Penicilliosis and Sporotrichosis in India

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Penicillium marneffei and Sporothrix schenckii

- An important dimorphic fungi which are endemic in geographic area of India
- *Sp. schenckii* – known pathogen for a long time having been detected from India in 1932 from Assam.
- *P. marneffei* was implicated to be a fungal pathogen in 1998
- In India, both fungal agents – 1st reported from NE India
- High mortality with penicilliosis
- High morbidity with sporotrichosis
Penicilliosis caused by Penicillium marneffei - recently Talaromyces

- Now a well established fungal opportunistic pathogen among HIV infected patients.
- 1956 – 1st detected from liver of a bamboo rat-rickettsial disease in Vietnam
- Implicated as human pathogen in 1973 in a pt of Hodgkin’s disease
- 1985 : USA- AIDS associated pathogen
- Till 1990 – very rare disease but
- Later on – an alarming increase in no of cases
ENDEMICITY of Penicilliosis

☑ Imported cases ......
Role of bamboo rats

4 species of bamboo rats
- *Cannomys badius*,
- *Rhizomys pruinosus*
- *R. sinensis* &
- *R. sumatrensis*

*are known* carriers of *P. marneffei*

- Disease endemicity corresponds to distribution of the bamboo rats
Indian scenario

- **Manipur, early 1998** AIDS patients with molluscum contagiosum like lesion on face and upper trunk- high mortality
- **Manipur** is one of the high HIV infection prevalent state of India
Giemsa stained direct smear

- Tissues

Culture in SDA
Unusually - high mortality

First confirmed case unfortunately succumbed to penicilliosis

By next year, over a period of 19 months (April 1998-October 1999):

- 42 more cases

- the clinical and epidemiological characteristics of *Penicillium marneffei* infection in 46 HIV infected patients of India


Disseminated Penicillium marneffei Infection among HIV-Infected Patients in Manipur State, India

K. H. Ranjana, K. Priyokumar, Th. J. Singh, Ch. C. Gupta, L. Sharmilla, P. N. Singh and A. Chakrabarti

Departments of Microbiology and Medicine, J. N. Medical Hospital, Imphal 795001, Manipur, India and Department of Medical Microbiology, Postgraduate Institute of Medical Education and Research, Chandigarh 160012, India
Clinical presentations in 36 HIV-infected patients of Manipur with *P. marneffei* infection.

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Number or cases</th>
<th>(%)</th>
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<tbody>
<tr>
<td>Fever</td>
<td>35</td>
<td>(97)</td>
</tr>
<tr>
<td>Weight loss</td>
<td>36</td>
<td>(100)</td>
</tr>
<tr>
<td>Weakness</td>
<td>31</td>
<td>(86)</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>8</td>
<td>(22)</td>
</tr>
<tr>
<td>Skin lesions</td>
<td>29</td>
<td>(81)</td>
</tr>
<tr>
<td>Anemia</td>
<td>31</td>
<td>(86)</td>
</tr>
<tr>
<td>Hepatosplenomegaly</td>
<td>14</td>
<td>(39)</td>
</tr>
<tr>
<td>Lymphadenopathy</td>
<td>12</td>
<td>(33)</td>
</tr>
</tbody>
</table>

- No respiratory symptoms
inapparent lesion
Interesting cases:

- 5 cases of acute abdomen admitted in Emergency apparently healthy looking, not previously diagnosed to be HIV infected.
- USG/CT - mesenteric/retroperitoneal lymphadenitis.
- USG-FNAC showing bunch of yeast cells.
- Treated, counseled for HIV testing, followed by ART.
- All cases responded well to antifungal drugs.
Cases from other states of India

✓ YES

- Inhabitants of Manipur, Assam, Mizoram, Meghalaya
- Because of the geographical location
- Distribution of the bamboo rat – Cannomys badius

North east India
Geographical distribution of Cannomys badius
Red pigments diffused in the culture media

Remember:
Not all Penicillium with diffused red pigment are *P. marneffei* there are other species of Penicillium that produce pigments
Colony morphology on SDA of *P. marneffei* (1) and *Penicillium purpurogenum* (2) which produce red pigments similar with *P. marneffei*. Colony morphology of *P. marneffei* (3) incubate at 37°C.
Current scenario

- Drastic decrease in no of cases because of provision of free ART since April 2004 and better supportive care of HIV infected patients and hence better immune status of affected persons
- Most of HIV infected pt on ART has a CD4 count above 200 cells / cu mm
Penicillium marneffei Infection and Recent Advances in the Epidemiology and Molecular Biology Aspects
Nongnuch Vanittanakom, Chester R. Cooper, Jr., Matthew C. Fisher, and Thira Sirisanthana

Fig 1: Temporal emergence of HIV (antenatal data, 1990 to 2000; UNAIDS/WHO working group report, 2003) and P. marneffei-associated penicilliosis (1985 to 2001; Maharaj Hospital, Chiang Mai) for the Chiang Mai region, northern Thailand.
Presently---

- Environmental sampling – conventional
- Virulence markers – enzymes
- AST
Extracellular enzymes activity assay

1. Non marneffei *Penicillium* spp. activity of protease (1) and cellulase (2). Extracellular protease assay of *P. marneffei* (3 & 4). Arrow indicates zone of enzyme hydrolysis.
SPOROTRICHOSIS
1st case in India was reported by Ghosh (1932) from Assam in NE India.

Study of Chakrabarti et al..

**Kangra valley, Himachal Pradesh**

Population-based study using sporotrichin and peptido–rhabdomannan skin test antigens:

- The rate of skin test positivity “test” villages (as defined by a minimum of two cases per village) - 23% to 40%
  - In “control” villages - 6.5% to 7.6%
- Higher skin test positivity rate in > 55 yrs & in people engaged in horticulture or agricultural activities
- **Manipur** over a period of 6 yrs (1999-2005) 73 cases
- 30 culture proven
- Females > Male
- Lymphocutaneous type followed by fixed cutaneous type
- Majority had h/o of scratches and injury
- All patient responded well to sat. Potassium iodide soln

- In my experience -
  - Tissue appearance – ? ? Cigar shaped yeast cells
  - More like any budding yeast cells
  - Very delicate and difficult to preserve
West Bengal & Sikkim

- Females > Male
- Lymphocutaneous type followed by fixed cutaneous type
- Majority had h/o of trauma
- Upper limb involvement – more
- Responded to KI soln.
The colony morphology and physiological characteristics of 49 clinical isolates from three regions (25) from north India (17) from east India and (7) south India were analysed in both mycelial and yeast forms.

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<thead>
<tr>
<th>Characteristics</th>
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<tbody>
<tr>
<td>Colony characters on three different media.</td>
<td>same</td>
</tr>
<tr>
<td>Growth at 40 °C</td>
<td>Inhibited</td>
</tr>
<tr>
<td>Tolerance to osmotic pressure and salt oncentrations</td>
<td>&gt; yeast</td>
</tr>
<tr>
<td>Growth at different pH</td>
<td>3–12 - hyphal 2.4 - 9.5 - yeast</td>
</tr>
<tr>
<td>Assimilation of arabinose, dextrin, raffinose, rhamnose &amp; starch</td>
<td>variance</td>
</tr>
<tr>
<td>Phenol oxidase + and potassium nitrate assimilation</td>
<td>positive</td>
</tr>
<tr>
<td>Gelatinase activity and casein hydrolysis</td>
<td>negative</td>
</tr>
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## Type of lesion

<table>
<thead>
<tr>
<th>Lymphocutaneous type of lesions</th>
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<tbody>
<tr>
<td>Fixed localized type</td>
</tr>
<tr>
<td>Disseminated sporotrichosis</td>
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## Site of lesion

<table>
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<th>Upper extremity</th>
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<tr>
<td>Lower extremity</td>
</tr>
<tr>
<td>Face, buttock</td>
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Molecular typing

• Indian clinical isolates – to be S. globosa and homogeneous with other Asian isolates.
• North India - isolate from pulmonary sporotrichosis was S. luriei.
Common factors in Sub himalayan range

- Temperate climate
- High humidity and
- High rainfall
In conclusion

Penicilliosis

- Decreasing but need to be alert considering IC pts other than HIV infections, endemicity & improved means of travel, clinical suspicion is very important for prompt management

Sporotrichosis

- Fungal pathogen that will remain
- Awareness by the dermatologist, prompt management
- Potential to cause outbreak

- Fungal pathogens where the environment and climatic condition have a big influence and we need to study more on the biology and other factors that may be contributing in the prevalence of the disease in India
THANK YOU