Issue 23-December 2021

ISMM MYCOSES Newsletter

Report of President

Dear Friends

Greetings to all! It is a great pleasure to write to you all again. The last time we met each other was in Jodhpur in 2019. It is now 2022 and it is unfortunate that we have not been able to conduct our Mycology conference owing to the extended period of the pandemic, which has restricted our movements to unprecedented extent. Academic activities have had to almost entirely shift online and has proven to be less effective than the physical mode. Keeping this in mind and also in lieu of the ISHAM conference, the ISMM meeting has been deferred for one more year, as requested by Dr. Ranjana.

Be that as it may, I encourage all young learners who are interested in Mycology to become members of International Society for Human and Animal Mycology (ISHAM). Dr. Chakrabarti would like to have a good number of ISHAM members before the ISHAM conference. I also request all the senior members to renew their ISHAM membership at the earliest, if they have not already. We sincerely hope that the much-awaited ISHAM conference is successfully conducted in the month of September 2022.

This time around, the ISMM newsletter is expected to be concise since the inflow of scientific articles to be included in the newsletter has decreased and this is the reason for delay in publishing of the newsletter, as was discussed in the ISMM council meeting. I further encourage all ISMM members to come forward with ideas to make the ISMM more vibrant, especially considering that things are relatively quiet and still.

I am happy to inform you all that we at Sri Ramachandra Medical College and Research Institute, Porur, Chennai; have planned to conduct an online mycology workshop at the end of March into April, 2022, dates being 30th March to 2nd of April. The flyer will be shared soon. In order to bring in some academic fun we have introduced a competition "Information with Humour in Mycology" which will be based on making a 2- minute video, similar to the one conducted in Nice, France, in which we had won the first prize.

I convey my best wishes for your future plans and the development of our society.

Dr. Anupma Jyoti Kindo
President, Indian Society of Medical Mycologists

Report of General Secretary

It is indeed a great feeling to be writing to you all. At the outset I apologize for being incommunicado since March of 2020. The only excuse I can offer is, our entire hospital with 1350 beds was turned into a covid facility and so you can imagine the workload.

In the first and the beginning of the second wave of COVID, none of us had the time or reason to think beyond COVID. But then it is not an exaggeration when I say that the entire medical fraternity were made to think beyond COVID when **COVID associated MUCORMYCOSIS** raised its head. Such was its havoc, that Black fungus - albeit a wrong terminology - has become a household name!

Most fungal related activities came to a grinding halt during this period. The casualty included the most awaited event for all of us, the ISMM biennial conference scheduled at Manipur, at about this time, by Dr. Ranjana.

One other program, which I would have loved organizing on a bigger scale, was welcoming our dear Sir, Dr. Chakrabarti to the world beyond PGIMER. We truly are a group who enjoy his constant nudge in every activity related to Mycology big or small. Thank you, Sir, for always being there for us.

We council members had an online meeting on the 29th of January 2022. Decisions regarding the conduct of the ISMM conference, the way forward for publishing the newsletter and council elections were discussed at length. The following were decided:

- To hold the conference in the beginning of 2023.
- To modify the format of the newsletter. Since including articles in every issue was not feasible, the abstracts of interesting articles published during the period will be included.
- New Council - The elections will be held during the next ISMM conference.

The newsletter can become an informative and interesting read if all of us members representing each zone try our best to encourage our fellow faculty to contribute any happenings related to our area of interest. Till next elections, the onus to run and manage all activities of ISMM rests with the present council. I will share the nomination forms well in advance so that all interested can send in their names. I am really looking forward to many coming my way!!

I take this opportunity to pen down my requests to members -

- Try to conduct as many educational programs in mycology as possible. With COVID showing signs of abatement this should be possible. I am sure senior members will be more than happy to share their experience and expertise as resource faculty.
- Log into the ISMM website. Send in your valuable suggestions to help me spruce and make it user friendly and vibrant.
- Join ISHAM

The members of the council and me in particular place on record our sincere gratitude to Dr. Savitri Sharma who readily accepts to manage all activities related to newsletter publication even after retirement and shifting base to Bengaluru. Madam, a heartfelt thank you.

I wish to conclude, with a prayer to all those whom we lost in this trying time.

They have taught us the most important life's lesson on GRATITUDE.

Wishing each one of you the best of everything.

Stay safe.

Jayanthi Savio
General Secretary,
SIHAM

1. **Dr. M. J. Thirumalachar Life Time Achievement Award.**

   The Life Time Achievement award is established to honor members of the Society, who during the span of his/her life-time have demonstrated a longstanding commitment to the cause of Medical Mycology in India. The award is made possible by a generous donation by one of the senior most and revered member of the Society, Dr. Arvind A. Padhye,

   The award would recognize the significant contribution to the understanding and application of the knowledge pertaining to the Medical Mycology in India, over the entire course of his /her life time, with a definable body of work through one or more of the following:-

   - Teaching /Training.
   - Research.
   - Publications/patents.
   - Patient care.

Who may receive the award?

The nominee should be a Life member of the Society in good standing, He should be in the field for at least 25 years but not necessarily active professionally at the time of receiving the award. He must be alive at the time the selection committee's choice is announced. In case of an unfortunate event of death of the awardee after selection, the award may be presented posthumously.

How will the recipients be chosen?

The president, with the approval of the executive committee, will appoint a Life Time Achievement Awards committee consisting of five active members of the Society. One committee member shall be a current member of the SIHAM executive council, who would co-ordinate the committee meeting. The committee will invite nominations from the members for the award. The nomination is to be made by at least two life members of the society at least 6 months in advance to the next annual conference of the society. Self-Nomination will not be accepted.

The nominations will be scrutinized by the award committee and the best among the nominations will be selected for the award

When will the award be presented?

The award may be presented to the deserving individual at the Annual Conference of the Society. The awardee will be introduced to the august gathering duly stating his/her achievements during the inaugural function of the Conference.

The award will consist of a citation and a memento.

No travelling or daily allowance will be provided to the awardee to attend the function.

The decision of the award committee will be final.

2. **G. P. Agarwal young scientist Award**

   The best paper award will be given to a young scientist below the age of 35 years (proof of age to be submitted). Applicant must submit the full length original research paper on any area of the medical mycology. Oral presentation of the research should be done in the separate award session during the conference

3. **Dr. Pankajalakshmi Venugopal Glaxo Meritorious Award**

   Age limit -35 years (proof of age to be submitted). Must submit the curriculum vitae with list of publications and reprints of the papers in the field of medical mycology. Award will be given on the basis of the CV for the outstanding work in the field of medical mycology

4. **Dr Kamalam Glaxo award**

   Applicant must submit full length research paper in duplicate in the field of dermatomycology. Award will be given based on oral presentation in the separate session during the conference.

Minutes of the virtual meeting of the executive council held on the 29th of Jan 2022 Time: 5.30 – 6.30pm

Agenda:

1. ISMM conference
2. ISMM council elections
3. ISMM Newsletter
4. ISMM – Payment gateway for new member online registration
5. ISHAM conference
6. Any other issues as proposed by the members present for the meeting / shared on the group prior to the meeting

Members Present:

1. Dr. Anupma J. Kindo – President
2. Dr. Jayanthi Savio – General Secretary
3. Dr. Bansidhar Tarai – Joint Secretary
4. Dr. Anup Ghosh – Treasurer
5. Dr. Savitri Sharma – Editor Newsletter
6. Dr. Pratibha kale – Member [North Zone]
7. Dr. Vinay Kumar Hallur – Member [East Zone]

This meeting was held at the behest of Dr. Jayanthi. The schedule, agenda and link were shared on the ISMM group.

Dr. Anupma made the introductory remarks on the need for this meeting and requested members to proceed with the discussion on the items listed in the agenda. Dr. Jayanthi began the discussion, listed the agenda, and requested members to give their suggestions so that final decisions can be made on each of the items.

1. **ISMM conference:**

   This conference was supposed to be held as scheduled in Jan – Feb 2022. It was communicated to Dr. Ranjana, the organizing secretary for this conference to plan whether this could be held as virtual / physical meet. However due to the constraints of the pandemic both formats were not possible. Dr. Ranjana shared her concerns and suggestions with Dr. Anupma. She had suggested -

   A. Conducting it along with ISHAM conference which is scheduled for September 2022

   B. Conducting the entire event in 2023

   The members discussed the matter, and it was felt that - conducting along with ISHAM would obscure the National importance this event has gained over the years. In the best interest it was decided to host the event between Jan – March 2023. This information will be shared with Dr. Ranjana and request her to start planning for the same.

2. **ISMM council elections:**

   As is the protocol, request for nominations is sent out well in advance and the elections are held during the ISMM conference if there are more than one nomination for any post. Dr. Jayanthi said - Since holding the conference itself was not decided the request for nominations were not sent out till date. Now that it has been decided to hold the conference in 2023, the nominations for Council would be sent out in June 2022 so that interested faculty can apply and the elections will be held during the conference in 2023. Till such time the present council will hold office and carry on the responsibilities.

3. **ISMM Newsletter:**

   This matter was discussed at length. Again, due to the pandemic we have not been able bring out the newsletter in the last year. However even prior to the pandemic also it has been difficult to motivate members and institutions to contribute articles. Dr. Savitri said we must relook at the format of the newsletter and

the need to publish articles? Suggested changes in the format included –

a. Messages from President and General secretary
b. Quiz
c. Report of the EQMM
d. Any pertinent information for dissemination – upcoming events, training programs, workshops related to mycology both National and international
e. List of abstracts of Mycology related Articles published by Indian authors
f. Awards received by members for Mycology related work

Members agreed to this new format and Dr. Savitri agreed to bring out the Jan 2022 issue at the earliest.

4. **Website and new members' registration:**
   a. New members' registration: Dr. Jayanthi informed the members that confirmation and issue of registration numbers to new members' registering online is delayed as the payment made must be confirmed by Anup and only then registration process can be completed by the vendor. This sometimes takes 2-3 working days and the new registrants get upset that they are not issued a number and keep mailing about it. She asked members if the payment could be linked to a gateway platform. The members agreed to go ahead with this after confirming the amount involved and if payment was onetime. Dr. Jayanthi said she would discuss with Mr. Prasad- the website vendor and communicate the same to all.
   b. Dr. Jayanthi informed that the Payment for the conduct of ISMM farewell program for Dr. Chakrabarti must be made.
5. **ISHAM conference:**
   Members agreed that ISMM should ensure good participation by encouraging friends and colleagues to register for the conference. Dr. Anup, informed that Dr. Chakrabarti had requested to enhance ISHAM membership especially the young mycologists given the advantages ISHAM membership offers.
6. **Suggestion by Dr. Pratibha:**
   She suggested that any mycology related activities by members if conducted under the banner of ISMM will enhance and dissipate the National presence and importance of ISMM body
7. **Change in Bank account and PAN card name:**
   Dr. Anup informed the members that the ISMM name has been incorporated in the PAN card and the same must reflect in bank account. This process has been initiated by Dr. Anup. He informed that he would send the necessary documents to Drs. Anupma and Jayanthi for signatures.

Two Feet-One Hand Syndrome: A short Case Report

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ABSTRACT

Dermatophytes are a group of keratinophilic fungi where genus *Trichophyton* is particularly important and complex. Two feet-one hand syndrome of the skin involves both feet and one hand, caused by dermatophytes. A 45-year-old male farmer presented with scaling localized lesions over plantar and palmar skin of bilateral feet and left hand, respectively. *Trichophyton mentagrophytes* complex was identified as the causative agent. The patient completely recovered on oral terbinafine and topical miconazole nitrate 2% cream.

Key words: *Trichophyton interdigitale,* Two feet-one hand syndrome, Sequencing

Introduction

Dermatophytes are keratinophilic fungi that infect keratinized tissues of human and animal origin that cause superficial fungal infections of the skin, hair and nails. *Trichophyton mentagrophytes* is considered to be a species complex composed of several strains, which include both anthropophiles and zoophiles. Due to its genetic complexity an accurate identification of the species is essential for understanding its clinical and epidemiological role in the community. Amongst various clinical forms, Tinea pedis is quite common in tropical and subtropical counries. Tinea unquium involving the interdigital toe web spaces is frequently found in association with tinea pedis which often leads to chronicity and recurrence. The most common causative agents responsible are anthropophiles, including *Trichophyton rubrum*, followed by *Trichophyton mentagrophytes* complex and *Epidermophyton floccosum*.[1]

Moreover, a co-existing toe nail onychomycosis and tinea pedis may also occur. In a study of over 2700 patients with toenail onychomycosis, 42.8% had concomitant fungal infections, with tinea pedis being most common presentation seen in 33.8% of patients.[2] A common occurrence of tinea pedis is observed among atheletes, in sports, and indoor swimming.[3,4]

Diabetic foot complications too present with a high prevalence of tinea pedis (46.7%) and simultaneous onychomycosis (53.3%). The hot and humid environmental conditions provide a conducive setting for dermatophyte invasion into the macerated skin.[3,4] In the two feet-one hand syndrome, the occurrence of tinea pedis with or without onychomycosis generally precedes the development of tinea manuum and may develop at an early age. Patients are more likely to seek attention once tinea manuum develops. Such an occurrence is commonly seen with a family history of the same.

We present a case of the "two feet-one hand syndrome" in an immunocompetent male farmer due to *Trichophyton mentagrophytes* complex infection.

Case Report

A 45 year-old healthy male farmer, a resident of Uttar Pradesh, presented to the Dermatology outpatient of a tertiary care centre situated in East Delhi with complaints of itchy lesions on both feet and left hand for 2 years and 1 month respectively. He was apparently healthy with no other co-morbidities and was not on any medications. The lesion first appeared on feet and in last 1.5 years spread to his hand. Itching was present on both feet and he often used his left hand to scratch them. At that point in time he was self-medicating with topical herbal products without any significant relief. Physical examination revealed ill-defined diffuse dry, scaling papular lesion on the plantar aspect of both feet and left hand (Figure 1). His routine laboratory investigations were normal. Specimens were obtained by scraping the edge of the lesion of both feet and left hand. Mycological examination,with 10% potassium hydroxide (KOH) mount of scales revealed abundant thin septate hyphae on direct microscopy from all sites.The culture was performed on Sabouraud dextrose agar (SDA) with 0.05 mg/mL chloramphenicol and 0.5 mg/mL cycloheximide and was incubated at 28°C in BOD incubator. Culture was examined thrice weekly for the appearance of growth. Fungal growth was identified by colony morphology followed by microscopic examination by tease mount technique in lactophenol cotton blue (LPCB) mount. The LPCB mount showed fungal spores, macroconidia and mycelia which resembled *Trichophyton mentagrophytes* complex. The culture

on SDA was subjected to DNA extraction using a commercially available DNA extraction kit (HiYield Genomic DNA Kit; Real Biotech Corporation, Taiwan). Genomic DNA was subjected to polymerase chain reaction (PCR) using pan fungal primers; Internal Transcribed Spacer (ITS)-1 (5'-TCCGTAGGTGAACCTGCGG-3') and ITS-4 (3'-TCCTCCGCTTATTGATATGC-5') region of 18S rRNA gene . The sequences were analyzed and compared with the sequences deposited in GenBank by using the BLAST analysis (http://www.ncbi.nlm.nih.gov/BLAST/Blast.cgi). The ITS sequences showed ≥99% similarity with *Trichophyton interdigitale*.

The patient was treated with Terbinafine 250 mg daily for sixteen weeks and topical miconazole nitrate 2% cream for 16 weeks. On follow up the patient showed complete cure and a repeat KOH examination and fungal culture was negative.

Discussion

"Two feet one hand disease" (referred now as syndrome) was described by Curtis in 1964.[6] It presents with bilateral plantar tinea pedis with coexistent unilateral tinea manuum.[6] *Trichophyton mentagrophytes* complex is one of the most common causative organisms implicated in superficial fungal infections worldwide and in India. Recent nomenclature and classification identified *T. mentagrophytes* isotype VIII as the most important pathogen associated with the current epidemic of recurrent and chronic dermatophytosis in India.

Tinea pedis is reported commonly amongst atheletes and soldiers in western and European countries (7,8). However in India, tinea pedis is one of the least common clinical forms of dermatophytosis, probably due to infrequent use of closed footwear. The first type of tinea pedis – the interdigital or intertriginous type, commonly referred to as "athlete's foot" presents as scaling, maceration, fissuring and/ or erythema of the web spaces between the toes, with the space between the fourth and fifth toes most commonly affected. Moccasin-type tinea pedis has a generalized scaling and hyperkeratosis of the plantar surface of the foot and is frequently associated with nail involvement with extension onto the dorsum of the foot. The inflammatory vesiculo-bullous type presents with painful, pruritic vesicular eruption on the arch or sides of the feet while the ulcerative type of tinea pedis is characterized by rapidly spreading vesiculo-pustular lesions and ulcers typically localized to the web spaces in immunocompromised and diabetic patients.[9]

Although the "two feet-one hand syndrome" is not rare, there have been only few large case series investigating this condition.[10] In this syndrome, tinea pedis commonly precedes the development of tinea manuum, which usually occurs on the hand that is used frequently to scratch the affected feet or the toe nails. Our patient had typical generalized scaling of the plantar surface of both feet and diffuse dry scaling of the left palm. Chronic tinea pedis must be differentiated from chronic eczema and psoriasis. Conditions like eczema, allergic dermatitis of the hands or psoriasis have to be ruled out by the clinicians or by laboratory investigations as they can mimic tinea manuum.[12] Daniel et al reported that an average time interval between infections at the two sites was 8.8 ± 1.3 years.[8] Our patient developed foot infection 1.5 years before hand infection.

Thus this clinical condition, though common, can escape the detection by clinicians. The burden of dermatophytosis in India has escalated enormously with hot and warm environment providing favourable conditions for persistence of dermatophytes .[10] Early diagnosis and proper treatment of tinea pedis along with strict instructions to patient and family members regarding hygiene and personal care are essential components of community medicine and practices.

References

1. Seebacher C, Bouchare JP, Mignon B. Updates on the epidemiology of dermatophyte infections. Mychopathologia 2008; 166: 335-52.
2. Szepietowski JC, Reich A, Garlowska E, et al. Factors influencing coexistence of toenail onychomycosis with tinea pedis and other dermatomycoses: a survey of 2761 patients. Arch Dermatol 2006;142:1279-84.
3. Papini M, Cicoletti M, Fabrizi V, et al. Skin and nail mycoses in patients with diabetic foot. G Ital Dermatol Venereol2013;148:603-8.
4. Kamihama T, Kimura T, Hosokawa JI et al. Tinea pedis outbreak in swimming pools in Japan. Public Health 1997; 111: 249-53.
5. Curtis JW. The two feet-one hand disease. Bull Assoc Milit Dermatol 1964; 13: 1.
6. Daniel CR 3rd, Gupta AK, Daniel MP, Daniel CM. Two feet-one hand syndrome: a retrospective multicenter survey. Int J Dermatol 1997; 36: 658-60.
7. Cohen AD, Wolak A, Alkan M et al. Prevalence and risk factors for tinea pedis in Israeli soldiers. Int J Dermatol 2005; 44: 1002-5.
8. Sabadin CS, Benvegnu SA, da Fontoura MM et al. Onychomycosis and tinea pedis in athletes fromthe State of Rio Grande Do Sue (Brazil): a crosssectional study. Mychopathologia 2011; 171: 183-9.
9. Zhan P, Ge YP, Lu XL et al. A case-controlanalysis and laboratory study of the two feet-onehand syndrome in two dermatology hospitals inChina. ClinExpDermatol2010 ; 35: 468-72.
10. Tigga RA, Das S, Bhattacharya SN et al. Burden of chronic dermatophytosis in a tertiary care hospital: Interaction of fungal virulence and host immunity. Mycopathologia 2018 ;183:951-959.

Quiz: Can you identify the fungus?

A 55-year-old man presented with fever, progressive breathlessness of three days duration. He was a known type 2 diabetes mellitus case on irregular treatment with oral hypoglycaemic drugs and infrequent blood sugar monitoring. His random plasma glucose at admission was 180 mg/dL. Physical examination revealed bilateral crepts at the lung bases and computed tomography (CT) scan of the chest showed multiple patchy ground-glass opacities in both lungs involving both upper lobes, the right middle lobe, and the lingual lobe. The nasopharyngeal swab was positive for SARS-CoV-2 by RT–PCR. He was started on intravenous dexamethasone. On day 8, bilateral lid edema with right eye prominence was noted and an MRI of the brain, orbits, and paranasal sinuses revealed a soft tissue swelling in the right preseptal, premaxillary, and retrobulbar regions. Sinusitis in the form of significant mucosal thickening in the right frontal, maxillary, and ethmoidal sinus was also seen. Nasal biopsy from the middle turbinate was subjected to microbiological evaluation which included 10% potassium hydroxide (KOH) smear and culture on Sabouraud dextrose agar (SDA). KOH mount showed ribbon like, aseptate hyphae. SDA culture at 25°C on day 3 showed cottony, buff coloured growth which filled the tube (Figure A). The lactophenol cotton blue mount from culture in shown in figure B. Please identify the fungus to species level.

Figure A

Figure B

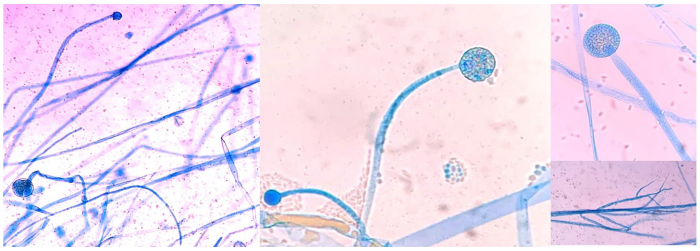
Send your answer to Dr Harsimran Kaur at drharsimranpgi@gmail.com

Answer for the last Issue's identify the fungus (ISMM mycoses, Issue 22, Quiz December 2020)

Question: 50-year-old male patient, farmer by occupation, presented with erythematous plaque over the left forearm of 3 years duration. There was no history of pain, itching, discharge or bleeding from the lesion. Patient was not a diabetic nor on medication for any ailment. Cutaneous examination revealed a well-demarcated, erythematous, indurated, non-tender and crusted plaque measuring 4 cm × 4 cm. Skin biopsy was performed and subjected to microbiological evaluation which included 10% potassium hydroxide (KOH) smear and culture on Sabouraud dextrose agar (SDA). KOH mount showed ribbon like broad aseptate hyphae. The culture on SDA shows white woolly colonies filling up the entire tube on the obverse and lemon yellow colour on the reverse surface. Microscopic findings revealed long ribbon like aseptate hyphae and branched sporangiophores with few rudimentary rhizoids. Sporangia were spherical and measured 50-100 µm with ellipsoidal columellae and globose sporangiospores.

Answer: Correct identification- *Rhizomucor variabilis,* reported by Dr. Mini PN, Additional Professor, Department of Microbiology, Govt. Medical College, Kozhikode, Kerala.

Last quiz lactophenol cotton blue mount picture



Results of ISMM Mycology External Quality Assurance Program conducted at PGIMER, Chandigarh

Performance Report of the Participants (24th Batch, Jan 2021)

Total number of participating laboratories -113

S No.	Sample/ Code	Clinical details			Correct identification	Interpretation	Laboratory (%) given correct results
		Age/Sex	Clinical feature/ Diagnosis	Source of specimen			
1	EQMM-1	30yrs/ M	Keratitis	Corneal scraping	*Exserohillum rostratum*	Fungal keratitis	95.5%
2	EQMM-2	50yrs/F	Brain abscess	Pus	*Aspergillus nidulans*	Cerebral Aspergillosis	97.8%
3	EQMM-3	25yrs/M	Tinea cruris	Skin scraping	*Microsporum gypseum*	Dermatophytosis	92.2%
4	EQMM-4	70yrs/M	COVID+ rhino-orbital swelling	Nasal scraping	*Lichtheimia corymbifera*	Rhino-orbital mucormycosis	90.4%
5	EQMM-5*	1 month/F	Sepsis	Blood	*C. auris / C. guilliermondii*	Candidemia	88.%

Results of antifungal susceptibility testing (AFST) performed for EQMM -5/20 Laboratories participating in AFST –70.8%

(EQMM-5) Minimum inhibitory concentration	Ampho tericin B 1.0mg/L	Flucona zole 0.5mg/L	Vorico nazole 0.03mg/L	Itraco nazole 0.5mg/L	Posa Conazole 0.25mg/L	Caspo fungin 0.5mg/L	Anidula fungin 1mg/L	Mica fungin 0.5mg/L
Participants results %	100%	98%	98%	96.6%	55.1%	57.1%	61.3%	48.8%

Abstracts (Jan-Dec 2021)

Compiled by Dr Joveeta Joseph

Head of Microbiology, Jhaveri Microbiology Centre, L V Prasad Eye Institute, Hyderabad

1. **The role of fungus in fungal keratitis**

Bethany Mills[1], Naveen Radhakrishnan[2], Siva Ganesa Karthikeyan Rajapandian[3], Gunasekaran Rameshkumar[3], Prajna Lalitha[3] , N Venkatesh Prajna[2]

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Exp Eye Res. 2021 Jan; 202:108372. **PMID:** 33249061

Abstract

Fungal keratitis (FK) accounts for approximately half of the microbial keratitis encountered in low middle income countries (LMICs) and predominantly affect the working rural-poor. FK causes significant morbidity with the majority of patients left with moderate or worse visual impairment and approximately 25% requiring expensive and often unsuccessful surgical interventions. The severity of FK and the resultant corneal damage or resolution can be attributed to i) the virulence and bioburden of the fungal pathogen, ii) the host defense

mechanism and immune response and iii) sub-optimal diagnostics and anti-fungal treatment strategies. This review provides a comprehensive overview of the multifaceted components that drive FK progression and resolution, highlighting where knowledge gaps exist and areas that warrant further research.

2. **Insights into the modulatory effect of magnesium on efflux mechanisms of *Candida albicans* reveal inhibition of ATP binding cassette multidrug transporters and dysfunctional mitochondria**

Sandeep Hans, Zeeshan Fatima , Saif Hameed

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Biometals. 2021 Apr;34(2):329-339. **PMID:** 33394279

Abstract

Candida infections pose a serious hazard to public health followed by widespread and prolonged deployment of antifungal drugs has which has led multidrug resistance (MDR) progress in prevalent human fungal pathogen, Candida albicans. Despite the fact that MDR is multifactorial phenomenon govern by several mechanisms in C. albicans, overexpression of drug efflux transporters by far remains the leading cause of MDR govern by ATP Binding Cassette (ABC) or major facilitator superfamily (MFS) transporters. Hence searching for strategies to target efflux pumps transporter still signifies a promising approach. In this study we analyzed the effect of magnesium (Mg) deprivation, on efflux pump action of C. albicans. We explored that Mg deprivation specially inhibits efflux of transporters (CaCdr1p and CaCdr2p) belonging to ABC superfamily as revealed by rhodamine 6G and Nile red accumulation. Furthermore, Mg deprivation causes mislocalization of CaCdr1p and CaCdr2p and reduced transcripts of CDR1 and CDR2 with no effect on CaMdr1p. Additionally, Mg deprivation causes depletion of ergosterol content in azole sensitive and resistant clinical matched pair of isolates Gu4/Gu5 and F2/F5 of C. albicans. Lastly, we observed that Mg deprivation impairs mitochondrial potential which could be the causal reason for abrogated efflux activity. With growing appreciation of manipulating metal homeostasis to combat MDR, inhibition of efflux activity under Mg deprivation warrants further studies to be utilized as an effective antifungal strategy.

3. **Thoracic mucormycosis in immunocompetent patients**

Karthik Panchanatheeswaran[1], Duvuru Ram[2], Sreevathsa Prasad[3], Bheemanathi Hanuman Srinivas[4], Durgaprasad Rath[3], Bathal Vedagiri SaiChandran[3], Hemachandren Munuswamy[3]

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J Card Surg. 2021 Apr;36(4):1183-1188. **PMID:** 33470008

Abstract

Background: Mucormycosis is an invasive fungal infection. It is rare and commonly associated with fatal outcomes.

Methods: We report two cases of thoracic mucormycosis in immunocompetent patients. First, is an immunocompetent child with mediastinal mass and extension into the pericardium and left atrium. The second is a young woman with a left pulmonary artery pseudoaneurysm.

Results: The first patient could not be salvaged while the second patient was successfully managed with surgical intervention and systemic antifungal treatment.

Conclusion: Mucormycosis should be considered as a differential diagnosis in the management of immunocompetent patients in patients with pyrexia of unknown origin and a mediastinal mass. Early and aggressive surgical management along with systemic antifungal treatment improves the survival in this subset of patients.

4. **Non-antifungal drugs inhibit growth, morphogenesis and biofilm formation in *Candida albicans***

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J Antibiot (Tokyo). 2021 May;74(5):346-353. **PMID:** 33469194

Abstract

The increased resistance/tolerance of *Candida* infections to antimicrobial treatment can be attributed to biofilm-associated cells. A way to overcome this situation is to re-purpose non-antifungal drugs that could be active against fungi. We have explored the potential of a small library of eighteen non-antifungal drugs used in different human diseases. *Candida albicans* was cultured in the presence and absence of different concentrations of these drugs. Subsequently, inhibition of growth, germ tube formation, adhesion, and biofilm development were studied. Out of eighteen drug molecules, six showed a reduction in planktonic and biofilm growth in a dose-dependent manner and three drugs inhibited germ tube formation. This study shows the potential of non-antifungal drugs for the development of new anti-Candida agents.

5. **Unusual presentation of mucormycosis mimicking a localised sino-orbital pathology**

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BMJ Case Rep. 2021 Jan 11;14(1):e239199. doi: 10.1136/bcr-2020-239199. **PMID:** 33431470

Abstract

Mucormycosis is an aggressive and deadly fungal infection, which is invariably associated with an immunocompromised patient. Mucormycosis in the head and neck region presents as skeletal necrosis, with or without soft tissue involvement. Early identification and treatment with combination of surgical debridement and parenteral antifungal therapy is critical for a favourable outcome. This paper reports an unusual presentation of mucormycosis,

mimicking a localised sino-orbital pathology involving the infraorbital subcutaneous tissue and the maxillary sinus, in a 35 years old immunocompetent man. Despite aggressive antifungal therapy and surgical management, the course of disease was fatal, reiterating the high mortality associated with mucormycosis.

6. **Glucose - The X factor for the survival of human fungal pathogens and disease progression in the host**

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Microbiol Res. 2021 Jun;247:126725. doi: 10.1016/j.micres.2021.126725. **PMID:** 33676311

Abstract

The incidence of human fungal infections is increasing due to the expansion of the immunocompromised patient population. The continuous use of different antifungal agents has eventually resulted in the establishment of resistant fungal species. The fungal pathogens unfold multiple resistance strategies to successfully tackle the effect of different antifungal agents. For the successful colonization and establishment of infection inside the host, the pathogenic fungi switch to the process of metabolic flexibility to regulate distinct nutrient uptake systems as well as to modulate their metabolism accordingly. Glucose the most favourable carbon source helps carry out the important survival and niche colonization processes. Adopting glucose as the center, this review has been put forward to provide an outline of the important processes like growth, the progression of infection, and the metabolism regulated by glucose, affecting the pathogenicity and virulence traits in the human pathogenic fungi. This could help in the identification of better treatment options and appropriate target-oriented antifungal drugs based on the glucose-regulated pathways and processes. In the article, we have also presented a summary of the novel studies and findings pointing to glucose-based potential therapeutic avenues to be explored to tackle the problem of globally increasing multidrug-resistant human fungal infections.

7. **Molecular identification of pathogenic fungi in formalin-fixed and paraffin-embedded tissues**

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J Med Microbiol. 2021 Feb;70(2). doi: 10.1099/jmm.0.001282. **PMID:** 33252325

Abstract

Introduction: Histopathological examination (HPE) of tissue helps in the diagnosis of invasive fungal infections (IFIs) but cannot identify the fungus to the genus/species level

Aim: Development of sequence-based fungal identification protocol after extraction of DNA from formalin-fixed and paraffin-embedded (FFPE) tissues.

Methodology: A total of 63 FFPE tissues from histopathology proven IFI cases were used to standardize the DNA extraction (commercial QIAamp kit-based extraction and conventional phenol-chloroform-isoamyl alcohol [PCI] method) and sequence-based fungal identification protocols. The PCR targeted different ribosomal DNA (rDNA) regions including complete internal transcribed spacer (ITS1-5.8S-ITS2), separate ITS1 and ITS2, 18S and D1/D2 of 28S regions. Semi-nested PCR targeting Mucorales-specific 18S rDNA region was performed in tissues having aseptate hyphae. The optimized ITS1-PCR protocol was evaluated in 119 FFPE tissues containing septate hyphae or yeast, and Mucorales-specific semi-nested PCR in 126 FFPE tissues containing aseptate hyphae.

Results: The DNA yield by conventional PCI method was significantly higher (P<0.0001) than commercial kit, though the quality of DNA was similar by both protocols. The test accuracy was best while using ITS1 (61.9 %) as the target compared to 7.9, 29.9 and 22.2 % on targeting ITS1-5.8S-ITS2, ITS2, the D1/D2 region of 28S, respectively. The test accuracies of ITS1-PCR in tissues containing septate hyphae, aseptate hyphae and yeasts were 75.5, 18.7 and 100 %, respectively. The amplification (targeting ITS1 region) improved by increasing the thickness of tissue section (up to 50 µm) used for DNA extraction. ITS1-PCR protocol could amplify fungal DNA in 76 (63.8 %) tissues and Mucorales-specific semi-nested PCR in 86 (68.3 %) tissues.

Conclusion: Conventional PCI-based DNA extraction from thick tissue (50 µm) may be used until optimal commercial fungal DNA extraction kit is developed. Subsequent ITS1-PCR for septate fungi and yeast, and semi-nested PCR targeting 18S rDNA for Mucorales are recommended to identify the fungus in FFPE tissues.

8. **Recombinant IL-22 promotes protection in a murine model of *Aspergillus flavus* keratitis and mediates host immune responses in human corneal epithelial cells**

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Cell Microbiol. 2021 May 24;e13367. doi: 10.1111/cmi.13367. **PMID:** 34029434

Abstract

Aspergillus flavus is a leading cause of corneal infections in India and worldwide, resulting in severe visual impairment. We studied the host immune response towards A. flavus in immortalised human corneal epithelial cells (HCEC) and found increased expression of Toll-like receptors, antimicrobial peptides and proinflammatory cytokines like IL-6 and IL-8. Differential expressions of antimicrobial peptides were determined in corneal scrapings from A. flavus keratitis patients with significantly increased expression of LL-37, S100A12 and RNase 7. Increased levels of IL-22 expression were observed both in patients with A. flavus keratitis and in experimental mice model of corneal infections along with IL-17, IL-23 and IL-18. IL-22 is an important mediator of inflammation during microbial

infections, and acts primarily on fibroblasts and epithelial cells. We observed constitutive expression of IL-22 receptors in HCEC, and IL-22 mediated activation of NF-κB, MAPK pathways and STAT3, along with increased expression of antimicrobial peptides in these cells. IL-22 also efficiently lessened cell deaths in corneal epithelial cells during A. flavus infection in vitro. Furthermore, recombinant IL-22 reduced fungal burden and corneal opacity in an experimental murine model of *A. flavus* keratitis.

9. **Evaluating the measures taken to contain a *Candida auris* outbreak in a tertiary care hospital in South India: an outbreak investigational study**

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BMC Infect Dis. 2021 May 6;21(1):425. doi: 10.1186/s12879-021-06131-6. **PMID:** 33957894

Abstract

Background: Candida auris infections are an emerging global threat with poor clinical outcome, high mortality rate, high transmission rate and outbreak potential. The objective of this work is to describe a multidisciplinary approach towards the investigation and containment of a Candida auris outbreak and the preventive measures adopted in a resource limited setting.

Methods: This outbreak investigational study was conducted at a 1300-bedded tertiary care academic hospital in South India. The study included 15 adult inpatients with laboratory confirmed Candida auris isolates. The outbreak cluster was identified in adult patients admitted from September 2017 to 2019. The system response consisted of a critical alert system for laboratory confirmed Candida auris infection and multidisciplinary 'Candida auris care team' for patient management. The team implemented stringent Infection Prevention and Control (IPC) measures including patient cohorting, standardized therapy and decolonization, staff training, prospective surveillance and introduction of Candida auris specific care bundle.

Results: Two outbreak clusters were identified; first cluster occurring between October and November 2017 and the second cluster in May 2018. The cohorts consisted of 7 and 8 Candida auris positive patients in the first and second waves of the outbreak respectively with a total survival rate of 93% (14/15). Deployment of containment measures led to gradual decline in the incidence of adult Candida auris positive cases and prevented further cluster formation.

Conclusions: The sustained implementation of guideline and evidence-based IPC measures and training of healthcare workers for improving awareness on systematically following standardized protocols of Candida auris related IPC practices successfully contained Candida auris outbreaks at our hospital. This demonstrates the feasibility of establishing a multidisciplinary model and bundling of practices for preventing Candida auris outbreaks in a Low- and Middle-income country.

10. **Environmental Isolation of Candida auris from the Coastal Wetlands of Andaman Islands, India**

Parth Arora[1] [2], Prerna Singh[1], Yue Wang[3], Anamika Yadav[1], Kalpana Pawar[1], Ashutosh Singh[1], Gadi Padmavati[2], Jianping Xu[3], Anuradha Chowdhary[4]

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mBio. 2021 Mar 16;12(2):e03181-20. doi: 10.1128/mBio.03181-20. **PMID:** 33727354

Abstract

Candida auris is a multidrug resistant pathogen that presents a serious global threat to human health. As *C. auris* is a newly emerged pathogen, several questions regarding its ecological niche remain unexplored. While species closely related to *C. auris* have been detected in different environmental habitats, little is known about the natural habitat(s) of *C. auris* Here, we explored the virgin habitats around the very isolated Andaman Islands in the Indian Ocean for evidence of *C. auris* We sampled coastal wetlands, including rocky shores, sandy beaches, tidal marshes, and mangrove swamps, around the Andaman group of the Andaman & Nicobar Islands, Union Territory, in India. Forty-eight samples of sediment soil and seawater were collected from eight sampling sites representing the heterogeneity of intertidal habitats across the east and west coast of South Andaman district. *C. auris* was isolated from two of the eight sampling sites, a salt marsh and a sandy beach. Interestingly, both multidrug-susceptible and multidrug-resistant *C. auris* isolates were found in the sample. Whole-genome sequencing analysis clustered the *C. auris* isolates into clade I, showing close similarity to other isolates from South Asia. Isolation of *C. auris* from the tropical coastal environment suggests its association with the marine ecosystem. The fact that viable *C. auris* was detected in the marine habitat confirms *C. auris* survival in harsh wetlands. However, the ecological significance of *C. auris* in salt marsh wetland and sandy beaches to human infections remains to be explored.

11. **Emergomycosis, an Emerging Systemic Mycosis in Immunocompromised Patients: Current Trends and Future Prospects**

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Front Med (Lausanne). 2021 Apr 23;8:670731. doi: 10.3389/fmed.2021.670731. **PMID:** 3396897

Abstract

Recently, the global emergence of emergomycosis, a systemic fungal infection caused by a novel dimorphic fungus Emergomyces species has been observed among immunocompromised individuals. Though initially classified under the genus Emmonsia, a taxonomic revision in 2017 based on DNA sequence analyses placed five Emmonsia-like fungi under a separate genus Emergomyces. These include

Emergomyces pasteurianus, *Emergomyces africanus*, *Emergomyces canadensis*, *Emergomyces orientalis*, and *Emergomyces europaeus*. *Emmonsia parva* was renamed as *Blastomyces parvus*, while *Emmonsia crescens* and *Emmonsia sola* remained within the genus Emmonsia until a taxonomic revision in 2020 placed both the species under the genus Emergomyces. However, unlike other members of the genus, *Emergomyces crescens* and Emergomyces sola do not cause disseminated disease. The former causes adiaspiromycosis, a granulomatous pulmonary disease, while the latter has not been associated with human disease. So far, emergomycosis has been mapped across four continents: Asia, Europe, Africa and North America. However, considering the increasing prevalence of HIV/AIDS, it is presumed that the disease must have a worldwide distribution with many cases going undetected. Diagnosis of emergomycosis remains challenging. It should be considered in the differential diagnosis of histoplasmosis as there is considerable clinical and histopathological overlap between the two entities. Sequencing the internal transcribed spacer region of ribosomal DNA is considered as the gold standard for identification, but its application is compromised in resource limited settings. Serological tests are non-specific and demonstrate cross-reactivity with Histoplasma galactomannan antigen. Therefore, an affordable, accessible, and reliable diagnostic test is the need of the hour to enable its diagnosis in endemic regions and also for epidemiological surveillance. Currently, there are no consensus guidelines for the treatment of emergomycosis. The recommended regimen consists of amphotericin B (deoxycholate or liposomal formulation) for 1-2 weeks, followed by oral itraconazole for at least 12 months. This review elaborates the taxonomic, clinical, diagnostic, and therapeutic aspects of emergomycosis. It also enumerates several novel antifungal drugs which might hold promise in the treatment of this condition and therefore, can be potential areas of future studies.

12. **On the emergence, spread and resistance of *Candida auris*: host, pathogen and environmental tipping points**

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J Med Microbiol. 2021 Mar;70(3). doi: 10.1099/jmm.0.001318.
PMID: 33599604

Abstract

Over a decade ago, a multidrug-resistant nosocomial fungus *Candida auris* emerged worldwide and has since become a significant challenge for clinicians and microbiologists across the globe. A resilient pathogen, *C. auris* survives harsh disinfectants, desiccation and high-saline environments. It readily colonizes the inanimate environment, susceptible patients and causes invasive infections that exact a high toll. Prone to misidentification by conventional microbiology techniques, *C. auris* rapidly acquires multiple genetic determinants that confer multidrug resistance. Whole-genome sequencing has identified four distinct clades of *C. auris*, and possibly a fifth one, in circulation. Even as our understanding of this formidable pathogen grows, the nearly simultaneous emergence of its distinct clades in different parts of the world, followed by their rapid global spread, remains largely unexplained. We contend that certain host-pathogen-environmental factors have been evolving along adverse trajectories for the last few decades, especially in regions where *C. auris* originally appeared, until these factors possibly reached a tipping point to compel the evolution, emergence and spread of *C. auris*. Comparative genomics has helped identify several resistance mechanisms in *C. auris* that are analogous to those seen in other Candida species, but they fail to fully explain how high-level resistance rapidly develops in this yeast. A better understanding of these unresolved aspects is essential not only for the effective management of *C. auris* patients, hospital outbreaks and its global spread but also for forecasting and tackling novel resistant pathogens that might emerge in the future. In this review, we discuss the emergence, spread and resistance of *C. auris*, and propose future investigations to tackle this resilient pathogen.

13. **A case series of presumed fungal endogenous endophthalmitis in post COVID-19 patients**

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Indian J Ophthalmol. 2021 May;69(5):1322-1325. doi: 10.4103/ijo.
PMID: 33913891

Abstract

The novel coronavirus disease 2019 (COVID-19), caused by the severe acute respiratory syndrome coronavirus 2, has challenged the medical community. Several ocular manifestations secondary to COVID-19 have been documented. Prolonged hospitalization exposes the patient to various multiresistant bacteria making them prone to various secondary infections. This case series describes four cases of presumed fungal endogenous endophthalmitis in patients who recovered from COVID-19.

14. **Fatal cutaneous zygomycosis caused by *Saksaenea vasiformis***

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J Assoc Physicians India. 2021 Feb;69(2):71-72. **PMID:** 33527819

Abstract

Fungi in the class of zygomycetes usually produce serious infections in diabetics and immunocompromised hosts. Cutaneous zygomycosis is a less common form, with an unpredictable extent of anatomical involvement and clinical course1.[1] Here, we report a case of primary cutaneous zygomycosis caused by saksaenea vasiformis as posttraumatic complications in a diabetic female. Zygomycosis was suspected and specimens from the surgical debridement were examined by microbiological and histopathological studies for conforming the clinical diagnosis. Rapid diagnosis, liposomal amphotericin B, and proper debridement of affected tissue are necessary to avoid a fatal outcome.

15. **Conventional PCR as a reliable method for diagnosing invasive mucormycosis in resource-limited settings**

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J Med Microbiol. 2021 May;70(5). doi: 10.1099/jmm.0.001370. **PMID**: 34038342

Abstract

Introduction: Invasive mucormycosis (IM) is a life-threatening infection caused by fungi belonging to the order Mucorales. Histopathology, culture and radiology are the mainstay of diagnosis but lack sensitivity, leading to a delay in timely diagnosis and intervention. Recently, PCR-based approaches have been shown to be a promising method in diagnosing IM.

Aim: In the present study we aimed to evaluate the clinical utility of panfungal and Mucorales-specific PCR for diagnosing IM from various clinical specimens.

Methods: This was a prospective study in which 239 clinically suspected cases of IM attending our tertiary care hospital from August 2015 to March 2018 were enrolled. All the cases were defined as 'proven', 'probable' or 'possible' based on EORTC/MSGERC guidelines. In addition to conventional diagnostics (KOH-calcofluor stain and culture), panfungal and Mucorales-specific PCR assays were also performed. The amplified products were sequenced for species identification. In vitro antifungal susceptibility was performed on all the culture-positive isolates.

Results: Among 239 clinically suspected cases of IM, only 140 cases were diagnosed by the demonstration of aseptate ribbon-like hyphae on direct microscopy. Culture was positive in 35.7 % (54/140) of direct microscopy-positive samples. Among the proven cases (n=11), the sensitivity for both Mucorales-specific nested PCR and panfungal PCR was 100 %, but specificity was 91.9 and 73.7% respectively. In probable cases (n=129), the sensitivity of both the PCRs was 98.5 % and specificity for panfungal PCR was 73.7 and 91.9 % for Mucorales-specific PCR.

Conclusion: Pan fungal PCR in combination with Mucorales-specific PCR, followed by sequencing, may play a significant role in IM diagnosis especially among those negative for both direct microscopy and culture.

16. **Multiple *Fusarium* brain abscesses in a young child**

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Childs Nerv Syst 2021 Aug 10. doi: 10.1007/s00381-021-05320-7. **PMID:** 34378119

Abstract

Isolated intracranial fungal infection is infrequent and mostly seen in high-risk, immunocompromised patients. Fusarium, a primary plant fungus, rarely contributes to such disease. Amongst the very few cases of Fusarium brain abscess that have been reported, the infection has occurred mostly in adults. We present a case of a 6-year-old boy with tuberculous meningitis diagnosed with multiple Fusarium brain abscess caused by *Fusarium falciforme* during his clinical course. An immunocompromised state secondary to tuberculous meningitis presumably led to this infection. After tapping the abscesses, the child was treated with a combination of amphotericin B, voriconazole and terbinafine. Despite an aggressive therapy, he remained in poor neurological state. This is the second report of an isolated Fusarium abscess in pediatric age and the first one in a young child and provides pertinent review of this unusual central nervous system fungal infection. Such unusual infectious spectrum should be borne in mind in patients with co-existent immunosuppression.

17. **Evaluation of DermaGenius ® resistance real-time polymerase chain reaction for rapid detection of terbinafine-resistant Trichophyton species**

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Mycoses 2021 Jul;64(7):721-726. doi: 10.1111/myc.13271. Epub 2021 May 18. **PMID:** 33760310

Abstract

Background: Treatment-resistant dermatophytosis caused by *Trichophyton mentagrophytes*/interdigitale complex has emerged as a global public health threat, particularly in endemic countries like India and has spread to many other countries. This veritable spread is alarming due to increase in resistance to terbinafine, which targets the ergosterol biosynthetic pathway by inhibiting the enzyme squalene epoxidase (SQLE). About two third of studies worldwide have reported amino acid substitutions Phe397Leu and Leu393Phe in the SQLE protein to be responsible for high terbinafine MICs.

Objectives: We evaluated the efficacy of the newly developed DermaGenius® Resistance real-time PCR assay to rapidly identify Trichophyton isolates harbouring most common SQLE mutant (Phe397Leu and Leu393Phe) conferring high terbinafine resistance from wild-type susceptible isolates.

Methods: A total of 97 Trichophyton isolates confirmed by ITS sequencing as T. mentagrophytes/interdigitale (recently named *T. indotineae* n = 90), *T. rubrum*/*T. soudanense* (n = 3), *T mentagrophytes* (n = 2) and *T tonsurans* (n = 2) were analysed to evaluate DermaGenius®Resistance real-time PCR assay. All 40 *T. indotineae* isolates exhibiting amino acid substitutions Phe397Leu or Leu393Phe identified by SQLE gene sequencing were evaluated for detection of non-wild-type strains by real-time PCR. Antifungal susceptibility testing for terbinafine was done by CLSI microbroth dilution method.

Results: All terbinafine-resistant isolates harbouring amino acid substitutions Phe397Leu or Leu393Phe in SQLE gene were correctly recorded as SQLE mutants by the DermaGenius®Resistance real-time PCR assay.

Conclusions: The DermaGenius® Resistance real-time PCR assay effectively identified Trichophyton species and distinguished wild-type from SQLE mutant genotype that harbour Phe397Leu and Leu393Phe amino acid substitutions.

18. **Hyperferritinemia and the Extent of Mucormycosis in COVID-19 Patients**

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Cureus. 2021 Dec 21;13(12):e20569. doi: 10.7759/cureus.20569. eCollection 2021 Dec. **PMID:** 35103148

Abstract

Introduction Coronavirus disease 2019 (COVID-19) disease attributed to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has shown associations with various fungal opportunistic infections such as mucormycosis, invasive candidiasis, and aspergillosis, which have contributed to the mortality of the disease. In India, the incidence of mucormycosis had risen rapidly during the second wave. There is ample literature demonstrating the role of iron in the pathogenesis of mucormycosis. The hyperferritinemia associated with COVID-19 may have played a significant role in promoting the invasion and extent of the fungus. Aims and objectives The study aimed to analyze the association between serum ferritin levels and the extent of involvement of mucormycosis in patients affected with COVID-19. Methodology A single-center cross-sectional study was conducted using retrospective hospital record data. G*Power statistical analysis software was used to compute the sample size of 62 (31+31). The radiological data were used to determine the extent of involvement. Results A statistically significant difference was seen in levels of serum ferritin (p = 0.008) between the radiologically judged two groups of the mild extent of invasion of mucormycosis (rhinosinusitis) and severe extent of invasion (rhino-orbital/cerebral mucormycosis), with a severe extent seen with the group having higher levels of serum ferritin. Severe extent of invasion was seen in 53.6% of patients with diabetes mellitus and 62.5% of patients with both diabetes and hypertension. Conclusion The hyperferritinemia not only presents as a marker of the systemic inflammatory process in COVID-19 but also indicates increased free iron, which thereby aids the growth and extent of involvement by the fungus (*Rhizopus oryzae*). In individuals with diabetes and hypertension, the severity was greater. Controlling catastrophic outcomes in individuals with high serum ferritin levels necessitates extra caution.

19. **Fatal cerebral phaeohyphomycosis caused by *Cladophialophora bantiana* mimicking tuberculous brain abscess**

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Germs 2021 Dec 29;11(4):597-603. doi: 10.18683/germs.2021. **PMID:** 35096677

Abstract

Introduction: *Cladophialophora bantiana*, a neurotropic phaeoid fungus, is the primary agent of cerebral phaeohyphomycosis. The disease more commonly affects immunocompetent males and is associated with a high mortality rate.

Case report: We report a case of brain abscess caused by *Cladophialophora bantiana* in a 50-year-old immunocompetent male who presented with headache for two months, weakness of both lower limbs for 15 days, and altered sensorium and aphasia for one day. Contrast-enhanced MRI of the brain showed multiple coalescent abscesses in the right basal ganglia and corpus callosum. Based on clinical and radiological suspicion of tuberculoma, treatment with antitubercular drugs was initiated. A month after discharge, the patient was re-admitted with history of loss of consciousness, altered sensorium, respiratory distress and aphasia. Brain CECT revealed multiple ring-enhancing lesions in the right basal ganglia with mass effect and a leftward midline shift. The patient underwent craniotomy and evacuation of abscess. Direct microscopy of pus aspirated from the lesions showed pigmented septate fungal hyphae, which was identified as *C. bantiana* in fungal culture. The patient was administered intravenous liposomal amphotericin B and voriconazole. However, he died due to multiple organ failure on day 19 after surgery.

Conclusions: Fungal etiology should be considered in the differential diagnosis of intracranial space occupying lesions, regardless of the host immune status. An early diagnosis, together with aggressive medical and neurosurgical interventions are imperative for improving the survival in such patients.

20. **Rhino-orbital mucormycosis: Our experiences with clinical features and management in a tertiary care center**

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Rom J Ophthalmol Oct-Dec 2021;65(4):339-353. doi: 10.22336/rjo.2021.69. **PMID:** 35087975

Abstract

Objective: To determine the prevalence, risk factors, and elaborate our experiences with diagnosis and treatment of patients with mucormycosis, enabling a better understanding of the disease and its management.

Methods: This is a case series of patients with Covid-19 associated with Rhino-orbital-cerebral mucormycosis, managed in our tertiary care center from April 2021 to June 2021.

Results: Six cases of Covid-19 associated with Rhino-orbital-cerebral mucormycosis have been analyzed in the study. The mean age of patients was 40.67 years with a male preponderance (83.3%). The most common complaint was headache (100%), while a minority (33%) came with ocular complaints. All the patients either had a previous history of diabetes mellitus or developed increased blood sugar levels following Covid infection, and were kept on insulin to control their blood sugar levels. 4 patients (66.67%) had a history of corticosteroid use during Covid-19 hospitalization. Treatment

included intravenous liposomal Amphotericin B (100%), functional endoscopic sinus surgery (66.67%), maxillectomy (33.33%) and transcutaneous retrobulbar liposomal Amphotericin B (33.33%). Amphotericin B induced nephrotoxicity, which was seen in 1 patient (16.67%). Mortality occurred in only one patient (16.67%), 25 days following successful surgery. **Conclusion:** Diabetes Mellitus is the most important predisposing factor for the development of Covid-19 associated Rhino-orbital-cerebral mucormycosis. Early presentation, prompt diagnosis and timely initiation of treatment with liposomal Amphotericin B and surgical debridement along with strict blood sugar control can lead to a favorable outcome. However, regular follow-up and monitoring of serum electrolytes and kidney profile must be ensured for such patients.

21. **Mucormycosis in COVID-19 pandemic and its neurovascular spread**

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Eur Arch Otorhinolaryngol. 2021 Oct 12;1-8. doi: 10.1007/s00405-021-07106-8. **PMID:** 34637017

Abstract

Purpose: Rhinocerebral mucormycosis is a rapidly progressive angioinvasive fungal infection commonly seen in diabetics. In the COVID-19 pandemic we have witnessed a sudden surge in these cases. We aimed to evaluate the disease presentation, patterns of spread, and any association with the COVID-19 virus.

Methods: This prospective study was conducted on mucormycosis patients operated between March and July 2021. The diagnosis was confirmed either on KOH staining, fungal culture or histopathological examination.

Results: Thirty one cases (21 males, 10 females) with a mean age of 53.3 years were included, of which 9 (29.1%) were COVID positive on presentation, 17 (54.8%) were post-COVID, while 5 (16.1%) had radiological evidence of COVID sequelae. Most common symptoms were cheek numbness (87.1%), headache (83.9%), visual disturbances (77.4%), and palate involvement (58.1%). Blackening of turbinates was uncommon (22.6%). Ethmoid sinus was involved in all patients. Pterygopalatine fossa involvement was present in 77.4%, and was accurately diagnosed on contrast enhanced MRI scan. There were 8 (25.8%) deaths, while the remaining are discharged or under treatment.

Conclusion: An increase in the incidence of mucormycosis in the COVID-19 pandemic is probably due to a compromise in host immunity along with a synergistic effect in thrombotic microangiopathy. Spread of infection to the soft tissues of the infratemporal fossa, orbit or palate occur via neurovascular structures rather than by bone erosion. The pterygopalatine fossa is involved in most individuals.

22. **Factors responsible for difficult to treat superficial fungal infections: A study from a tertiary healthcare centre in India**

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Mycoses. 2021 Nov;64(11):1442-1447. doi: 10.1111/myc.13301. **PMID:** 33966290

Abstract

Background: Recurrent and clinically unresponsive dermatophytosis is being increasingly observed in India. However, there is little information regarding the extent of the problem and the factors responsible for these difficult to treat superficial fungal infections.

Aim: To identify factors contributing to difficult to treat recurrent superficial fungal infections.

Materials and methods: This prospective cross-sectional study enrolled 105 patients of all age groups presenting with either recurrent or long-standing dermatophyte infection attending the outpatient department of Dermatology, Venerology and Leprosy of Bharati Hospital, Pune, India, between September 2018 and March 2020. Patients were clinically examined, clinical history was taken and questions were asked regarding their current complaints and recorded in a proforma. Data were analysed using the SPSS software package.

Results: The males outnumbered females (74.3% vs 25.7%). A strong association was observed between the presence of past history and duration of disease ($p = .007$). The association of use of topical steroids or keratolytic agents with the duration of disease was statistically significant ($p = .022$). There was a statistically significant inverse association of duration of disease with dermatologist consultation ($p < .001$). The association between consultation with non-dermatologist and the duration of disease was statistically significant ($p = .035$).

Conclusion: Hyperhidrosis, obesity, positive family history, tight clothing and chronic diseases may be considered important factors in acquiring dermatophytic infection. However, when it comes to difficult to treat tinea infections, irrational usage of topical steroids, treatment from non-dermatologists and a past history of tinea appear to be more critical causative factors. Treatment of dermatophytosis by dermatologists/ trained physicians and increasing general awareness of the public regarding the current situation about tinea in the country would help to alleviate the current crisis.

23. **COVID-19-associated rhino-orbital-cerebral mucormycosis: A systematic review, meta-analysis, and meta-regression analysis**

Anusuya Bhattacharyya[1], Phulen Sarma[2], Hardeep Kaur[2], Subodh Kumar[2], Jaimini Bhattacharyya[3], Manisha Prajapat[2], Ajay Prakash[2], Saurabh Sharma[2], Dibbanti Harikrishna Reddy[4], Prasad Thota[5], Seema Bansal[2], Bhaswati Sharma Gautam[6], Bikash Medhi[2]

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Indian J Pharmacol Nov-Dec 2021;53(6):499-510. doi: 10.4103. **PMID:** 34975140

Abstract

Background: Till now, no meta-analysis is available to address the clinical profile, risk factors, different interventions, and outcomes among COVID-19-associated rhino-orbito-cerebral mucormycosis (C-ROCM) cases.

Materials and methods: Eight literature databases were screened using appropriate keywords from November 1, 2019, to June 30, 2021. The objectives were to analyze the clinical and microbiological profile, risk factor/comorbidity, intervention, and outcome. "R-metafor package" was used for analysis.

Results: A total of 23 studies were included. The mean age of presentation of C-ROCM was 54.6 years. The most common presentation was ptosis (72.7%), lid edema (60.6%), proptosis (60.6%), ophthalmoplegia (57.3%), loss of vision (53.7%), facial edema (34.7%), and nasal-blockage (11.8%). Evidence of intracranial spread was seen in 42.8% of cases. Rhizopus was the most common fungus (57.1%) isolated in fungal culture. Among C-ROCM patients, diabetes was the commonest comorbid condition, and the use of corticosteroids related to COVID-19 treatment was the most common risk factor (85.75%). Compared to controlled diabetics, C-ROCM was significantly higher among uncontrolled diabetics (odds ratio [OR] 0.15, 95% confidence interval [C.I.] 0.041-0.544, P = 0.0010). However, no significant association was seen between C-ROCM and COVID-19 severity (OR 0.930, 95% C.I. 0.212-4.087, P = 0.923). For treatment, amphotericin-B was the most common antifungal drug used which was followed by surgical options. However, mortality was high (prevalence 0.344, 95% C.I. 0.205-0.403) despite treatment.

Conclusion: Although local rhino-orbito symptoms were the first to appear, rapid intracranial extension was seen in a significant number of C-ROCM cases. Uncontrolled diabetes and excessive use of corticosteroid were the most common risk factors present among the C-ROCM cases. High index clinical suspicion is imperative (specifically among COVID-19 patients with diabetes), and routine screening may be helpful.

24. **Rhino-orbital-cerebral-mucormycosis in COVID-19: A systematic review**

Anusuya Bhattacharyya[1], Phulen Sarma[2], Dibya Jyoti Sharma[3], Karuna Kumar Das[4], Hardeep Kaur[2], Manisha Prajapat[2], Subodh Kumar[2], Seema Bansal[2], Ajay Prakash[2], Pramod Avti[5], Prasad Thota[6], Dibbanti Harikrishna Reddy[7], Bhaswati Sharma Gautam[8], Bikash Medhi[2]

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Indian J Pharmacol. Jul-Aug 2021;53(4):317-327. doi: 10.4103/ijp.ijp_419_21.

Abstract

Since the onset of COVID-19 pandemic, parallel opportunistic infections have also been emerging as another disease spectrum. Among all these opportunistic infection, mucormycosis has become a matter of concern with its rapid increase of cases with rapid spread as compared to pre-COVID-19 era. Cases have been reported in post-COVID-19-related immune suppression along with the presence of comorbidity which adds on the deadly outcome. There is no systematic review addressing the issue of COVID-19-associated mucormycosis. This is the first systematic review of published studies of mucormycosis associated with COVID-19. The aim was to analyze the real scenario of the disease statement including all the published studies from first November 2019 to 30th June to analyze the contemporary epidemiology, clinical manifestations, risk factor, prognosis, and treatment outcome of COVID-19 associated rhino-orbito-cerebral-mucormycosis. A comprehensive literature search was done in following databases, namely, PubMed, Google Scholar, Scopus, and EMBASE using keywords mucormycosis, rhino orbital cerebral mucormycosis, COVID-19, and SARS-CoV-2 (from November 01, 2019 to June 30, 2021). Our study shows that, while corticosteroids have proved to be lifesaving in severe to critical COVID-19 patients, its indiscriminate use has come with its price of rhino-orbito-cerebral mucormycosis epidemic, especially in India especially in patients with preexisting diabetes mellitus with higher mortality. Corticosteroid use should be monitored and all COVID-19 patients should be closely evaluated/monitored for sequelae of immunosuppression following treatment.

Keywords: COVID-19; Corticosteroid; diabetes; fungal co infection; mucormycosis; rhino-orbito-cerebral mucormycosis; supplemental oxygen.

PMID: 34414911

25. **Epidemiology and Antifungal Susceptibility Patterns of Invasive Fungal Infections (IFIs) in India: A Prospective Observational Study**

Yubhisha Dabas[1], Immaculata Xess[1], Mragnayani Pandey[1], Jaweed Ahmed[1], Janya Sachdev[1], Azka Iram[1], Gagandeep Singh[1], Manoranjan Mahapatra[2], Rachna Seth[3], Sameer Bakhshi[4], Rakesh Kumar[5], Viveka P Jyotsna[6], Sandeep Mathur[7]

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J Fungi (Basel) 2021 Dec 30;8(1):33. doi: 10.3390/jof8010033. **PMID:** 35049974

Abstract

The epidemiology of invasive fungal infections (IFI) is ever evolving. The aim of the present study was to analyze the clinical, microbiological, susceptibility, and outcome data of IFI in Indian patients to identify determinants of infection and 30-day mortality. Proven and probable/putative IFI (defined according to modified European Organization for Research and Treatment of Cancer/Mycoses Study Group and AspICU criteria) from April 2017 to December 2018 were evaluated in a prospective observational study. All recruited patients were antifungal naïve (n = 3300). There were 253 episodes of IFI (7.6%) with 134 (52.9%) proven and 119 (47%) probable/putative infections. There were four major clusters of

infection: invasive candidiasis (IC) (n = 53, 20.9%), cryptococcosis (n = 34, 13.4%), invasive aspergillosis (IA) (n = 103, 40.7%), and mucormycosis (n = 62, 24.5%). The significant risk factors were high particulate efficiency air (HEPA) room admission, ICU admission, prolonged exposure to corticosteroids, diabetes mellitus, chronic liver disease (CLD), acquired immunodeficiency syndrome (AIDS), coronary arterial disease (CAD), trauma, and multiorgan involvement ($p < 0.5$; odds ratio: >1). The all-cause 30-day mortality was 43.4% (n = 110). It varied by fungal group: 52.8% (28/53) in IC, 58.8% (20/34) in cryptococcosis, 39.8% (41/103) in IA, and 33.9% (21/62) in mucormycosis. HEPA room, ICU admission for IC; HEPA rooms, diabetes mellitus for cryptococcosis; hematological malignancies, chronic kidney disease (CKD), sepsis, galactomannan antigen index value ≥1 for IA and nodules; and ground glass opacities on radiology for mucormycosis were significant predictors of death (odds ratio >1). High minimum inhibitory concentration (MIC) values for azoles were observed in *C. albicans*, *C. parapsilosis*, *C. glabrata*, *A. fumigatus*, *A. flavus*, *R. arrhizus*, *R. microsporus*, and M. *circinelloides*. For echinocandin, high MIC values were seen in *C. tropicalis*, *C. guillermondii*, *C. glabrata*, and *A. fumigatus*. This study highlights the shift in epidemiology and also raises concern of high MICs to azoles among our isolates. It warrants regular surveillance, which can provide the local clinically correlated microbiological data to clinicians and which might aid in guiding patient treatment.

26. Use of Topical Cyclosporine 0.1% in Therapeutic Penetrating Keratoplasty for Fungal Keratitis

Samrat Chatterjee, Deepshikha Agrawal

Cornea and Anterior Segment Services, MGM Eye Institute, Raipur, Chhattisgarh, India.

Cornea. 2021 Sep 4. doi: 10.1097/ICO.0000000000002827. **PMID:** 34483271

Abstract

Purpose: The efficacy and safety of topical cyclosporine 0.1% in preventing early graft failure after therapeutic penetrating keratoplasty (TPK) in eyes with fungal keratitis were evaluated.

Methods: This prospective case series included patients with fungal keratitis undergoing TPK from May to December 2019 who were treated with cyclosporine A 0.1% eye drops (tCSA group). We compared the outcome with a historical cohort of patients who were treated conventionally (CT group) with topical prednisolone acetate 1% eye drops started 3 weeks after surgery.

Results: There were 20 patients (male: 13; female: 7) in the tCSA group and 28 patients in the CT group (male: 23; female: 5). The number of clear grafts 3 months postoperatively was 10 (50%) in the tCSA group and 4 (14.3%) in the CT group ($P = 0.011$). The mean logarithm of the minimum angle of resolution best-corrected visual acuity was 1.49 ± 0.74 in the tCSA group and 2.10 ± 0.62 in the CT group ($P = 0.003$). There were 5 patients (17.9%) with recurrence of the primary fungal infection in the CT group, 4 of whom were using topical prednisolone. There was no recurrence in the tCSA group. A logistic regression analysis revealed higher odds of a clear graft at 3 months postoperatively with topical cyclosporine 0.1% [odds ratio: 14.35 (95% confidence interval, 2.38-86.5), $P = 0.004$].

Conclusions: Postoperative treatment with topical cyclosporine 0.1% seems to increase graft survival and postoperative vision with reduced risk of recurrence of primary infection in eyes with fungal keratitis undergoing TPK.

27. Cranial Mycetoma: A Rare Case Report with Review of Literature

Fouzia Siraj[1], Akanksha Malik[1], Sharma Shruti[1], K B Shankar[2], Swati Singh[1]

[1]Department of Pathology, [2]Department of Neurosurgery, VMMC and Safdarjung Hospital, New Delhi, India.

J Glob Infect Dis. 2021 Nov 23;13(4):192-195. doi: 10.4103. **PMID:** 35017879

Abstract

Mycetoma is a chronic granulomatous infection caused by fungi or bacteria, known as eumycetoma and actinomycetoma, respectively. Mycetoma commonly affects young males belonging to low socioeconomic strata, usually barefooted agricultural workers. It mainly affects lower and upper limbs presenting as a painless swelling with discharging sinus. Rarely, is it encountered in the intracranial location. The diagnosis relies on the clinical presentation and identification of the etiological agents within the tissue, by histology and special stains. It is important to specify the fungal or bacterial etiology, because the treatment of each is completely different. The management of such infections is challenging and should involve early diagnosis, the use of antibacterials or antifungals, and surgical removal of the lesion. To the best of our knowledge, only seven cases of intracranial mycetoma have been reported. The present case highlights the rarity of this lesion, thereby contributing to the existing literature and presenting its diagnostic implications.

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INTRODUCTION

The incidence of fungal infections has increased at an alarming rate in the past two decades. Drastic life style modifications have produced a lot of opportunities for microbes. All these changes are related to the recent emergence of previously unrecognized diseases or the resurgence of disease that were thought to be under control. As for all the infectious diseases emergence of fungal infections, result from (1) changes in human demographics and behaviour; (2) changes in technology and industry; (3) changes in economic development and land use; (4) increasing and rapid international travel and commerce; (5) microbial adaptation to all the man produced changes (6) weakened immune systems due to HIV, cancer & other diseases & to modern medical practices such as the use of intensive chemotherapy.

WORKSHOP

The topics will be discussed by eminent faculty as didactic lectures, discussion of fungal slides, extensive demonstration of PCR for yeasts and molds, antifungal susceptibility testing and calculation of the drug concentration for micro broth dilution method through video & explanations, discussions and demonstrations of various aspects of diagnostic mycology, histopathological staining procedures to identify fungus. There are intresting prizes to win every day.

OBJECTIVES

- Comprehend the unique terminologies employed in mycology
- Perform and interpret direct microscopic examination of specimens for fungi
- Utilize preferred laboratory methods for culturing and identifying fungi
- Recognize morphologic characteristics of cultured fungi
- Identify a broad range of isolates
- Get an overview of basic DNA extraction techniques in molds and yeasts
- Perform PCR, sequence data analysis and trouble shoot
- Perform and interpret antifungal suceptbility testing for yeasts and molds by microbroth dilution.

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- Interesting, Informative, Humorous if possible

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