Tenofovir Induced Nephrotoxicity in HIV-Infected Patients at Maharaj Nakorn Chiang Mai Hospital

Jiraporn Chirayucharoensak¹  Romanee Chaiwarith²
Kajohnsak Noppakun³

¹Department of Medicine, Faculty of Medicine, Chiang Mai University, Chiang Mai 50200, Thailand,
²Division of Infectious Disease, Department of Medicine, Faculty of Medicine, Chiang Mai University, Chiang Mai 50200, Thailand,
³Division of Nephrology Disease, Department of Medicine, Faculty of Medicine, Chiang Mai University, Chiang Mai 50200, Thailand

Background: Due to less toxicity than thymidine analogue, tenofovir disoproxil fumarate (TDF) is commonly used as first-line nucleoside/nucleotide reverse transcriptase inhibitor (NRTI) together with emtricitabine/lamivudine plus a third agent.

Objective: This study aimed to determine the incidence and risk factors of TDF-induced nephrotoxicity in HIV-infected patients.

Methods: A retrospective study was conducted among 367 randomly selected HIV-infected patients at the Maharaj Nakorn Chiang Mai Hospital. Patients aged 18 years or older, receiving TDF for at least 6 months, and not receiving indinavir or atazanavir were enrolled. Nephrotoxicity was defined as either 1) acute kidney injury (creatinine rising of 0.3 mg/dL from baseline) or 2) tubulopathy (defined as presence of urine sugar while blood sugar < 180 mg/dL or serum potassium < 3.5 mEq/L and bicarbonate < 20 mEq/L and anion gap < 12 mEq/L). Whereas, those values were normal at baseline.

Results: Of 367 patients, 167 were male (45.5%), mean age 42.4 years (SD 8.6). The cumulative incidence of TDF-induced nephrotoxicity was 30.8% (113 patients), including 17 patients (4.6%) with both acute kidney injury and tubulopathy, 76 patients (20.7%) with acute kidney injury/without tubulopathy, and 20 patients (5.4%) with tubulopathy/without acute kidney injury. The incidence of acute kidney injury and tubulopathy was 2.01 and 0.7/100 person-months, respectively. Median time to develop acute kidney injury and tubulopathy was both 24 weeks (IQR 12, 36 weeks and IQR 18, 36 weeks, respectively). The factor associated with acute kidney injury was male (HR 2.13, 95% CI 1.40, 3.23). Whilst, factors associated with tubulopathy included age older than 50 years (HR 2.32, 95% CI 1.18, 4.58) and male (HR 2.21, 95% CI 1.12, 4.38).

Conclusion: The incidence of TDF-induced acute kidney injury is far more common than tubulopathy. The median time to develop nephrotoxicity is 6 months. Monitoring kidney function and damage in HIV-infected adults receiving TDF particularly in the first year of treatment is recommended.

Keywords: Tenofovir, Nephrotoxicity, Chiang Mai Hospital