

An observational study on the epidemiology, risk factors, management and outcomes of COVID-19 associated mucormycosis in Imam Khomeini Hospital complex, Tehran, Iran

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Introduction:

Recently mucormycosis observed in patients with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) as coronavirus disease (COVID-19) and recognized throughout the world. To describe the epidemiology, management and outcome of individuals with mucormycosis; and to evaluate the risk factors associated with mortality.

The main objectives of this study were describe the epidemiology, risk factors, management, and outcome of individuals with COVID-19 associated mucormycosis (CAM).

Methods:

We conducted a prospective observational study involving consecutive individuals with proven mucormycosis in Imam Khomeini Hospital complex, Tehran, Iran.

The demographic profile, mycology diagnosis, predisposing factors, management and mortality of CAM cases were recorded and analysed. Mucorales were identified using by VITEK MS MALDI-TOF Mass Spectrometer. Microdilution testing was performed following the European Committee on Antimicrobial Susceptibility Testing (EUCAST) standard methodology.

Result:

Among the 150 CAM individuals enrolled, 59 (39.3%) were female. The median age was 55(16-84) years. The median duration of mucormycosis detection or suspicion was 21 days after COVID-19 diagnosis. Rhino-orbital mucormycosis was the most common presentation. The predisposing factors included diabetes mellitus (81/150, 54%), hypertension (36/150, 24%), and others. *Rhizopus oryzae* (97.5%) were the most common followed by *Rhizopus microsporus* (3.5%). Amphotericin B exhibited the lowest MICs (MIC range, 0.25 to 2 µg/ml; MIC50, 0.5 µg/ml), followed by posaconazole (MIC range, 0.016 to 16 µg/ml; MIC50, 2 µg/ml). Surgical treatment was performed in 2.6% of the participants. Amphotericin B was the primary therapy in all, and posaconazole was used as combination therapy with Amphotericin in 1.4% of individuals. The 90-day mortality rate was 26.6%.

Discussion & Conclusion:

CAM is a serious problem in Iran with high mortality and uncontrolled diabetes mellitus was the dominant risk factor in all forms. A combined medical and surgical management was associated with a better survival. The gaps in knowledge identified in the study need to be addressed urgently and effectively

Characteristics of survivors and non-survivors of CAM cases in Iran

		Total (n=150)	Survivors (n =110)	Non- survivors (n = 40)
Age, in years		55	50.5	61.5
Male sex		91	71	20
duration of mucormycosis detection or suspicion days after COVID-19		21	21	26
Hospital stay, days		26(2-150)	32.5	36
Individual predisposing factors	Diabetes mellitus	81	25	56
	hypertension	36	10	26
	Malignancy	4	1	3
	Chemotherapy	5	1	4
Site of mucormycosis	Rhino-orbital	150	110	40
	with brain involvement	5	3	2
Treatment	Complete Amphotericin B (2w)	33	23	19
	Incomplete Amphotericin (less than 2w)	57	38	19
	Amphotericin and posaconazole combination	2	0	2
Combined surgical and medical management		4	3	1