2.1d Incidence of mixed fungal infections in post-COVID-19 outbreak of Mucormycosis
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Introduction: Post-COVID-19 rhino orbital mucormycosis has emerged as an important life-threatening complication adding to mortality. Fungal infections are a major health challenge, especially in the immunocompromised. Mucormycosis is a severe, frequently fatal fungal infection that has a unique predisposition to infect patients with diabetes. The most common organ for the infection of these cases could be the unique use of nose and sinuses in the management of coronavirus disease 2019 (COVID-19) patients and extensive disengaged immune responses due to severe acute respiratory respiratory difficulties in COVID-19 patients. A prompt diagnosis is crucial for the effective management of invasive rhino orbital fungal infections due to their propensity for angioinvasion and destructiveness spread with brain involvement. Materials and Methods: A total of 110 surgical pathology specimens received with a clinical suspicion of invasive fungal infection were assessed in the department of the Institute of Pathology. The cases were reviewed for the presence of Aspergillus fungi by senior pathologists and microbiologists using histochemical, immunohistochemical and special fungal stains. The findings from patients’ charts were summarized and correlated with the fungal BOHR and culture. The tissue reaction pattern, presence of eukaryotic cells, and morphology of the fungal hyphae were also noted in each case showing Aspergillus fungi cultures.

Results: A total of 9 out of 10 cases (90%) showed the presence of Aspergillus fungi cultures. The histopathological diagnosis given in these 9 cases were: Aspergillus fumigatus (1), combined Aspergillus and Mucor (2). Two types of fungal hyphae were noted in all seven cases of combined infection. Granulomas tissue reaction was noted in two out of seven cases of combined infection. Calcium oxalate crystals were noted in the single case of Aspergillus and wool-like debris in all cases of fungal infections.

Conclusions: To conclude Aspergillus fungi hyphae are found in a small but significant number of cases of post-COVID-19 Rhino Orbital invasive mold infections so while reporting the surgical specimen with clinical suspicion of post-COVID-19 mucormycosis one should be aware of the possibility of mixed fungal infections and look for Aspergillus fungi fungi as a self-limiting mucormycosis infection. Pattern recognition could be the most significant drawbacks of the development and occurrence of fungal infections are a major health challenge, especially in the immunocompromised. Mucormycosis is a severe, frequently fatal fungal infection that has a unique predisposition to infect patients with diabetes. The most common organ for the infection of these cases could be the unique use of nose and sinuses in the management of coronavirus disease 2019 (COVID-19) patients and extensive disengaged immune responses due to severe acute respiratory respiratory difficulties in COVID-19 patients.

2.2d Evaluation of new tools for the diagnosis of histoplasmosis
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72.2d Mucormycosis and histoplasmosis, September 21, 2022, 3:00 PM – 4:10 PM

In sub-Saharan Africa (SSA) and West African countries, histoplasmosis is rarely diagnosed probably due to lack of epidemiological information, insufficient training and awareness of frontline healthcare workers, and clinical features very similar to those of other common mycoses that can be managed by conventional therapy, without the need for extensive investigations and particularly advanced HIV patients, with a high case-fatality rate in the absence of treatment (from < 10% to < 40%). The clinical diagnostic methods are microscopic observation of yeasts with supportive morphology and a positive culture from a clinical sample, but the results can vary between different laboratories and culture takes prolonged incubation (often 2-6 weeks) and involves, when positive, handling in a level 3 security laboratory. Implementing non-invasive diagnostic tools will allow us to improve histoplasmosis diagnosis for the most exposed populations and significantly reduce the prevalence of the fungal infection in countries where data are still lacking. Rapid diagnostic tests (RDTs) such as the TB LAM for the diagnosis of tuberculosis or the Cryptococcus antigen (CAT) lateral flow assay (LFA) for yeast have demonstrated their usefulness for the management of advanced HIV patients in similar contexts.

Recently, two RDTs have been made commercially available for the diagnosis of histoplasmosis, based on urinary mycological antigen detection: (1) Histoplasma Capulinae/Antigen Urinary Antigen Rapid Test from Optimus Imaging Diagnostics (ODS) and (2) Histoplasma Urine Antigen Lateral Flow Assay from MicroViva Diagnostics (MV). Objectives and Methods: Our objective was to evaluate these new tests, by experiencing with their laboratory in low- and middle-income countries (LMICs) and by studying their diagnostic performances using different sample collections sourced from patients with documented histoplasmosis (culture positive), other HIV-related infections, and patients without negative urine (culture and histoplasmosis antigen detections).

In this study, we have evaluated the performance of the two RDTs. The result was obtained from the EDARPS 2022 study based on a clinical sample with positive histoplasmosis (culture positive) from a patient with positive urine (culture and histoplasmosis antigen detections).

2.3c High-resolution digital DNA melting: a breakthrough in diagnosing IMH
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2.3c Novel diagnostic tools for intranasal mold infection, September 21, 2022, 3:00 PM – 4:10 PM

Invasive mold infections (IMIs) such as Aspergillus, Mucormycosis, Fusarium, and Lomentospora have emerged as important pathogens in immunocompromised patients, with mortality rates as high as 50% to nearly 80% for these infections. Outcomes can be substantially improved with early initiation of appropriate antifungal therapy, but early diagnosis is difficult to establish and often requires multidisciplinary teams evaluating clinical and radiological findings plus suggestive microbiologic findings. Conventional fungal culture and PCR techniques are limited by low sensitivity, long turnaround times, and are insufficient for differentiating between infection and colonization. Other culture-based tests, such as the Galactomannan test, are available only for invasive aspergillosis and are limited by imperfect test performance. Better and more rapid tests for IMI are needed to enable early diagnosis and targeted therapy and improve survival.

We have developed a new technology called digital high resolution melting analysis (HRM) to enable a rapid and robust diagnosis of IMI from bronchoalveolar lavage (BAL) collections. This technology allows a 48-hour diagnosis for fungal pneumonia, which is critical in patients with advanced HIV disease, pathogen-based diagnosis is still limited by atypical clinical presentation. Direct microscopic examination, xeroradiographic, and histopathological are the standard traditional diagnostic methods used to isolate T. marneffei from clinical specimens, however, due to time-consuming, it may take a day to 14 days. Metagenomic next-generation sequencing (mNGS) technology has shown promising results as a rapid, convenient method for detecting T. marneffei from various types of specimens, leading to earlier and more appropriate treatment. Recent studies and current newborn study, mNGS has been shown to be a superior and possibly superior to conventional fungal culture in terms of speed and specificity in the diagnosis of talassemia.

In terms of clinical diagnosis, mNGS showed a high sensitivity of 97.72% compared with conventional culture (61.43%). Evaluation of mNGS technology and use of mNGS in talassemia patients is our ongoing project for talassemia patients. Currently, there is no optimal therapeutic regimen for the treatment of talassemia in this specific group of patients. Amphotericin B is the first line to initial antifungal treatment, other antifungal agents such as voriconazole have shown good efficacy against talassemia. We investigated the efficacy of voriconazole in the treatment of talassemia patients using population pharmacokinetics. C-reactive protein (CRP) was found to significantly affect voriconazole plasma concentrations. Optimizing the dosing regimen (mg/kg BW) by guide voriconazole dosing in clinical practice. The mortality rate in non-HIV talassemia is higher than the population, which may be due to the atypical and complex clinical manifestations. Failure to achieve antifungal treatment in a timely manner often results in poor prognosis and even death. The course of treatment is protracted, and deaths, and depends on the status of the patient. Diagnosis and treatment of talassemia remains a challenge. Optimization of diagnostic tools and treatment strategies to ensure early detection and prompt antifungal treatment should be considered.