

INTRODUCTION / AIM

- Mucormycosis is a rare but serious fungal infection with high mortality and morbidity, infecting many locations.
- Immunocompromised individuals are known to be under risk.
- In the second wave of the COVID-19 pandemic: significant increase in the number of Mucormycosis cases reported, especially around India.
- Later defined: COVID-19 Associated Mucormycosis (CAM)
- Current need to define new guidelines for CAM prevention and treatment
- Literature gap: Few-meta-analyses; few IPD or regional

METHODOLOGY

- Systematic search on databases: PubMed, Scopus, ScienceDirect, Cochrane, CINAHL, and Ovid MEDLINE with the search terms "COVID-19" AND "mucormycosis" between Jan 1, 2019-Dec 31, 2021.
- Inclusion criteria for the studies:
 - presenting patients (>18 y.o.) who developed mucormycosis at the time of or after SARS-CoV-2 infection (CAM);
 - Presenting individual participant data (IPD)
- Additional studies and cases: citation chaining, contacting authors of studies presenting aggregate data for IPD, unpublished IPD from international collaborators
- Data extraction: >65 variables for each individual case
- Triple blind check for inclusion and data extraction
- Statistical analyses: Stata 16.0 software (Stata Corp, College Station, TX, USA)
 - chi-squared test, t-test, multivariate logistic regression

RESULTS



Fig.1 Global distribution of 556 COVID-19 associated mucormycosis cases from 154 studies.

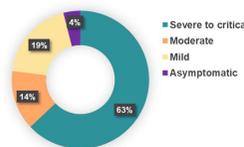


Fig.2 Severity distribution of COVID-19 in our CAM cases.

Underlying Conditions	% Survived	% Deceased	p value
DKA	44%	77%	***
Malignancy	42%	88%	***
Pulmonary Disease	42%	68%	**
Renal Disease	38%	61%	**
Neutropenia	43%	78%	*
Obesity	42%	86%	**

Table 1. Distribution between survived and deceased populations for significant comorbidities

- Top 3 countries reporting the most cases: India (60%), Egypt (11%), Iran (6%).
- Most common comorbidity was DM (77%), mostly uncontrolled DM (83%).
- Among the comorbidities, predictors of fatality were diabetic ketoacidosis, malignancy, pulmonary disease, renal disease, and neutropenia.
- Severe COVID-19 (63%), ICU admission (52%), mechanical ventilation (33%) were common and associated with higher mortality.
- Corticosteroid use for COVID-19 management (77%) was common but did not affect survival.
- Aspergillus coinfection and hospital-onset mucormycosis were also associated with higher mortality.

RESULTS

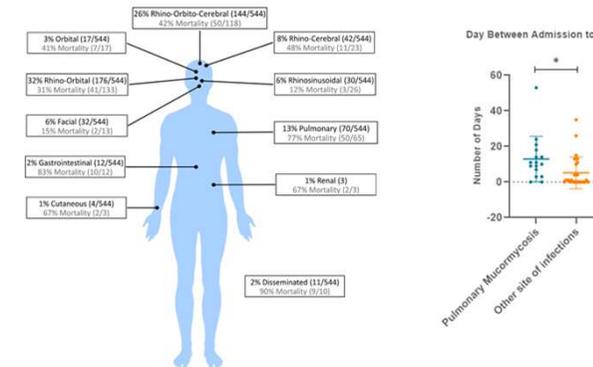


Fig.3 Infection site distribution and associated mortality rates of mucormycosis in CAM cases.

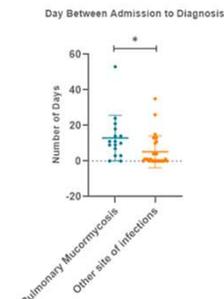


Fig.4 the diagnosis of pulmonary mucormycosis compared to other sites of infections

- The most common sites: ROM (32%), ROMC (26%) and pulmonary mucormycosis (13%). Pulmonary, gastrointestinal and disseminated mucormycosis were the most fatal sites.
- The diagnosis of pulmonary mucormycosis was significantly delayed.
- Combination therapy with antifungals and surgery was more successful than antifungals alone. Posaconazole users had higher survival rates while voriconazole and echinocandin users had lower survival rates.
- R. arrhizus was more common in diabetic patients while R. microsporus was more common in non-diabetic patients.

CONCLUSION

- Our study is the most comprehensive IPD-meta-analysis in the literature so far, including the MOST number of cases from all over the world, providing an insight into CAM from all aspects.
- We identified changing epidemiological information, novel mortality predictors, pathophysiological connections, treatment efficacies and shifting trends with COVID-19.