

Challenges of Nontuberculous Mycobacterial Infections in Lung Transplantation

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DESCRIPTION

Lung transplantation is a life-saving procedure for patients with end-stage lung disease, offering a chance for extended survival and improved quality of life. However, the presence of Nontuberculous Mycobacterial (NTM) infections poses a significant challenge to successful lung transplantation. NTM infections, caused by a group of mycobacteria other than *Mycobacterium tuberculosis*, have become increasingly recognized as major complications in transplant patients. These infections can hinder transplant eligibility, complicate post-transplant care, and impact overall outcomes. NTM are environmental bacteria found in soil, water, and dust. The most common species implicated in lung infections include *Mycobacterium avium*, *Mycobacterium abscessus*, *Mycobacterium kansasii*, and *Mycobacterium marinum*. NTM infections can cause a range of pulmonary diseases, from localized nodular lesions to widespread, diffuse lung disease that mimics or exacerbates chronic lung conditions such as Chronic Obstructive Pulmonary Disease (COPD) and cystic fibrosis.

NTM infection as a barrier to lung transplantation

Pre-transplant challenges: The presence of an active NTM infection can exclude patients from being considered for lung transplantation. Transplant centres typically require that any infectious disease, including NTM, be adequately treated and under control before listing a patient for transplantation. Persistent or treatment-resistant NTM infections can therefore delay or prevent the opportunity for transplantation. Diagnosing NTM infections can be challenging, involving complex microbiological tests and imaging studies. The diagnosis often requires differentiation from other lung conditions, which can be especially difficult in patients with existing lung pathology. Delays in diagnosis and treatment can further complicate the patient's overall management.

Post-transplant complications: Even if a patient with NTM is successfully treated before transplantation, there is a risk of infection recurrence after the transplant. The immunosuppressive

therapy required to prevent organ rejection can inadvertently promote the reactivation or exacerbation of NTM infections. Post-transplant patients are on immunosuppressive medications to prevent organ rejection. These drugs reduce the patient's ability to fight infections, making them more susceptible to NTM and other opportunistic pathogens. Managing NTM infections in immunocompromised individuals is challenging and requires a careful balance of antimicrobial therapy and immunosuppressive management. NTM infections often require prolonged and complex antibiotic regimens, which can be difficult to manage in the context of post-transplant care. Drug interactions with immunosuppressive medications and the potential for side effects complicate treatment regimens and can affect patient adherence and outcomes.

Strategies for managing NTM in lung transplantation

Pre-transplant screening and treatment: Comprehensive pre-transplant evaluation should include screening for NTM infections, especially in patients with risk factors such as chronic lung disease or a history of exposure to environmental sources of NTM. Effective pre-transplant treatment and eradication of NTM infections are crucial for optimizing transplant outcomes.

Post-transplant monitoring: Vigilant monitoring for NTM infections post-transplant is essential. Regular surveillance through clinical assessment, imaging studies, and microbiological testing can help detect infections early and manage them promptly.

Multidisciplinary care: Managing NTM infections in transplant patients requires a multidisciplinary approach involving pulmonologists, infectious disease specialists, and transplant surgeons. Collaborative care ensures comprehensive management of both the infectious and transplant-related aspects of patient care.

Increased morbidity and mortality: Patients with NTM infections may experience higher rates of postoperative complications, including graft failure and increased mortality. The presence of

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active or chronic NTM infections can impact lung function, increase the risk of graft rejection, and lead to poorer overall outcomes.

Quality of life: The chronic nature of NTM infections and the need for ongoing treatment can affect the patient's quality of life. Persistent symptoms and the burden of managing complex medication regimens can impact physical and psychological well-being.

CONCLUSION

Nontuberculous mycobacterial infections present a significant barrier to successful lung transplantation. The challenges of

diagnosing, treating, and managing NTM infections in the context of pre- and post-transplant care can impact patient eligibility, transplant outcomes, and overall quality of life. Addressing these challenges through improved screening, treatment strategies, and multidisciplinary care is essential for optimizing lung transplant success and improving the lives of patients with end-stage lung disease. These infections are often difficult to diagnose and treat due to the slow-growing nature of NTM and their intrinsic resistance to many antibiotics. In patients with pre-existing lung disease, NTM can accelerate disease progression, further complicating the clinical picture and posing additional risks during and after lung transplantation.