Fungiscope
Rare Invasive Fungal Infection in India

Oliver A. Cornely
on behalf of The ECMM/ISHAM Working Group
Factors that are prerequisites for the development of IFI
- Exposure to fungi
- Host acquisition of potential pathogen
- Competition with microbial flora
- Disruption of skin or mucous membrane barriers
- Sufficient growth to overcome host defenses

Risk factors
- Prolonged immunosuppression (HIV/AIDS, cancer, SOT, HSCT)
- central venous catheter, mechanical ventilation, parenteral nutrition, burns
- Diabetes mellitus
- Broad-spectrum antibiotics
Background – Fungal Pathogens

Yeast
- Candida
- Cryptococcus
- Trichosporon

Molds
- Aspergillus
- Fusarium
- Mucormycosis
- Absidia
- Mucor
- Rhizopus
- Cunninghamella
- Scedosporium

Dimorphic fungi
- Histoplasma capsulatum
- Blastomyces dermatitidis
- Alternaria
- Exophilia

Increasing number of patients at risk for fungal infections worldwide
→ Increasing incidence of invasive infections caused by rare fungi
Fungiscope – Goals

• Collect epidemiological and clinical data on invasive infections caused by emerging fungal pathogens
• Provide data for analysis of risk factors and treatment strategies to guide treatment recommendations
• Build a biobank of emerging fungi
• Collaborate with other groups for joint analyses
Improvement in the outcome of invasive fusariosis in the last decade


- N=233 cases
- 11 countries
- Death associated with:
  - Corticosteroids (HR 2.11, 95% CI 1.18–3.76, p 0.01)
  - Persistent neutropenia (HR 2.70, 95% CI 1.57–4.65, p <0.001)
  - D-AmB (HR 1.83, 95% CI 1.06–3.16, p 0.03)

Eligibility Criteria

Inclusion

Invasive fungal infection documented by at least one of the following

- Culture
- Histology
- Antigen detection
- PCR-based detection of fungal DNA

Exclusion

- Infection due to Aspergillus, Candida, Cryptococcus neoformans, Pneumocystis jiroveci
- Endemic fungal infection such as coccidioidomycosis or histoplasmosis
- Colonisation or other non-invasive infection
Add a new patient
Start the survey
✓ Risk Factors
✓ Diagnostic Procedures
✓ Clinical Signs and Symptoms
✓ Site of Infection
✓ Mycological Evidence
✓ Treatment
✓ Outcome
FungiThek

Diagnosis of rare IFI

Central storage of isolates

Diagnostic laboratories

Macroscopic and microscopic identification

Sequencing

Mass Spectrometry

Reference database
Link specimens to clinical and demographic data
Manage requests for specimen use

Fungiscope™
Diagnosis of rare IFI

www.fungiquest.net
Search the database

Browse through cases

FungiScope® is a global research project of the German Mycological Society, the ISHAM, the ECMM, and other international mycological societies. We collect clinical characteristics, culture and tissue samples of patients with rare fungal diseases. The aim is to create a network of interested researchers, allowing them to share experiences and samples to ultimately improve diagnosis and treatment of these rare infections.

If you'd like further information on the project or would like to register, visit our site www.fungiquest.net.

Looking for a specific pathogen? Search our database through FungiQuest™ now! Or jump directly to some of our interesting cases, e.g. Rhizopus, Fusarium, Scedosporium, or Trichosporon.

When searching e.g. for Aspergillus, remember aspergillus, in this case Absidia and Mycocola, to retrieve information on older cases.

Note: Search query must contain at least 5 characters.

Search the FungiScope® database for:

Fusarium

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Risk Factors</th>
<th>Site</th>
<th>Empirical Agents</th>
<th>Targeted Agents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fusarium solani</td>
<td>Diabetes mellitus</td>
<td>Eyes</td>
<td>Voriconazole, Liposomal_amphotericin_B</td>
<td>Voriconazole</td>
</tr>
<tr>
<td>fusarium solani</td>
<td>Hematopoietic stem cell transplantation (hSCT)</td>
<td>Deep soft tissues, e.g. muscles, Skin, Disseminated</td>
<td>Caspofungin</td>
<td></td>
</tr>
</tbody>
</table>
Please note that we are currently rebuilding our database and that FungiQuest™ therefore only provides information on about 30% of our cases. Also note that some of these cases were transferred from an older version of our database and not all information has yet been correctly formatted.

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<table>
<thead>
<tr>
<th>ID</th>
<th>Pathogen</th>
<th>Culture</th>
<th>PCR</th>
<th>Risk Factors</th>
<th>Site</th>
<th>Empirical Agents</th>
<th>Targeted Agents</th>
<th>Surgery</th>
<th>Response</th>
<th>Survived</th>
<th>Last observed</th>
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</thead>
<tbody>
<tr>
<td>15</td>
<td>Fusarium solani</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Yes</td>
<td>Other, Please specify, Focalazole</td>
<td>therapeutic keratoplasty</td>
<td>Stable</td>
<td>Yes</td>
<td>2009</td>
<td></td>
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<tr>
<td>30</td>
<td>Fusarium solani</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Deep soft tissues, e.g., muscles, Skin, Disseminated</td>
<td>Voriconazole</td>
<td>No</td>
<td>Deterioration or failure</td>
<td>No</td>
<td>2010</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Fusarium oxysporum</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Lungs, Disseminated</td>
<td>Voriconazole, Voriconazole</td>
<td>No</td>
<td>Partial response</td>
<td>Yes</td>
<td>2009</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Fusarium oxysporum</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Deep soft tissues, e.g., muscles, Disseminated</td>
<td>Voriconazole, Voriconazole</td>
<td>No</td>
<td>Partial response</td>
<td>Yes</td>
<td>2007</td>
<td></td>
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<tr>
<td>34</td>
<td>Fusarium solani</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Bloodculture, Bones, Deep soft tissues, e.g., muscles, Lungs, Disseminated</td>
<td>Liposomal amphotericin B, Voriconazole</td>
<td>No</td>
<td>Deterioration or failure</td>
<td>No</td>
<td>2008</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Fusarium dimerum</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Major surgery (not including surgery as part of antifungal therapy), Chronic renal disease</td>
<td>Lungs, Disseminated</td>
<td>No</td>
<td>Complete response</td>
<td>Yes</td>
<td>2009</td>
<td></td>
</tr>
</tbody>
</table>
Slide nur zur Info

- Arunaloke Chakrabarti
- Ritesh Agarwal
- Jagdish Chander
- Anuradha Chowdhary
- Sameer Bakhshi
- Lalit Kumar
- Neelam Sood
- Atul Patel
- Mammen Chandy
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- C.S. Sharma
- Prakash Yegneswaran
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404 Valid Cases from 24 Countries

Cases
- Germany: 111
- India: 77
- Czech Republic: 52
- Russia: 37
- France: 19
- Austria: 18
- Italy: 18
- Canada: 16
- Brazil: 14
- Slovakia: 13
- Israel: 5
- Belgium: 3
- Hungary: 3
- Romania: 3
- Turkey: 3
- Croatia: 2
- Thailand: 2
- Australia: 1
- Cuba: 1
- Denmark: 1
- Finland: 1
- Greece: 1
- The Netherlands: 1
- USA: 1

Fungiscope™
404 Cases – Demographic Features

- **Caucasian**
  - India: 14 cases
  - Other: 287 cases

- **Asian**
  - India: 77 cases

- **American Indian or Alaska Native**
  - India: 5 cases
  - Other: 2 cases

- **Sub-Saharan African/Afro-American**
  - India: 1 case

- **Hispanic/Latino**
  - India: 1 case

- **North African**
  - India: 1 case

- **Arabic**
  - India: 1 case

- **Unknown**
  - India: 8 cases
  - Other: 327 cases

**India (n=77)**
- Median Age: 48
- Age Min-Max: 2-78
- Gender (Female %): 26
- Weight (kg): 63
- Height (cm): 163

**Other (n=327)**
- Median Age: 51
- Age Min-Max: 0-83
- Gender (Female %): 37
- Weight (kg): 69
- Height (cm): 170
Distribution of Types of Fungi

327 cases from countries other than India

77 cases from India
Risk Factors in 327 Cases (other than India)

- Chemotherapy
- HCV
- ICU stay
- Diabetes mellitus
- Chronic pulmonary disease
- Chronic renal disease
- Solid organ transplantation
- Major surgery
- Alcoholism
- Trauma
- Chronic liver disease
- HIV/AIDS
- No risk factor identified

Other (n=327)
Site of Infection (other than India)

- Lungs
- Blood
- Skin
- Paranasal sinus(es)
- Deep soft tissues
- CNS
- Bones
- Gastrointestinal tract
- Eyes
- Liver
- Spleen
- Kidneys
- Peritoneum
- Genitourinary tract
- Biliary system
- Disseminated

Other (n=327)
Site of Infection

- India (n=77)
- Other (n=327)
Favorable Outcome

- Mucoromycotina
- *Fusarium*
- Yeast
- *Penicillium/Paecilomyces*
- Dematiaceae
- *Scedosporium*
- Other

**India (n=77)**

**Other (n=327)**
Overall Mortality

Overall mortality

- Mucoromycotina
  - Fusarium
  - Yeast
  - Penicillium/Paecilomyces
  - Dematiaceae
  - Scedosporium
  - Other

- India (n=77)
- Other (n=327)
Fungiscope provides

- A platform for fruitful collaboration
- Efficient method for collecting patient information
- Immediate diagnostic and therapeutic services
Global Emerging Fungal Infection Registry
Initiated in 2003
ISHAM and ECMM Working Group
www.fungiscope.net

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Become a Fungiscope Collaborator

Global Emerging Fungal Infection Registry
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Send an Email to register@fungiscope.net
to contribute your rare cases of invasive fungal infection

e.g.
Acremonium, Alternaria, Bipolaris, Cladosporium, Cryptococcus other than neoformans, Culvalaria, Exophiala, Fusarium, Geotrichum, Paecilomyces, Penicillium, Phialophora, Scedosporium, Trichoderma, T-richosporon