EDITORIAL

Pulmonary mucormycosis

Joy Wood

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ABSTRACT

The COVID-19 pandemic resulted in a large increase in the number of cases of mucormycosis, an uncommon opportunistic fungal illness. The prevalence of mucormycosis was observed to be 2.1 times higher than usual in India during the first wave of COVID-19. During the second wave, however, these figures skyrocketed, with over 28,000 cases recorded. The link between C-OVID-19 and mucormycosis is mostly unknown. Among the several hypotheses offered were: a protracted uncontrolled hyperglycemic condition, glucocorticoid-induced immunosuppression, hyperglycemia, and lymphopenia, viral-induced lymphopenia and endothelitis, elevated blood free iron levels (hyper-ferritinemic condition), and ketonemia and ketoacidosis, even in the absence of diabetic mellitus.

Key Words: *Pulmonary infiltrates.*

INTRODUCTION

The third most prevalent type of COVID-associated Mucormycosis is pulmonary mucormycosis. The angio-invasive and thrombotic characteristics of Covid-Associated Pulmonary Mucormycosis (CAPM) induce tissue necrosis. Because of this, the illness most usually manifests as massive cavitation in the lung parenchyma or, in certain cases, widespread pulmonary infiltrates [1]. Mucor, due to its invasive nature, can spread quickly to nearby tissues such as the pulmonary artery, generating pseudo aneurysms, hilar lymph nodes, mediastinum, and heart, and can sometimes diffuse haematogenously to other organs. A high level of suspicion is required, and the fungus should be actively searched for in sputum (poor yield) or, preferable, a bronchoscopically acquired sample from the affected lobe or in trans-thoracic tru-cut lung biopsy material [2].

Antifungal medication should be started as soon as there is a suspicion of infection, even before a formal diagnosis, for better therapeutic results. There is sufficient data in the literature to quantify and validate the advantages of initiating liposomal amphotericin-B treatment early in pulmonary mucormycosis.

The important components of pulmonary mucormycosis care include: 1) reversal of underlying risk factors such as hyperglycemia and/or steroid tapering, 2) appropriate antifungal medication, and 3) vigorous surgical resection. However, the clinical scenario in COVID-19 is so unusual and difficult that all three aspects of management are compromised. First, because corticosteroids are required, uncontrolled hyperglycemia is the norm rather than the exception in moderate and severe COVID-19 [3].

The underlying multi-organ failure, extensive lung infiltrates, and baseline oxygen need aggravate and exacerbate the present situation. Second, during the pandemic, all health-care institutions were inundated by COVID-19 patients, severely limiting the availability of necessary treatments such as anti-fungal drugs. Third, because this illness is uncommon, there were no clear-cut criteria for the scope and timing of the surgery. The majority of the researches described in CAPM were anecdotal case reports. As a result, information on the real incidence and variables influencing post-surgical complications, including death, was scarce in the literature.

Rather from being an alternative to antifungal medication, surgery is a supplement to it. However, definitive criteria for the size and time of surgical resection have never been established. The authors did, however, make a successful attempt at methodical care of pulmonary mucormycosis in the previously published surgical series in non-COVID pulmonary mucormycosis. The following were the key findings from the prior study: 1) Aggressive surgical resection should be conducted as soon as feasible with the goal of establishing clean margins; 2) Peri-operative anti-fungal medication is required. Several additional authors made similar recommendations. CAPM surgery is difficult owing to extensive pleural adhesions and complicated anatomical planes with major blood arteries. Because of the angio-invasive nature of the illness, pseudo-aneurysm of the pulmonary artery/branches (mycotic aneurysm) is not uncommon in pulmonary Mucormycosis [4]. All of these characteristics make it difficult to complete surgery using the Video-Assisted Thoracoscopic (VATS) approach, and open surgery is frequently necessary.

Editorial office, Journal of Chest and Lung Research, United Kingdom

Correspondence: Joy Wood, Editorial office, Journal of Chest and Lung Research, United Kingdom, e-mail: lungresearch@pulsusjournal.com

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Mortality in COVID-associated Mucormycosis was thought to be greater than in non-COVID patients due to all of these causes. A case series of CAPM in critical care settings is given in the current edition of Lung India, in which all patients were started on Liposomal Amp B but could not be operated on due to instability, significant disease, and fibrosis — a trait that appears to be specific to CAPM. However, data from the author's unpublished personal experience with 36 CAPM patients were extremely conflicting. Out of a total of 36 patients in this series, 25 received comprehensive management with intravenous liposomal amphotericin-B followed by aggressive surgical resection, while the remaining 11 received intravenous liposomal amphotericin alone due to extensive bilateral multi-lobar involvement or extensive mediastinal involvement.

All 11 patients died within two weeks after starting antifungal medication, indicating that mortality was 100%. However, peri-operative mortality was 20% in the surgical cohort. Furthermore, post-operative complications and death were not different in CAPM and non-COVID PM. This can be explained by 1) previous surgical experience with a large number of pulmonary Mucormycosis patients; 2) adhering to time-proven and successful institutional guidelines for the management of this complex situation; and 3) proper patient selection, as well as robust anesthesia and critical care support. To summarize, pulmonary Mucormycosis is an opportunistic, deadly fungal infection that provided a significant treatment challenge for doctors in COVID-19 patients [5].

A high level of suspicion is required for early diagnosis, and antifungals should be begun at the first sign of suspicion, even before the diagnosis is confirmed. When possible, aggressive surgical resection with clean margins should be provided, as antifungal medication alone will produce suboptimal results. To promote long-term survival, surgical resection should be combined with peri-operative anti-fungal medication.

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