Mucormycosis in Lung Transplant Recipients: A Systematic Review

Ori Wand MD[1], Avraham Unterman MD[1], Osnat Shtraichman MD[1], Shimon Izhakian MD[1], Ludmila Fridel MD[1], Mordechai R Kramer MD[1]

Rabin Medical Center, Petach Tikva, ISRAEL

INTRODUCTION

Mucormycosis is a rare fungal infection in lung transplant recipients (LTR). The clinical presentation and optimal management of this frequently lethal infection are based mostly on small case series and case reports.

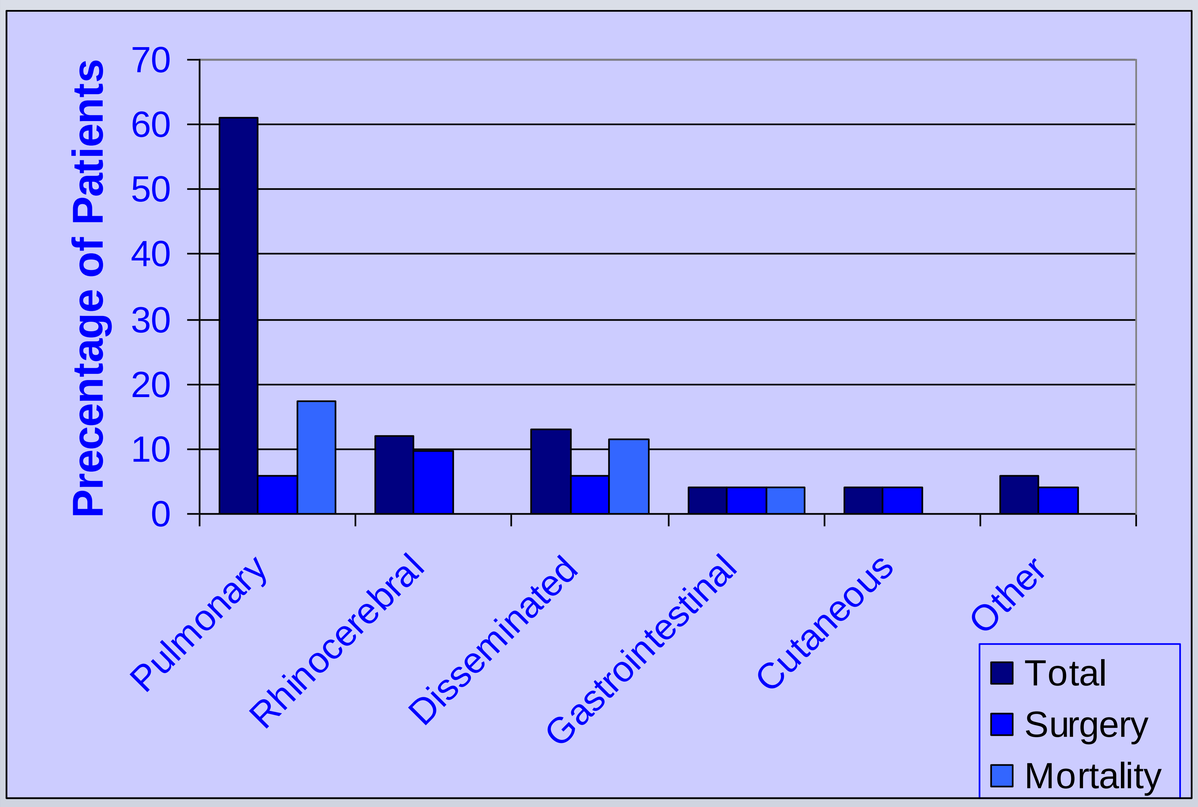
METHODS

A systematic review of the literature from January 1981 to May 2017 was performed to identify all published cases of mucormycosis in LTR. These cases were analyzed together with a case series from our LTR clinic.

RESULTS

The literature search yielded 42 articles matching the inclusion criteria, describing 106 cases. Our series included additional 6 cases from our LTR clinic. Detailed information regarding the infection site and outcome was available for 52 of these cases. Timing of the infection varied from the immediate post-operative period and up to 11.5 years post-transplantation. Most cases (78%) developed in the first post-transplant years, with 41% of them developing in the first month. The lungs were the most common site of infection (61%) followed by disseminated infection (13%) and rhino-cerebral disease (12%). Additional risk factors for mucormycosis were identified in over half of the patients, and included diabetes, chronic kidney disease, treatment with high-dose corticosteroids, and recent diagnoses of acute graft rejection or post-transplantation lympho-proliferative disease. Diagnosis was mostly established by culture and histological findings, while molecular studies (PCR) supported the diagnosis in only 6 cases. Surgical debridement was required for 5/6 patients with rhino-cerebral disease, all of which were cured, but was uncommon for pulmonary disease (3 of 32 patients). Posaconazole therapy was used in 35% of cases and associated with high success rates. Overall mortality was 33% and was related to the site of infection

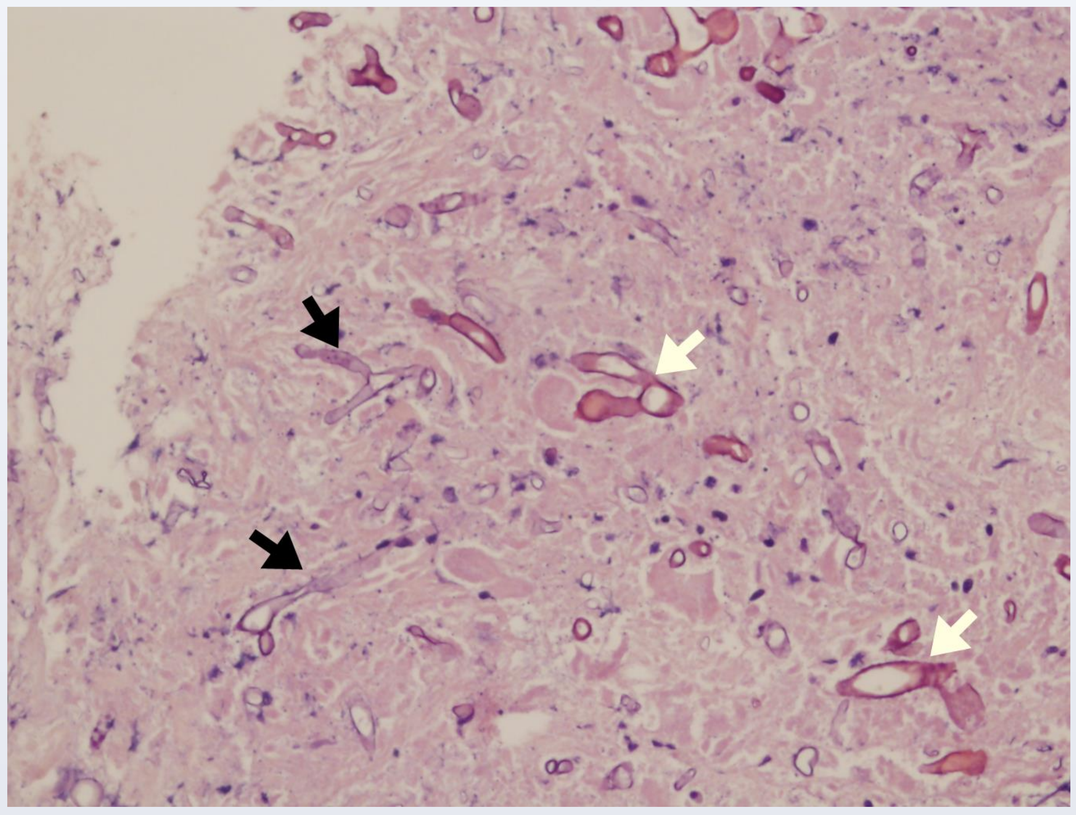
Figure 2: patient outcome according to infection site



The figure shows the distribution of different infection sites, the proportion of patients that underwent surgery as part of their therapy, and mortality rates. All data are shown as percentage from total (N=52).

RESULTS

Figure 1: Lung biopsy specimen



A hematoxilin and Eosin (H&E) stained lung tissue specimen obtained by percutaneous biopsy from a LTR patient with mucormycosis and aspergillosis co-infection. Both thin, branching hyphase with frequent septations consistent with *Aspergillus* (black arrows), as well as broad, non-septate hyphae compatible with *Mucor* (white arrows) are visible.

Table: Primary antifungal therapy and related mortality

Treatment	N (%)	Mortality N (%)
AmpB	20 (50)	7 (35)
Posaconazole	4 (10)	1 (25)
AmpB+posaconazole	10 (25)	2 (20)
Other	2 (5)	0
None	2 (5)	2 (100)
NA	1 (2.5)	1 (100)
Total	**40**	**13 (32.5)**

AmpB, amphotericin B based formulation

Conclusions

Mucromycosis is infrequently reported in LTR and tends to be an early post-operative infection. It is commonly associated with additional risk factors and states of intensified immunosupression. The lungs are the most commonly affected site of disease, and surgery is rarely feasible in pulmonary infection, and may be unnecessary in many cases. An aggressive and invasive diagnostic approach is essential, and molecular diagnostic assays can facilitate diagnosis. The role of posaconazole as first-line therapy should be further explored.

Corresponding author: Mordechai R. Kramer Kramerm@clalit.org.il