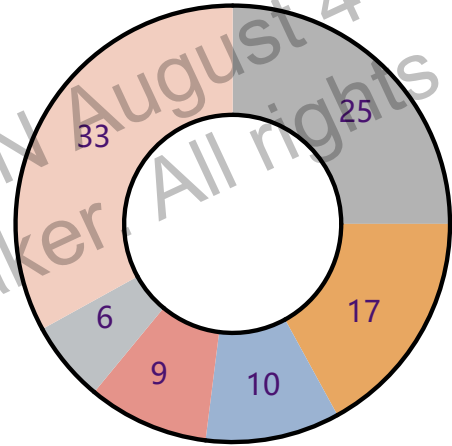
CNS infection



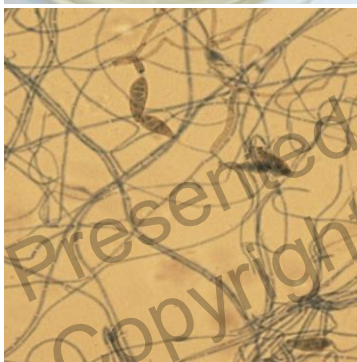
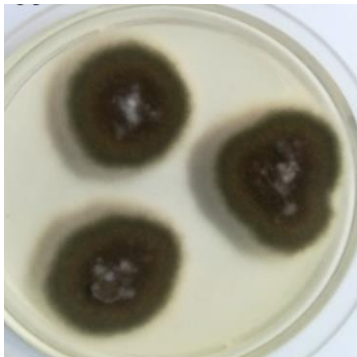
Pulmonary infection

Microbiology and susceptibility

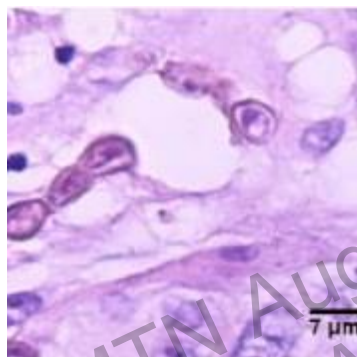
- A total of **25 genera** were identified among 186 cases with fungal isolates identified at the genus and/or species level.



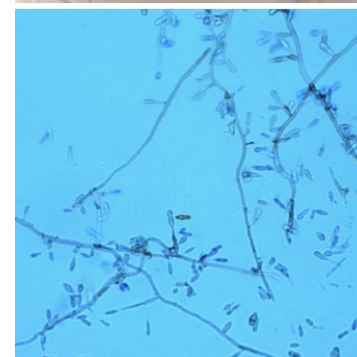
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Alternaria alternata



Exophiala xenobiotica



Verruconis gallopava

Microbiology and susceptibility

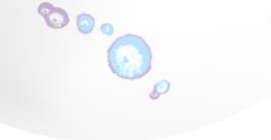
- Minimum inhibitory concentration (MIC) values derived from BMD methods or Sensititre YeastOne (Thermo Fisher Scientific) were available for 37/58 (64%) fungal isolates.

Genus	Species	Amphotericin B (µg/ml)	Ketoconazole (µg/ml)	Fluconazole (µg/ml)	Itraconazole (µg/ml)	Voriconazole (µg/ml)	Posaconazole (µg/ml)	Isavuconazole (µg/ml)	Anidulafungin (µg/ml)	Caspofungin (µg/ml)	Micafungin (µg/ml)	Flucytosine (µg/ml)	Terbinafine (µg/ml)
<i>Acrophialophora</i>	<i>Acrophialophora levis</i>			8	0.06	0.25	0.06	0.25	0.5	1	1		
<i>Alternaria</i>	<i>Alternaria</i> spp.	0.04-1.0	0.78	2-32	0.03-1.0	1-4	0.125-0.25			<0.03-1.0			
	<i>Alternaria alternata</i>	0.25-1.0		32-256	0.5-4	0.125-0.25	0.125-0.25		0.125	0.25	0.06		
	<i>Alternaria anthropophila</i>	2			0.125	1	0.125		0.5 ^{MEC}	0.5 ^{MEC}	0.125 ^{MEC}		0.5
	<i>Alternaria infectoria</i>	2		>64	0.5	4				4 ^{MEC}		>64	8
<i>Cladophialophora</i>	<i>Cladophialophora bantiana</i>	<0.5				0.5	0.016	0.25	0.031				
<i>Colletotrichum</i>	<i>Colletotrichum crassipes</i>	1	8	>16	2	2						>128	2
<i>Exophiala</i>	<i>Exophiala dermatitidis</i>	1		4.0	0.5	0.032	0.125	0.125	>16				
	<i>Exophiala spinifera</i>	≤0.14	0.2			≤0.018						≤10.09	
	<i>Exophiala xenobiotica</i>	16	1		16	2	0.125						>0.5

Microbiology and susceptibility

Genus	Species	Amphotericin B (µg/ml)	Ketoconazole (µg/ml)	Fluconazole (µg/ml)	Itraconazole (µg/ml)	Voriconazole (µg/ml)	Posaconazole (µg/ml)	Isavuconazole (µg/ml)	Anidulafungin (µg/ml)	Caspofungin (µg/ml)	Micafungin (µg/ml)	Flucytosine (µg/ml)	Terbinafine (µg/ml)
<i>Cladophialophora</i>	<i>Cladophialophora bantiana</i>	<0.5				0.5	0.016	0.25	0.031				
<i>Colletotrichum</i>	<i>Colletotrichum crassipes</i>	1	8	>16	2	2						>128	2
<i>Exophiala</i>	<i>Exophiala dermatitidis</i>	1		4.0	0.5	0.032	0.125	0.125	>16				
	<i>Exophiala spinifera</i>	≤0.14	0.2		≤0.018							≤10.09	
	<i>Exophiala xenobiotica</i>	16	1		16	2	0.125						>0.5
<i>Medicopsis</i>	<i>Medicopsis romeroi</i>	0.25–8.0			8 to >16	0.5–2.0	0.5–2.0			1 to >16			0.25 to >16
<i>Microsphaeropsis</i>	<i>Microsphaeropsis arundinis</i>	0.5–1.0			<0.015–0.032	0.06	<0.008						
<i>Paraconiothyrium</i>	<i>Paraconiothyrium cyclothyrioides</i>	0.25			0.125	0.25	0.03						
<i>Phaeoacremonium</i>	<i>Phaeoacremonium parasiticum</i>	0.25–8			0.03–2	0.03–0.25	0.03–0.125						
<i>Phomopsis</i>	<i>Phomopsis longicolla</i>	0.03			0.25	0.015	0.015			≤0.03			1
<i>Pleurostoma</i>	<i>Pleurostoma richardsiae</i>	0.5		128	1	2	1		>8	>8	>8	>64	
<i>Rhinocladiella</i>	<i>Rhinocladiella mackenziei</i>	≤0.03			≤0.015		≤0.015					8	
<i>Scopulariopsis</i>	<i>Scopulariopsis brumptii</i>	0.8		780	0.07								
<i>Veronaea</i>	<i>Veronaea botryosa</i>			>64	0.25	2							
<i>Verruconis</i>	<i>Verruconis gallopava</i>	<0.12–1.0	0.8	20–128	0.06–0.25	0.13–1.0	0.06–0.125		0.06	0.25	0.03	2–128	

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MICs of different antifungals against 52 isolates of *B.spicifera* (mg/L)

Antifungals	GM	MIC Range	MIC ₉₀
ANI	0.06	<0.015->8	0.25
AMB	0.21	<0.03-2	1
CAS	0.89	0.25-2	1
ITC	0.63	<0.03-4	1
FLU	38.7	4->64	>64
FC	>64	>64	>64
MIK	0.05	<0.015-0.125	0.125
POS	0.26	<0.03-1	0.5
VRC	1.56	0.25-4	2



da Cunha KC, et al. *J Clin Microbiol.* 2012.

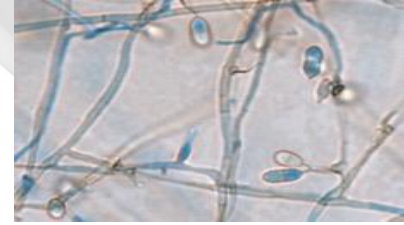
MICs of different antifungals against 37 isolates of *C. bantiana* (mg/L)



Antifungals	GM	MIC Range	MIC ₅₀	MIC ₉₀
AMB	0.7	0.125-2	1	1
FLU	35.14	16-64	32	64
ITC	0.064	<0.016-0.25	0.063	0.125
VRC	0.769	0.125-4	1	2
POS	0.044	<0.016-0.25	0.031	0.125
ASV	0.259	0.008-1	0.25	0.5
CAS	2.551	1-8	2	4
ANI	0.073	0.016-4	0.063	2

Badali H, et al. *J Clin Microbiol*, 2010

MICs of different antifungals against 11 isolates of *Ochroconis musae* (mg/L)



Antifungals	GM	MIC Range	MIC ₉₀
AMB	28.36	8-32	32
ITC	7.00	1-32	32
POS	18.23	0.5-32	32
VRC	11.09	2-32	32
ANI	3.93	0.015-32	4
CAS	7.90	1-32	4
MIK	0.22	0.06-0.5	0.25
TERB	0.03	0.015-0.025	0.02

Giraldo A, et al. *J Clin Microbiol*, 2014

MICs of different antifungals against 18 isolates of *Verruconis gallopava* (mg/L)



Antifungals	MIC Range	MIC ₅₀	MIC ₉₀	GM
AMB	0.125-4	0.25	0.5	0.54
FC	0.5-64	4	32	11.53
FLU	4->64	64	>64	52.22
ITC	0.016-4	0.125	0.5	0.40
VRC	0.5-2	1	2	1.06
POS	<0.016-4	0.031	0.125	0.28
CAS	0.25-1	0.5	1	0.64
ANI	0.016-0.125	0.031	0.063	0.04

Syedmousavi S, et al. *Antimicrob Agents Chemother*, 2014

MICs of different antifungals against 43 isolates of *E. dermatitidis* (mg/L)



Antifungals	MIC Range	GM	MIC ₅₀	MIC ₉₀
AMB	0.12-2	1.19	1	2
FC	0.12-64	0.24	1	4
VRC	0.015-1	0.06	0.06	0.25
ITC	0.015-1	0.05	0.06	0.25
TERB	0.015-0.25	0.02	0.015	0.03

Duarte AP, et al. *Mycopathologia*, 2013

Therapy and outcome

- The median duration of therapy was 5 months (range 0.1–40 months) for the 120 cases which reported treatment duration, reflecting the **heterogeneity of presentations and clinical courses** across the reports.

	Total (n = 201)
Duration of therapy (months, mean [range])	5 [0.1–40]
Choose of antifungal agents	
→ Itraconazole	91 (45%)
→ Voriconazole	59 (29%)
→ Posaconazole	18 (9%)
Isavuconazole	3 (1%)
→ Amphotericin B	57 (28%)
Receipt of ≥2 antifungal agents (No., %)	65 (32%)
Disseminated infections (No., %)	47 (73%)
Without antifungal therapy (No., %)	23 (11%)
SSTIs (No., %)	22 (96%)

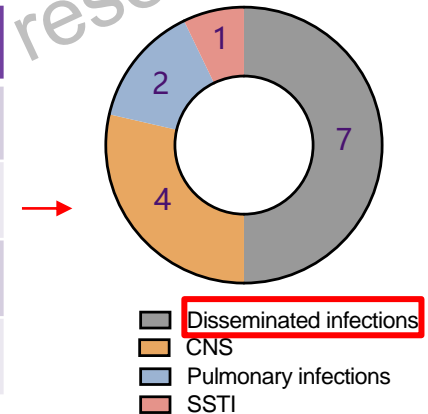
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Therapy and outcome

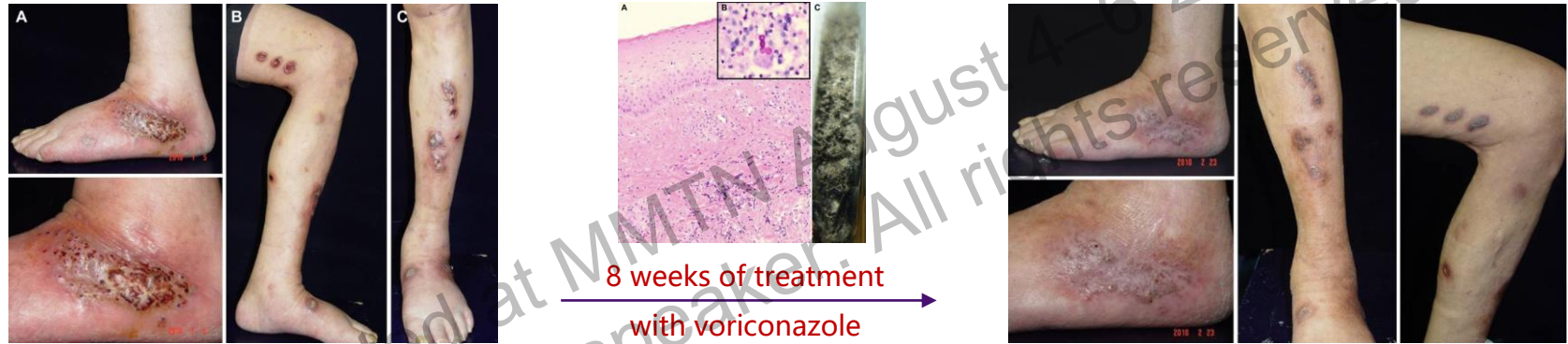
	Total (n = 201)
Received procedural intervention for infection (No., %)	134 (67%)
SSTIs (No., %)	104/146 (71%)
incision and drainage, local excision, and debridement	
Pulmonary infections (No., %)	2/11 (18%)
lobectomies	
CNS infections (No., %)	13/22 (59%)
surgically drained, resected	

Therapy and outcome

	Total (n = 201)
Alive at time of report (No.)	149 (74%)
Death from dematiaceous fungal infection (No.)	14 (7%)
Death from other cause(s) (No.)	28 (14%)
Multifactorial death (No.)	10 (5%)



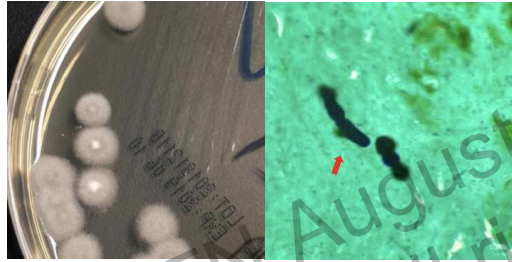
Case 1



- A renal transplant recipient with a cutaneous phaeohyphomycosis due to *Alternaria* species
- Clinical improvement was achieved by combination of amphotericin B wet-packing and systemic antifungal therapy with oral voriconazole

Hsu C.C., et al. *Asian Journal of Surgery* (2015) 38, 47e57

Case 2

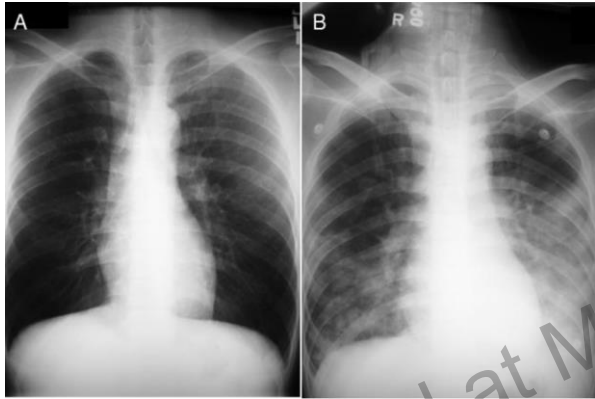


4 weeks of treatment
with voriconazole
(200 mg/day)



- A renal transplant recipient with subcutaneous phaeohyphomycosis due to *Hongkongmyces snookiorum*.
- The condition improved significantly by systemic antifungal therapy with oral voriconazole

Case 3



Chest radiographs before admission (A) and upon admission (B)

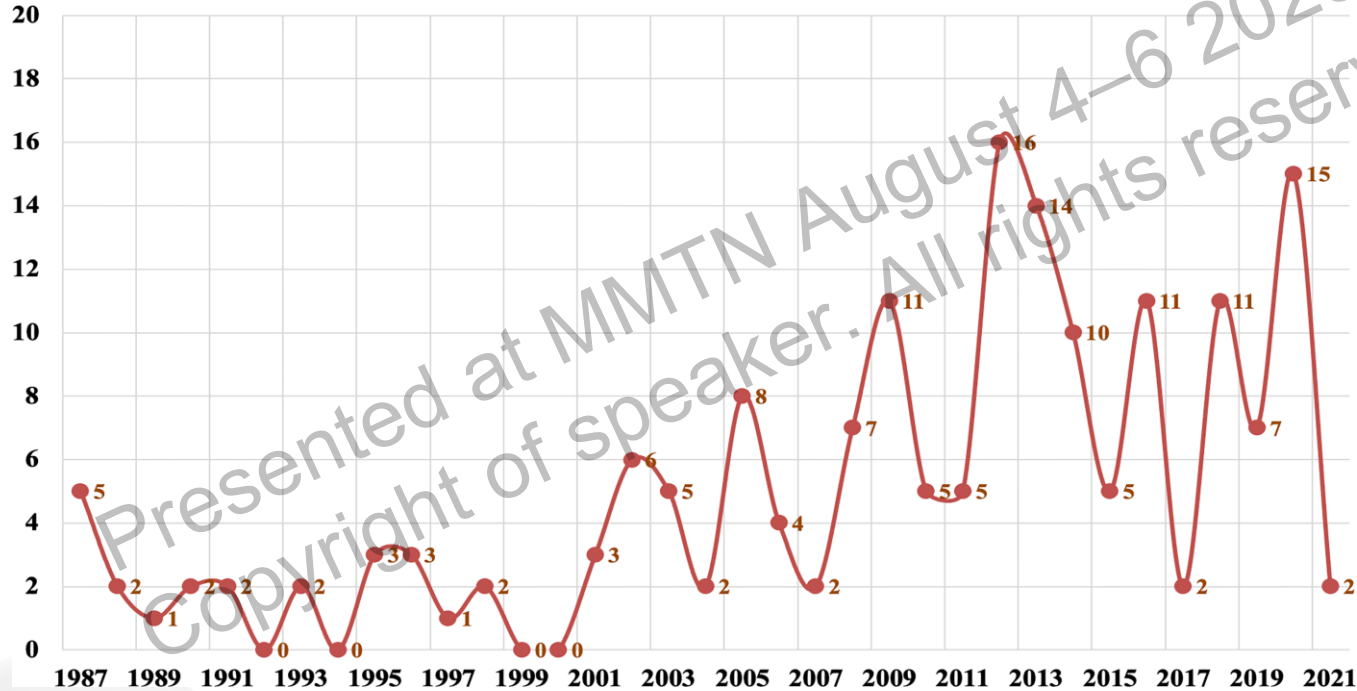


- A case of *Lasiodiplodia theobromae* pneumonia in a patient who died 14 days after cadaveric-liver transplantation. A dematiaceous mold was recovered and identified as *L. theobromae* by microscopic morphology and EF1 gene sequencing.

Phaeohyphomycosis in China

- 174 cases of proven phaeohyphomycosis reported in Chinese and English literature from 1987 to 2021 were reviewed according to the classification definitions;
- Epidemiology, species of dematiaceous fungi, MIC values, clinical features, treatments, and prognosis were analyzed;
- The most common risk factors were traumas (37%), diabetes (11%), and corticosteroid use (11%); CARD9 deficiency (7%), **kidney transplantations** (3%), were frequent risk factors in patients with disseminated, CNS, deep local, and pulmonary infections;
- The mortality of cerebral, disseminated and pulmonary phaeohyphomycosis are 55%, 36%, and 25%;
- The overall misdiagnosis rate of phaeohyphomycosis was 74%. Moderate to severe rashes are accounting for 82% of subcutaneous phaeohyphomycosis.;

Number of the cases since 1987 to 2021



Demographics & risk factors of phaeohyphomycosis

TABLE 1 | Demographics and risk factors of phaeohyphomycosis in China.

Infection type	Total	CNS	Disseminated	Pulmonary	Deep-local	Subcutaneous	Keratitis	Superficial
Demographics (Ratio %)	n=174	n=11	n=11	n=8	n=10	n=85	n=26	n=23
Male	107 (61%)	11 (100%)	5 (45%)	7 (88%)	6 (60%)	49 (58%)	16 (62%)	13 (57%)
Female	67 (39%)	0 (100%)	6 (55%)	1 (13%)	4 (40%)	36 (42%)	10 (38%)	10 (43%)
Age, mean (year)	48	29	26	54	61	51	57	37
Range (year)	2-89	4-73	9-56	10-89	45-75	2-89	22-79	2-87
Risk factor (Ratio %)								
Stem cell transplantation	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Heart transplantation	1 (1%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1%)	0 (0%)	0 (0%)
Lung transplantation	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Liver transplantation	2 (1%)	0 (0%)	0 (0%)	1 (13%)	1 (10%)	0 (0%)	0 (0%)	0 (0%)
Kidney transplantation	5 (3%)	0 (0%)	1 (9%)	1 (13%)	0 (0%)	3 (4%)	0 (0%)	0 (0%)
Graft vs host disease	1 (1%)	0 (0%)	1 (9%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Corticosteroid use	20 (11%)	0 (0%)	1 (9%)	1 (13%)	1 (10%)	14 (16%)	0 (0%)	3 (13%)

Demographics & risk factors of phaeohyphomycosis

TABLE 1 | Continued

Infection type	Total	CNS	Disseminated	Pulmonary	Deep-local	Subcutaneous	Keratitis	Superficial
Other immunosuppressants	9 (5%)	0 (0%)	0 (0%)	1 (13%)	1 (10%)	5 (6%)	0 (0%)	2 (9%)
Malignancy	9 (5%)	1 (9%)	1 (9%)	0 (0%)	2 (20%)	4 (5%)	1 (4%)	0 (0%)
Chemotherapy	3 (2%)	0 (0%)	1 (9%)	0 (0%)	1 (10%)	0 (0%)	1 (4%)	0 (0%)
Neutropenia	2 (1%)	0 (0%)	0 (0%)	1 (13%)	1 (10%)	0 (0%)	0 (0%)	0 (0%)
HIV/AIDS	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Primary T-cell immunodeficiency	1 (1%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1%)	0 (0%)	0 (0%)
CARD9 mutation	12 (7%)	1 (9%)	2 (18%)	0 (0%)	0 (0%)	9 (11%)	0 (0%)	0 (0%)
Malnutrition	10 (6%)	0 (0%)	2 (18%)	1 (13%)	1 (10%)	6 (7%)	0 (0%)	0 (0%)
Pregnancy	3 (2%)	0 (0%)	1 (9%)	0 (0%)	0 (0%)	2 (2%)	0 (0%)	0 (0%)
Trauma	65 (37%)	2 (18%)	5 (45%)	0 (0%)	4 (40%)	25 (29%)	22 (85%)	7 (30%)
Smoke	2 (1%)	0 (0%)	1 (9%)	1 (13%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Diabetes mellitus	20 (11%)	2 (18%)	1 (9%)	0 (0%)	4 (40%)	12 (14%)	0 (0%)	1 (4%)
Chronic liver disease	2 (1%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1%)	1 (4%)	0 (0%)
Chronic pulmonary disease	11 (69%)	0 (0%)	1 (9%)	2 (25%)	0 (0%)	8 (9%)	0 (0%)	0 (0%)
Chronic renal disease	4 (2%)	0 (0%)	0 (0%)	0 (0%)	1 (10%)	3 (3%)	0 (0%)	0 (0%)
Chronic heart disease	3 (2%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	3 (3%)	0 (0%)	0 (0%)
No risk factor	38 (22%)	3 (27%)	0 (0%)	2 (25%)	1 (10%)	19 (22%)	2 (8%)	11 (48%)

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Summary

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Summary

- Dematiaceous fungi are important causes of infection in SOT recipients.
- An early diagnosis and therapy are critical in preventing the dissemination of disease.
- The diagnosis relies on clinical suspicion paired with mycological investigation.
- Treatment of these infections continues to be a challenge.

As cases increase, further studies are becoming necessary to determine the optimal management strategy in this vulnerable immunosuppressed population.

Thanks for your attention!

Presented at MMTN August 4-6 2023.
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