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Fungal brain abscess in the era of COVID-19: an experience from a tertiary care Neurosciences Institute in South India

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Introduction: Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is ruling the world for more than 2 years since 2020. In 2021, the second wave of COVID-19 arrived in the ‘delta variant’ except across India, causing significant morbidity and mortality. In addition, the epidemic of COVID-19-associated meningitis affected the 3rd-semester student specifically, with a whopping 41.52 cases and 3516 deaths attributed to this dreadful disease.
Methods: The single-center retrospective cross-sectional study was aimed to determine the impact of COVID-19 on fungal brain abscess cases at a non-COVID tertiary care Neurosciences Institute in South India. The study included all cases diagnosed with fungal brain abscess microbiologically (microscopy and/or fungal culture), supported by radiological findings or by histopathological examination. Cases of brain abscess which were negative for fungal elements by microscopy, culture, and imaging were excluded from the study. Fungal culture was done on routine mycological media as per standard procedures. Fungal identification was done by microscopic morphology, MALDI-TOF MS, and ITS sequencing.
Results: A total of 406 cases of brain abscess were recorded between January 2020 and April 2022. Out of these, 26 (6.4%) were cases of fungal brain abscess. In 2020, these out of 153 (32%) cases had a fungal etiology, while it was 10.4% (22/2021) in 2021 and 0.84% (142) till April 2022. Overall, a male preponderance was observed (282/3%, 77%) were males. The cases had an even distribution from 6 to 62 years, with no predilection in any particular age group. The most common underlying comorbidity was type 2 diabetes mellitus (13/26, 50%). Four cases had a past history of COVID-19. Radiological suspicion of fungal infection was present in all the cases. Mycological examination (gnotobio and 20/26 KOH mount) of brain abscess pus from all the cases revealed fungal elements. Out of 26 cases, 25 cases showed hyaline, broad septate hyphae, 2 showed melanized septate hyphae and 1 showed budding yeast cells with pseudohyphae and arthroconidia on direct microscopy. Culture positivity was observed in 15 cases (57.7%). Out of 25 vegetative cases of thraustochytrid morphotype cases based on clinical, radiological, and direct microscopic findings, fungal culture was positive in 15 cases, all of which were identified as Rhizopus arrhizus. Out of two cases that showed melanized hyphae in direct microscopy, one grew a dematiaceous mold that was identified as Cladosporium herbarum. The other melanized fungus failed to grow in culture. The single case of brain abscess caused by a yeast-like fungus was attributed to Trichosporon ocellatum, identified by ITS sequencing. It was initially misidentified as T. cutaneum by VITEK MS due to lack of non-special database for T. ocellatum.
Conclusion: A significant increase in the incidence of fungal brain abscess has been observed in the COVID-19 era, particularly with such new waves of infection. Clinical features along with imaging and mycological findings are crucial in making an early diagnosis and decision regarding antifungal therapy. Accurate identification to the species level is necessary to guide optimal antifungal therapy as several species exhibit resistant response to antifungal drugs.

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Diagnostic dilemmas in Pneumocystis pneumonia in case of long COVID-19

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Background: To diagnose Pneumocystis pneumonia in an underlying COVID-19 infection is difficult because of the clinical and radiological indistinctibility of the presentation.
Case Presentation: We report the case of a 67-year-old male background of type 2 diabetes mellitus (DM) and hypertension (HTN) who presented to the emergency department for severe dyspnea for 6 days. He is treated with corticosteroids and other supportive therapy. Initially, the patient responded with that treatment but suddenly his respiration is increasing and getting labored. All possible causes of deterioration hypoxia were evaluated and cause ruled out. Later stage, BAL was done and immunofluorescence test for PCP came positive. Systemic, concurrent bacteria and gradually hypoxia improved and exudation ruled out.
Conclusion: Pneumocystis and COVID-19 co-infection needs serious consideration, particularly for patients with long-term COVID-19, even if patients do not have conventional risk factors for Pneumocystis pneumonia.

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COVID-associated invasive pulmonary aspergillosis (CAPA) — a case report

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COVID-associated invasive pulmonary aspergillosis (CAPA) is a severe fungal infection with a high mortality rate. The incidence of CAPA is on the rise possibly due to the prescription of corticosteroids and tocilizumab two repurposed drugs used for treating SARS-CoV-2. Diagnosis is challenging due to the non-specific nature of symptoms. Voriconazole is the mainstay of therapy. We present a case of a 42-year-old male presenting with left hydro pneumothorax post recovery from COVID infection, and later succumbed to this complication. Patients developing pulmonary aspergillosis after short-term steroid therapy is uncommon. The possibility of aspergillosis in immunocompromised patients should be considered in those on systemic steroids and demonstrating pulmonary functions.

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Dematilaceous fungi as a rare cause of fungal sinulitsis in a tertiary care center

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Objective: To discuss the occurrence and diagnosis of dematiaceous fungi as a causative organism of fungal sinulitsis in patients at a tertiary care center in North India. Since there is limited data on its prevalence, this study was aimed to know the non-Angerlebas fungi causes of fungal sinulitsis focusing on the dermatomycoses.
Methods: A total of 451 nasal biopsy samples, from the department of pulmonary medicine ward and ICU were received over a period of 5 years, from January 2019 to December 2021. The samples were subjected to conventional mycological techniques including direct-epifluorescence and light microscopy, culture on solid media and visual identification of growth in cultures using benzidine cotton blue stains.
Results: Out of 451 samples, no fungus were isolated from 299 samples (64.29%), Aspergillus spp from 63 samples (13.96%), dematiaceous fungi from 10 samples (2.13%) and other fungi from 79 samples (17.5%). Among the dematiaceous fungi isolated, 7 isolates were identified as Alternaria spp. (70%) and 1 isolates were identified as Curvularia species (30%) and described.
Conclusion: Most reported cases of allergy and invasive sinulitsis were attributed to Aspergillus spp. However, in the current study, dematiaceous ‘black’ fungi like Alternaria and Curvularia, were also identified as causes of fungal sinulitsis in both immunocompromised and immunocompetent individuals, showing an increasing pathogenic spectrum. Hence a high index of clinical suspicion and appropriate laboratory diagnosis is required in instituting appropriate treatments such as surgical debridement, reducing immunosuppression, and antifungal treatment with newer azoles.

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Molecular epidemiology of clinical filamentous fungi in Qatar beyond Aspergillus and Fusarium

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Objective: Due to an increasing number of patients at risk, i.e., with a highly compromised immune system and/or receiving aggressive chemotherapy treatment, invasive fungal infections (IFI) are increasingly being reported. They are associated with significantly high mortality rates. Aspergillus spp., particularly A. fumigatus, is the major cause of mold-related IFI around the world followed by Fusarium spp., however, other molds are emerging as human pathogens. The aim of this study was to explore the epidemiology and prevalence of the non-Aspergillus and non-Fusarium molds in human clinical samples over 11 years period in Qatar based tertiary hospital using molecular techniques.
Methods: A total of 91 clinical specimen positive for molds belonging to 90 patients were recorded in about 11 years (September 2011 to November 2020). The isolates were identified based on morphological characteristics and by sequencing the internal transcribed spacer (ITS) gene. To confirm the identification, a phylogenetic tree based on ITS sequences was constructed.
Results: Most patients were males (72%), 6% were immunocompromised, 12% had IMI, and 7% died within 30 days of diagnosis. The fungal isolates were recovered from a variety of clinical samples, including nails, sputum, tissue, blood, cerebrospinal, abscess, and skin tissue samples. Dematiaceous fungi were most isolated (30%) followed by dermatophytes (29.5%), 21% Fusarium, and 10% molds other than dermatophytes and Fusarium. Furthermore, rare fungi that are not commonly known to cause human diseases were recovered such as Rhizopusstolonifer panfil, Subhamantula amorina, Distrotheca jupuncta, and Gausamsalleyi.
Conclusion: The current study highlights the epidemiology and spectrum of mold genera, other than Aspergillus and Fusarium, recovered from human clinical samples in Qatar, which can aid in surveillance of uncommon and emerging mycoses other than aspergillosis and fusariosis.
The epidemiology, clinical manifestations and outcomes of cerebral mucormycosis: A systematic review
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Objective: Mucormycosis is a devastating infection caused by Mucorales order ubiquitously existing in the environment. Cerebral mucormycosis, the most mentioned type of brain infection, is commonly seen in association with deep immuno-compromised status. Despite lethality of brain mucormycosis, the lack of common data specifically concerning clinical manifestations, radiographical characteristics, diagnostic methods, and management are seriously felt.

Methods: In this systematic review and meta-analysis, we searched PubMed and Scopus (up to December 31, 2018) using the combination of the following keywords: ‘Mucor*’ or ‘Zygomyc*’ and ‘cerebral’ or ‘brain’ or ‘central nervous system’ or ‘intracranial’) and found ~1462 articles.

Only published case reports or case series with the definition of cerebral mucormycosis (finding the signs of this invasive mold in histopathological sections or mycological examination and the presence of histopathological or radiological signs of brain involvement) were included. However, animal mucormycosis or papers in languages other than English or duplicates were excluded. Overall, 2871462 articles were reviewed and included consisting of 145 cases of cerebral mucormycosis.

Results: A total of 206 (99.7%) patients were male. The most common risk factor was diabetes mellitus (55%), followed by hematological malignancies (25.6%). Remarkably, among hematological malignancies, acute lymphoblastic leukemia was significantly associated with cerebral mucormycosis (P < .001). In terms of reported risk factors, only 14.3% of patients had hematological malignancies still 2000, while the percentage of cases (29.7%) with this risk factor increased significantly after 2000 (P < .04). The most common clinical symptoms were orbital (46.4%) and neurologic symptoms (41.2%), while headache was present in 35.9% of patients and fever only in 6%. Of the patients reported, 49.4% died and there was a significant correlation between mortality rate and diabetes mellitus (P = .003), while the mortality rate was not associated with other risk factors such as hematological malignancies.

Conclusions: In patients with mucormycosis, the presence of orbital clinical symptoms may suggest cerebral involvement as much as the presence of neurologic symptoms. Finally, it can be said that Cerebral Mucormycosis is a very fatal mold infection, especially if it occurs in diabetic patients.