

# Pre-transplant Fungal Colonization and Outcomes in Lung Transplant Recipients

**Author:** \*William W. Mangin<sup>1</sup>

1. Mayo Clinic, Rochester, Minnesota, USA  
\*Correspondence to [drwmangin@gmail.com](mailto:drwmangin@gmail.com)

**Disclosure:** The author has declared no conflicts of interest.

**Keywords:** *Aspergillus*, fungal colonization, fungal infection, lung transplantation, outcomes.

**Citation:** Respir AMJ. 2026;4[1]:80-81.  
<https://doi.org/10.33590/respiramj/6MR93OD1>

## BACKGROUND AND AIMS

Pre-transplant respiratory tract colonization with *Aspergillus* species has been associated with an increased incidence of invasive aspergillosis after lung transplant in certain transplant populations.<sup>1</sup> Although less common, diagnoses of invasive infections by other non-*Aspergillus* fungal species are increasing.<sup>1,2</sup> Despite this increased recognition of rarer infections from species such as *Alternaria*, *Cladosporium*, *Fusarium*, *Lomentospora*, *Mucorales*, *Scedosporium*, and others, how pre-transplant colonization with these organisms influences post-transplant outcomes is unknown.

## MATERIALS AND METHODS

This was a multicenter, retrospective cohort study of all adult bilateral lung transplant recipients at Mayo Clinic sites in Rochester, Minnesota, and Jacksonville, Florida, USA, between January 1, 2016–December 31, 2024.<sup>3</sup> Patients with pre-transplant respiratory tract fungal colonization were compared to those without colonization. Exclusion criteria included previous organ transplantation and multi-organ transplantation. Fungal colonization was defined as positive respiratory fungal

culture(s) in asymptomatic patients without evidence of infection. Only fungal cultures that were speciated were included. *Candida* species and *Penicillium* species were not included in analysis. The primary outcome was severe post-transplant invasive fungal infection (IFI), which was defined as proven or probable IFI (based on European Organization for Research and Treatment of Cancer/Mycoses Study Group [EORTC/MSG] criteria) that required subsequent hospitalization or additional procedures.<sup>4</sup> Baseline characteristics were summarized using descriptive statistics (medians with interquartile ranges or counts with percentages) and groups were compared using standardized mean differences. Unadjusted risk ratios (RR) with 95% CIs were used to analyze associations with post-transplant infection and mortality (Table 1).

## RESULTS

Four hundred and forty-nine patients were included in the author's analysis. In total, 83 patients (18.5%) had pre-transplant fungal respiratory tract colonization, 45 (10%) colonized with *Aspergillus* species and 38 (8.5%) with non-*Aspergillus* species. Nineteen of the 45 patients with *Aspergillus* colonization were also colonized with at least one non-*Aspergillus* species. Three hundred and sixty-six patients did not have pre-transplant colonization. The most common pre-transplant fungal species were *Cladosporium* (28), *Alternaria* (15), and *Fusarium* (14). Other fungal species included *Scapulariopsis* (three), *Rhizopus* (two), and *Scedosporium* (two). The two cohorts primarily differed in indication for transplant, with a higher percentage of patients with muco-obstructive disease in the colonization group. A total of four patients (4.8%) in the fungal colonization cohort developed severe

**Table 1: Association between pre-transplant fungal colonization and any post-transplant fungal infection.**

Outcome	Pre-TX fungal colonization (N=83)	No pre-TX fungal colonization (N=366)	Risk ratio (95% CI)
Any post-TX fungal infection, n (%)	4 (4.8%)	13 (3.6%)	1.36 (0.45–4.06)
Post-TX <i>Aspergillus</i> infection, n (%)	2 (2.4%)	11 (3.0%)	0.80 (0.18–3.55)
Death, n (%)	17 (20.5%)	101 (27.6%)	0.74 (0.47–1.17)

TX: transplant.

fungal infection post-transplant. Fungal species differed pre- and post-transplant in all cases, with none of the species of colonizers being a causative organism in any of the post-transplant infections. There was no significant association between pre-transplant colonization and severe post-transplant fungal infection (RR: 1.36 [0.45–4.06]), severe post-transplant *Aspergillus* infection (RR: 0.08 [0.18–3.55]), or unadjusted mortality (RR: 0.74 [0.47–1.17]).

## CONCLUSION

Previous studies showing an increased risk of post-transplant aspergillosis in patients with cystic fibrosis could be explained by their sinus involvement, and thus lung transplantation potentially did not remove all sites of fungal airway colonization. The results of this study show that pre-transplant fungal colonization is not associated with severe post-transplant IFIs in the author's cohort of bilateral lung

transplant recipients. Although limited by the retrospective nature of the study and low incidence of the primary outcome, the author's results do add supporting evidence to the idea that airway fungal colonization should not be a reason to preclude patients from undergoing lung transplantation.

## References

1. Luong ML et al. Pretransplant *Aspergillus* colonization of cystic fibrosis patients and the incidence of post-lung transplant invasive aspergillosis. *Transplantation*. 2014;97(3):351-7.
2. Hoenigl M et al. Global guideline for the diagnosis and management of rare mould infections: an initiative of the European Confederation of Medical Mycology in cooperation with the International Society for Human and Animal Mycology and the American Society for Microbiology. *Lancet Infect Dis*. 2021;21(8):e246-57.
3. Mangin WW et al. Pre-transplant fungal colonization and outcomes in lung transplant recipients. Poster Board 920. ATS International Conference, May 15-20, 2026.
4. Donnelly JP et al. Revision and update of the consensus definitions of invasive fungal disease from the European Organization for Research and Treatment of Cancer and the Mycoses Study Group Education and Research Consortium. *Clin Infect Dis*. 2019;71(6):1367-76.