

Lung Transplantation in a Multidrug-Resistant Gram-Negative *Acinetobacter Baumannii*-Colonized Patient: A Case Report

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Abstract

Keywords

- ▶ lung transplantation
- ▶ α -1-antitrypsin deficiency
- ▶ Multidrug-resistant *Acinetobacter baumannii*

Colonization or infection with various pathogens is frequently found in patients listed for lung transplantation. We describe a case of a 50-year-old woman with α -1-antitrypsin deficiency, which was listed for double-lung transplantation, with multidrug-resistant gram-negative *Acinetobacter baumannii* (MRGN4-Ab) skin colonization. Transplantation was successfully performed. Colistin (Polymyxine E) was administered intravenously and through inhalation in the first month. MRGN4-Ab was still detectable in skin swabs without evidence of infection. After good recovery and clinical inapparence, the patient was discharged 2 months after transplantation.

Introduction

In the past years, incidence of multiresistant pathogens increased, aggravating pre- and posttransplantation management and outcome of patients waiting for life-saving organ transplantation or even prohibiting transplantation.^{1,2}

Multidrug-resistant gram-negative *Acinetobacter baumannii* (MRGN4-Ab) is defined as acquired nonsusceptibility to at least one agent in three or more antimicrobial categories.² So far, little is known about preoperative colonization or infection with *A. baumannii*, notably if multiresistant and/or carbapenem resistant; therefore, it has an unclear influence on transplantation outcome.³ Most case reports published to date addressed to *A. baumannii* infections are related to posttransplantation-acquired infections, including donor-recipient transmission, often associated with severe courses and high mortality.^{3–8}

In this report, the pre- and postoperative management of a 50-year-old patient with α -1-antitrypsin deficiency, who was listed for double-lung transplantation, with MRGN4-Ab skin colonization is presented.

Case Description

A 50-year-old woman, with a long history of pulmonary disease due to α -1-antitrypsin deficiency and chronic pulmonary obstruction, was admitted to the hospital with respiratory failure caused by acute infectious exacerbation. The patient was listed for double-lung transplantation before. Hypercapnia necessitated admittance to intensive care unit (ICU) for passive interventional lung assist (iLA) therapy and high-flow ventilation. After 2 weeks, the patient was stabilized; iLA and mechanical ventilation could be weaned. Primarily improved clinical condition impaired again and the patient was readmitted to ICU and iLA therapy was restarted.

By this time, outbreak of MRGN4-Ab was detected at our hospital. Routine screening swabs revealed skin colonization with MRGN4-Ab in our patient. Antimicrobial susceptibility was determined; MRGN4-Ab isolates were susceptible to colistin (polymyxin E), intermediate to carbapenems, and resistant to all other tested antimicrobial agents. Dealing with colonization or infections of such multidrug-resistant pathogens before transplantation remained unclear, and

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literature revealed no groundbreaking decision support. Therefore, this issue was extensively discussed in our interdisciplinary transplant conference and with official national and international institutions (i.e., medical societies, Eurotransplant, German Organ Transplantation Foundation, German Medical Association). Ultimately, the colonization was not considered as a contraindication for lung transplantation, since there were no signs for infection with this multidrug-resistant pathogen and considering the patient's worsening clinical situation.

The patient could successfully be double-lung transplanted. The initial need for further assisted ventilation or oxygen insufflation could be weaned off in the first month after transplantation. Colistin was administered intravenously (3 Mio IE three times a day) and through inhalation (1 Mio IE twice a day) in first month after transplantation and was combined with a carbapenem, like previously reported for MRGN4-Ab infections after transplantation.⁹ Immunosuppressive therapy was based on a triple-drug regimen, namely, a calcineurin inhibitor (cyclosporine), mycophenolate mofetil, and a corticosteroid according to our institutional standard protocol. Inflammatory markers remained low and there were no signs for organ rejection. Initial required hemodialysis could be stopped after colistin therapy was discontinued and re-improvement of renal function.

MRGN4-Ab was once detectable in catheter urine probe, therefore additional Colistin was administered intravesically. MRGN4-Ab was still detectable in skin swabs without evidence of systemic infection. After good recovery, adequate wound healing, and clinically inapparence, the patient could be moved to a transplant-specialized rehab clinic 2 months after transplantation.

Conclusion

Colonization or infection with various pathogens can frequently be found in patients listed for lung transplantation. Known risk factors are long-term admittance to ICU, immunosuppression, mechanical ventilation, and multiple applications of broad-spectrum antibiotics.³ Patients on the waiting list prior to transplantation are also often hospitalized and are thus at high risk for nosocomial infections. So far, little is known about regimen and outcome of multidrug-resistant colonization or infection in patients requiring solid organ transplantation.

Nosocomial outbreaks of *A. baumannii* is an emerging cause for health care-associated infections.¹ The most common site of *A. baumannii* infections after solid and nonsolid organ transplantation in the respiratory tract.^{4,5} Optimal treatment regimens are so far unknown and limited due to multidrug resistance. Appropriate antimicrobial therapy therefore can lower mortality even in transplanted patients.⁸ Manifestation of resistance pattern influences therapeutic

regimens and outcome of the patients. Carbapenem resistance was not associated with a higher mortality in liver- and kidney-transplanted patients.⁸ Beside one case report of a heart transplant recipient, whereas *A. baumannii* infection was detected 4 days after transplantation in a recipient's prior collected sample, *A. baumannii* infections in transplantation are up to date only reported after organ transplantation. In that patient therapy contained colistin combined with teicoplanin and tigecycline.⁴ The patient could be discharged and was alive at the 9-month follow-up.

In our case, *A. baumannii* was detected 4 weeks before transplantation. The patient could successfully be transplanted. Colistin was administered intravenous and through inhalation, and was combined with a carbapenem and a standard immunosuppressive therapy. Inflammatory markers remained low and there were no signs for organ rejection.

In conclusion, our case illustrates that lung transplantation in patients colonized with multidrug-resistant pathogens can be feasible in the presence of preemptive individualized antibiotic treatment.

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