Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Restricting steroid use to patients with severe COVID-19 requiring oxygen therapy, screening for and optimally controlling hyperglycaemia can prevent CAM in a large majority.

Variables	Total N = 164	Mucormycosis with COVID -19 N = 132 (80.5%)	Mucormycosis without COVID-19 N= 32 (19.5%)	OR (95%CI)	p value
Age (in years) Mean ± SD	50.91 ± 11.51	50.52 ± 11.66	52.53 ± 10.87	-	0.376
Gender					
Males (%)	128(78.0%)	101(76.5%)	27(84.4%)	0.60 (0.21-1.70)	0.335
Comorbidity					
Chronic lung disease	6(3.7%)	3(2.3%)	3(9.4%)	0.22 (0.04-1.17)	0.089
Ischemic heart disease	7(4.3%)	5(3.8%)	2(6.2%)	0.59 (0.10-3.19)	0.411
Chronic kidney disease	7(4.3%)	7(5.3%)	0	-	0.212
Cerebrovascular events	2(1.2%)	2(1.5%)	0	-	0.647
Chronic liver disease	1(0.6%)	0	1(3.1%)	-	0.195
HIV/AIDS	2(1.2%)	2(1.5%)	0	-	0.647
Diabetes Mellitus	159(97.7%)	129(97.7%)	30(93.8%)	2.86 (0.45-17.92)	0.240
Uncontrolled DM	156(95.1%)	128(97.0%)	28(87.5%)	4.57 (1.07-19.39)	0.026
Newly detected DM	56(35.2%)	51(39.5%)	5(16.7%)	3.26 (1.17-9.09)	0.018
DKA at presentation	6(3.7%)	6(4.5%)	0	-	0.266
HbA1c Mean ± SD	10.74 ± 3.39	10.84 ± 3.58	10.31 ± 2.42		0.426
Steroid Use	74(45.1%)	73(55.3%)	1(3.1%)	38.35 (5.08-289.33)	<0.001
Serum Ferritin Mean ± SD	451.75 ± 499.71	490.88 ± 521.9	290.3 ± 358.08	-	0.041
CRP Mean ± SD	80.91 ± 71.99	85.05 ± 70.72	63.84 ± 75.76	-	0.135
O2 Therapy	19(11.6%)	19(14.4%)	0	-	0.012
Ventilation (NIV / IMV)	3(1.8%)	3(2.3%)	0	-	0.519
Vaccination Status					
Vaccinated	5(3.0%)	4(3.0%)	1(3.1%)	0.96 (0.10-8.9)	0.667
Clinical presentation					
Acute (≤ 7 days)	76(46.3%)	69(52.3%)	7(21.9%)	3.91 (1.58-9.66)	0.002
Sub acute (8 -21 days)	88(53.7%)	63(47.7%)	25(78.1%)		
Extent of involvement					
Sinus limited	164(100.0%)	132 (100.0%)	32 (100.0%)	-	-
Orbital involvement	116(70.7%)	93(70.5%)	23(71.9%)	0.93(0.39-2.19)	0.874
CNS involvement	51(31.1%)	39(29.5%)	12(37.5%)	0.69(0.31-1.56)	0.383
Outcome					
In-hospital mortality	13(7.9%)	13(9.8%)	0	-	0.053

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COVID-19 associated Invasive Fungal Rhinosinusitis: A Retrospective Analysis of 15 Cases

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Purpose: India is witnessing an increasing number of invasive fungal infections, especially mucormycosis, associated with the second wave of the COVID-19 pandemic. The purpose of this study is to describe the epidemiological and clinical features of patients with COVID-19 associated invasive fungal sinusitis (CIFRS) who presented to our centre (KIMSHEALTH, a tertiary hospital in Thiruvananthapuram, Kerala, India).

Methods & Materials: We included biopsy and/or culture proven invasive fungal rhinosinusitis in patients who had history of COVID-19 infection (confirmed by RT-PCR or an antigen based test). Clinical details were collected by review of the electronic medical records and analysis was done by descriptive statistics.

Results: 15 patients who satisfied the inclusion criteria were included in the analysis. This included 11 cases of rhino orbital mucormycosis, 2 cases of invasive aspergillosis and 2 cases of co-infection with Mucorales and *Aspergillus* species. Fungal culture showed growth of Mucorales in 4 patients and *Aspergillus flavus* in one patient. The mean age of the patients was 58.0 ± 9.7 years, and 12 were male. Type 2 diabetes mellitus was a common additional risk factor in all the patients and the mean HbA1c was 9.9 ± 2.1. All patients except two had received corticosteroids as a part of their COVID-19 treatment. All patients except one had used steam inhalation for symptom relief for COVID-19 symptoms. The median duration between the diagnosis of COVID-19 and the diagnosis of CIFRS was 20 days (interquartile range: 16-27). All patients underwent emergency endoscopic sinus debridement surgery followed by antifungal medicines. Antifungals used included liposomal amphotericin B, amphotericin B deoxycholate and isavuconazole for mucormycosis patients while two patients with invasive aspergillosis were treated with isavuconazole. At the time of reporting one patient had expired while the others have shown clinical improvement.

Conclusion: The common risk factor for all cases of CIFRS was diabetes mellitus. Majority of patients also had history of steroid use and steam inhalation during their COVID-19 treatment. Their role in pathogenesis need to be ascertained by larger studies.

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Using Electron Microscopy to Detect SARS-CoV-2 in Human and Animal Tissues

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Purpose: Global efforts to combat the COVID-19 pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) have placed renewed focus on the use of transmission electron microscopy (EM) for infectious disease diagnosis and detection. Recently, attempts to identify SARS-CoV-2 directly in human autopsy and animal necropsy tissues have inaccurately identified normal subcellular structures, including coated vesicles, multivesicular bodies, and rough endoplasmic reticulum, as coronavirus particles. Working with SARS-CoV-2 positive autopsy and necropsy tissues, the Infectious Diseases Pathology Branch at CDC sought to use EM to accurately detect coronavirus particles.

Methods & Materials: Two sample types were used, formalin-fixed wet tissue and formalin-fixed paraffin embedded (FFPE) tissue blocks. Wet tissue samples provide the best preservation of ultrastructure but require a time-intensive search for viral particles. FFPE tissues enable a targeted approach to finding viral particles but with deteriorated ultrastructure. Areas of formalin-fixed wet tissue showing evident disease pathology were selected for EM, while areas of interest from FFPE blocks were selected based on results from SARS-CoV-2 immunohistochemistry and in situ hybridization results. All samples were post-fixed with 1% osmium tetroxide, en-bloc stained with uranyl acetate, dehydrated, and embedded in Epon-Araldite resin.

Results: A multifaceted approach for SARS-CoV-2 detection in autopsy and necropsy tissues allowed for swift and accurate determination of the localization of coronavirus and correlation of histopathological and ultrastructural features of SARS-CoV-2 infection. Coronavirus particles were found associated with degenerating cells in the alveolar space, in pneumocytes, and near collagen of the heart in fetal tissue as well as in the syncytiotrophoblast of the placenta. In animal tissues, virus was found in the bronchiolar epithelium and type 1 pneumocytes.

Conclusion: Comprehensive studies of SARS-CoV-2 infection, and all emerging pathogens, are crucial to improving the understanding of pathogenesis and for the formulation of clinical treatments and transmission prevention measures. An important part of this process is providing robust EM evidence of SARS-CoV-2 localization within tissues to ensure that misinterpretations of subcellular structures as virus are reduced, enabling more accurate conclusions concerning COVID-19 pathology and disease.

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