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Guest Editorial

Diagnostic procedures of rhino-orbital mucormycosis

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Mucormycosis is a recent emerging infectious cause of morbidity and mortality in COVID-19 patients in our country.[1–3] About 12 to 15 thousand cases have been reported to be affected by mucormycosis throughout different states of India in COVID patients with co-morbidity of diabetes and other immunosuppressive conditions (India's National News). Mucormycosis is fungal infection caused by members of the order mucorales.[1–3] This is an invasive fungal infection and complicated by aggressive course.[1–3]

The diagnosis of mucormycosis is challenging. Rhino-orbital mucormycosis are dealt by oculoplasty surgeons, ENT specialists and sometimes by neurosurgeons along with internists.[1–3] Local aspirates or biopsy material from rhino-orbital areas can be carefully taken during the procedures.[1–3] The tissue should not be crushed as Zygomycetes are very fragile and sometimes culture may show negative due to crushing effect.[1–3] Growth is very rapid and usually occurs during incubation for 18 to 24 hours at (25-37) degree centigrade.[1–3] Culture (In Sabouraud dextrose agar, low pH with addition of Chloramphenicol) from the site may confirm mucormycosis infections and allow precise genus and species identification. Demonstration of hyphae in clinical samples by direct microscopy is very useful. Author (s) had developed a rapid, cost effective fluorescein stain technique which can demonstrate the hyphae of mucormycosis [Figure 1].[4]

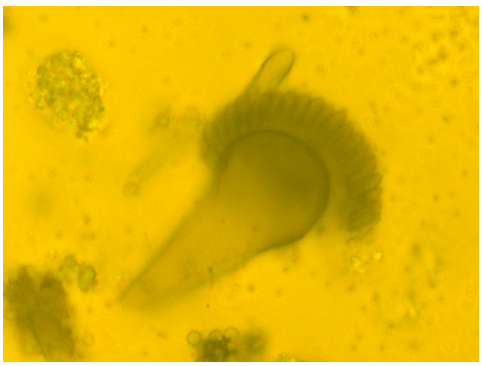

Fig. 1: Mucormycosis in fluorescein stain. Please note: Grey colored of the non septate fungus with conidial head

Others stain can be used in routine microbiology as 10% potassium hydroxide, Gomori methenamine silver stain, Periodic- acid Schiff and calcofluor white in fluorescent microscopy.[1–3] The hyphae are hyaline in character, non-septate and ribbon like with diameter ranging from 4 to 30 micrometer.[1–3] The width is irregular with branching angle of 90 degree (like Aspergillus fumigatus in tissue stain).[1–3] The hyphae are often fragmented and color of the fungus is grey or white (Unlike Aspergillus niger or mycetoma which are black in color).[1–3] Special aspect of mucormycosis in biopsy specimen is that they can be picked up by hematoxylin and eosin stain directly unlike

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other septate fungus like Aspergillus and Fusarium.[1–3] Hyphae of mucormycosis can be observed in a necrotic tissue with evidence of angioinvasion and infraction of the tissue.[1–3] There may be perineural involvement also.[1–3] Neutrophilic infiltration can be seen in acute cases and granuloma can be seen in a chronic variety.[1–3] If the cultures are negative, molecular identification with commercially available anti-zygomycete antibodies may aid in the diagnosis.[1–3] However, there is a problem in standardization by this antibody even in many advanced centers.[1–3] Molecular identification of mucormycosis can be helpful in some advanced centers to identify the fungus in respect with genus and species.[1–3] Different techniques have been reported in respect to DNA probes targeting 18S subunit, ITS-1 sequencing after polymerase chain reaction (PCR) with pan-fungal primers, 18 S-targeted semi-nested or gradient PCR and real time PCR targeting cytochrome b gene.[1–3]

In follow up of the cases, if ENT endoscopy is performed, aspirates and biopsy should be reevaluated. In case of pulmonary involvement of COVID-19, sputum smear analysis, broncho-alveolar lavage or pulmonary biopsy etc should be performed for the invasive pulmonary fungal infection. In COVID-19 patients, D-Dimer test, serum Ferritin level, complete blood count including platelet count (for Thrombocytopenia), ESR, C-reactive protein, liver function test, blood sugar estimation and renal function test would be important.[1]

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