Moxifloxacin-associated Neutropenia in a Patient Planned for Renal Transplantation

Incidence of tuberculosis (TB) in patients on maintenance hemodialysis (MHD) and in renal transplant (RT) recipients is 10–15%. Rifampicin-based antitubercular therapy is the standard of care for the management of TB across the world. However, rifampicin is generally avoided in transplant recipients because of significant interaction with calcineurin inhibitors, thereby increasing the cost of therapy, sub therapeutic drug levels, and risk of rejection. In MHD patients, rifampicin is associated with accelerated hypertension due to drug interaction through cytochrome P450 enzymes, and therefore, is often avoided in certain situation.[1] Therefore, in these situations, fluoroquinolone is mostly used in place of rifampicin. Moxifloxacin is a common broad-spectrum fluoroquinolone used for the management of respiratory infections and is generally considered safe and well-tolerated. In view of good efficacy against *Mycobacterium*, moxifloxacin is used in these patients

Table 1: Prior reported cases with moxifloxacin-associated neutropenia

Author	Patient (Age/ Sex) in years	Diagnosis	Comorbidity	Day of onset of neutropenia	No. of days for recovery after drug cessation
Chang *et al*.[2]	77/F	Cellulitis	Cirrhosis	Day 5	2 days
Berk *et al*.[3]	32/F	Lobar pneumonia	Breast carcinoma	Day 2	4 days
Chen *et al*.[4]	76/M	CAP	None	Day 3	2 days

CAP: Community acquired pneumonia, F: Female, M: Male

as part of antituberculosis therapy. The adverse effects reported, in general, are predominantly gastrointestinal or central nervous system effects with reports of QTc prolongation, phototoxicity, and tendinopathy. There are no characteristic hematological adverse events described. Here, we report a patient on MHD who developed neutropenia following moxifloxacin-based antituberculosis therapy (ATT).

A 30-year-old male patient with end-stage renal disease (ESRD) on MHD for 1 year was initiated on an intensive phase of ATT with isoniazid, rifampicin, pyrazinamide, and ethambutol for disseminated TB. The patient responded clinically, and following completion of intensive phase of therapy, he was shifted to a maintenance phase with isoniazid and moxifloxacin, as he was planned for live-related RT in few days. Routine blood investigation done after 5 days of changing ATT, revealed significant leucopenia (2×10^9/L) with neutropenia (0.8×10^9/L). He was otherwise asymptomatic and was not on any other medication, which could explain his cytopenia. Peripheral smear examination was normal, and bone marrow examination was also normal. As the only change in medication was the introduction of moxifloxacin and there were sporadic reports of moxifloxacin-induced neutropenia, moxifloxacin was stopped. He was placed on neutropenic precautions, and his leukopenia resolved over the next 4 days. Patient was then started on levofloxacin, which he tolerated well; he underwent RT after 2 weeks. He did not have recurrence of cytopenia and completed 1-year ATT therapy following RT.

Our patient had findings consistent with moxifloxacin-induced neutropenia. All the three cases which have been reported earlier also had similar presentation[2-4] [Table 1]. Though reports of ciprofloxacin and norfloxacin-induced neutropenia are available, we could not find any report of cytopenia following levofloxacin administration. We also performed a bone marrow evaluation in our patient to rule out any other cause, which was not done in the earlier reports. The rapid onset as well as recovery of neutropenia after stoppage of moxifloxacin suggests the possibility of hypersensitivity reactions.[5] However, the absence of skin eruptions and systemic symptoms makes type-1 hypersensitivity reactions unlikely. Whether a prior drug exposure results in an antibody-mediated reaction needs to be studied further.[5,6] Recovery from cytopenia is complete and starts as soon as the offending drug is stopped. The drugs commonly responsible for cytopenia are penicillin, β-lactam antibiotics, carbamazepine, valproate, clozapine, and propylthiouracil. Nevertheless, fluoroquinolone-induced neutropenia is also reported, though uncommonly.

Moxifloxacin-induced neutropenia is an unusual yet potentially serious adverse effect. It has to be considered in all patients with cytopenia in whom moxifloxacin was recently introduced and may be of significance in RT recipients who have multiple other etiologic factors for cytopenia, and are more likely to receive moxifloxacin as a part of the ATT regimen. Early discontinuation of the drug results in prompt resolution of neutropenia.

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Conflicts of interest

There are no conflicts of interest.

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