

Inhaled Pentamidine For *Pneumocystis jiroveci* Prophylaxis in a Heart Transplant Recipient With Allergy for Trimethoprim Sulfamethoxazole

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Abstract

Pneumocystis jiroveci is an important cause of mortality and morbidity among heart transplant recipients. This raises the question of prophylactic treatment for this infection. Trimethoprim-sulfamethoxazole is commonly used in *P. jiroveci* pneumonia prophylaxis with mild to severe adverse effects. We present the use of inhaled pentamidine as *P. jiroveci* prophylaxis in a patient with an allergy to trimethoprim sulfamethoxazole.

Key words: Pentamidine, Heart transplantation, *Pneumocystis carinii*, *Pneumocystis jiroveci*

Introduction

Infection is the most-common cause of death in heart transplant patients.^{1, 2} Among these, *P. jiroveci* (*P. carinii* renamed as *P. jiroveci*, PneumoCystisPenumonia) is a significant cause of mortality and morbidity for heart transplant recipients. Mortality rates as much as 34% have been reported in the literature.³ This raises the question of considering prophylactic treatment for this infection. Trimethoprim sulfamethoxazole is commonly used in as PneumoCystisPenumonia prophylaxis. We present the use of inhaled pentamidine as PneumoCystisPenumonia prophylaxis in a patient who is allergic to trimethoprim sulfamethoxazole.

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Case Report

A 59-year-old man who was followed-up for ischemic cardiomyopathy underwent an orthotopic heart transplantation. Postoperative immunosuppression included cyclosporine, prednisolone, and mycophenolate sodium. The patient made an uncomplicated recovery and was discharged 21 days after surgery. According to the previous anamnesis, he presented with a diffuse allergic skin rash and severe pruritus after administration of trimethoprim sulfamethoxazole.

Trimethoprim sulfamethoxazole is not an appropriate choice for *Pneumocystis jiroveci* prophylaxis; instead, monthly pentamidine 300 mg (diluted in 6 mL H₂O) via a nebulizer (Respirgard-II, Marquest, Englewood, CO, USA) was used. Monthly postoperative follow-up did not reveal any clinical, laboratory, or radiographic findings compatible with PneumoCystisPenumonia. The therapy was well-tolerated by the patient, and no allergic symptoms occurred during treatment.

Discussion

Infections caused by *Pneumocystis jiroveci* are the most-significant causes of postoperative mortality and morbidity in heart transplant patients.^{1, 2} *Pneumocystis jiroveci* is an opportunistic pathogen. It is found in the healthy population and does not cause pathology.⁴ The classic hypothesis made for *Pneumocystis jiroveci* is that it remains latent in the lungs after a primary infection and causes PneumoCystisPenumonia in immunosuppressed individuals. Detecting persistently high levels of antigens of this pathogen in the early years of, and throughout the lives of healthy individuals, supports this hypothesis.⁵ Conversely, various studies have

shown that the lungs are completely free of PneumoCystisPenumonia within a year of infection.⁶ Another study on PneumoCystisPenumonia in heart transplant patients revealed that infection in these patients originated from exogenous *Pneumocystis jiroveci* infection.⁷ Independent of whether this pathogen is due to a latent infection or an exogenous source, prophylaxis of this patient group is essential. Trimethoprim sulfamethoxazole is the most-common antibiotic for PneumoCystisPenumonia prophylaxis. The efficiency and reliability of trimethoprim sulfamethoxazole has been shown by many studies.⁸ Pentamidine is the second-line antibiotic in cases where trimethoprim sulfamethoxazole cannot be used. Although there are many studies on the use of pentamidine in *Pneumocystis jiroveci* prophylaxis (which can be administered parenterally and by inhalation) in various cases of immunosuppression, there is limited knowledge on its prophylactic use after heart transplant.

Many adverse effects of trimethoprim sulfamethoxazole have been reported.^{9, 10} In cases where adverse effects are seen, as in our case, pentamidine is the second-line choice of drug.¹¹⁻¹³ Treatment with pentamidine appears to be effective but has some disadvantages (eg, medical and nursing supervision because of the use of bronchodilators before inhalation of pentamidine in some patients and increased cost as a result of prolonged hospital stay and medications).¹³ As our knowledge on the use of pentamidine in PneumoCystisPenumonia prophylaxis in heart transplant patients is limited, the dosage and mode of delivery was extrapolated from its use in cases of immunosuppression with other underlying causes.^{14, 15} Inhaled pentamidine used as PneumoCystisPenumonia prophylaxis in bone marrow and solid-organ transplant recipient is a single monthly aerosol dose (300 mcg/single monthly dose).^{13, 16} This single monthly dosage regimen for pentamidine appears equally effective as a 2-dose regimen via other nebulizers (System 32 Mizer).¹³

Conclusions

We presented the use of aerosol pentamidine for PneumoCystisPenumonia prophylaxis in heart transplant patients in which trimethoprim

sulfamethoxazole was not tolerated. During follow-up, there were no clinical findings compatible with *Pneumocystis jiroveci* infection. Studies have proven the efficacy of using aerosol pentamidine as PneumoCystisPenumonia prophylaxis in immuno-suppressed patients as a cause other than a heart transplant, in whom trimethoprim sulfamethoxazole is contraindicated. We believe that aerosol pentamidine also can be used for the same purpose equally as safely in heart transplant recipients.

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