

Renal Disease in Persons Infected with Human Immunodeficiency Virus in Korea

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Over the last two decades, the rapid advances made in the development and implementation of combination antiretroviral therapy (CART) has led to substantial reductions in human immunodeficiency virus (HIV)-associated morbidity and mortality, changing the diagnosis from a potential death sentence to a manageable chronic illness [1]. The advent of CART has also affected the distribution of morbidities among patients with HIV infection. Many cohort studies conducted in developed countries have demonstrated that non-Acquired Immunodeficiency Syndrome (AIDS) complications such as kidney, liver, bone, and cardiac diseases have largely replaced opportunistic infections as the leading causes of morbidities in patients with HIV infection [2]. The distribution of non-AIDS complications among patients with HIV infection may differ between countries because of variations in the underlying characteristics of the affected patients, such as the ethnic distribution, primary mode of infection, co-infection with hepatitis B and C viruses (HBV and HCV), adherence to medication, and availability of antiretroviral drugs.

A number of renal abnormalities have been described in patients with HIV infection, including a specific HIV-related nephropathy. The prevalence and incidence of renal dysfunction

are higher in patients with HIV infection than in the general population, and kidney disease in patients with HIV infection is associated with poor outcomes including increased mortality [3]. The etiology of chronic kidney disease (CKD) in patients with HIV ranges from HIV-independent disorders (*e.g.* hypertension, diabetes, and incomplete recovery from an episode of acute kidney injury) to HIV-related disorders, including HIV-associated nephropathy and HIV immune complex kidney disease [4]. Risk factors for incident or progressive CKD in HIV-positive adults include HCV co-infection, low CD4 cell count, high HIV viral load, and traditional CKD risk factors such as diabetes and hypertension. Moreover, many drugs used to treat HIV infection and its associated opportunistic infections are nephrotoxic. Tenofovir can cause Fanconi syndrome, and indinavir can cause intratubular obstruction by crystal formation. Boosted protease inhibitors have also been associated with estimated glomerular filtration rate (GFR) decline or decreased GFR, while CART, in general, appears to slow the rate of renal function decline.

The prevalence of CKD associated with HIV infection varies according to the population studied and the definition of CKD used. The reported prevalence of CKD (defined as an estimat-

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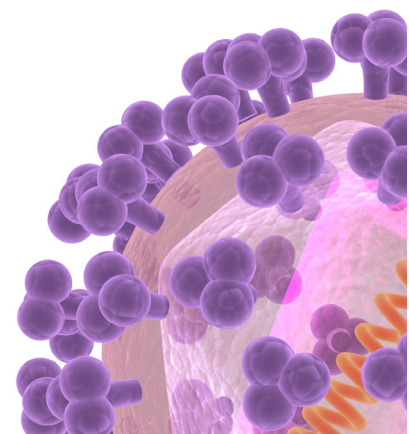
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ed GFR of less than 60 mL/minute/1.73 m²) among patients infected with HIV ranges from 4.7% to 9.7% in North America and Europe, and higher rates were reported when CKD was defined either as reduced estimated GFR or proteinuria [4]. The reported prevalence of CKD in other regions is widely variable as follows: 5.6% in Hong Kong, 6.7-9.7% in Japan, 38% in Nigeria, 33.5% in Zambia, 26% in Cote d'Ivoire, 20% in Uganda, 11.5% in Kenya, and 5.5-6% in South Africa. Screening studies defining persistent proteinuria as an indicator of CKD revealed prevalence rates of 27% in India, 12.3% in Iran, and 5.6% in Brazil [5]. This variation is attributed to genetic heterogeneity and inconsistency in access to care, initiation of combined antiretroviral therapy, reporting methods, and CKD definition.

In this issue of *Infection & Chemotherapy*, Kim et al. reported the prevalence and risk factors of renal insufficiency among patients with HIV infection who participate the Korea HIV/AIDS Cohort study [6]. They conducted a cross-sectional survey and analyzed the data at entry to cohort between December 2006 and July 2013. A total of 1,218 patients with HIV infection participated in the Korea HIV/AIDS Cohort study during the study period, of which 764 patients were excluded because of insufficient essential data. Of the 454 eligible patients, 24 (5.3%) patients had an estimated GFR of less than 60 mL/min/1.73 m², and were diagnosed as having renal insufficiency. They also found that renal insufficiency was independently associated with aged over 65 years (adjusted odds ratio [aOR], 6.84; 95% confidence interval [CI], 1.17-27.34; *P* = 0.007), having diabetes mellitus (aOR, 3.03; 95% CI, 1.17-7.82; *P* = 0.022), and taking indinavir (aOR 3.07; 95% CI, 1.17-8.05; *P* = 0.023). The prevalence of renal insufficiency in Korean HIV-positive patients was similar to the results published in East Asian countries such as Japan and China [7]. However, the prevalence of renal insufficiency might be underestimated in the study by Kim et al. because they did not consider albuminuria as a definition criterion for CKD.

In Korea, the demographic and clinical features for patients with HIV infection have changed over time. In particular, the proportion of patients aged over 50 years has substantially increased; in 2009, the proportion of patients with HIV infection aged older than 50 years was 20.8%, but increased to 34.5% in 2016 [8]. The proportion of patients with metabolic complication is also increasing in Korean HIV-positive patients. In one survey conducted between 1998 and 2002, the proportion of patients with diabetes among Korean HIV-positive patients was 4.3% [9], but increased to 10.4% in a study conducted between 2006 and 2013 [10].

The current prevalence of renal dysfunction in patients with HIV infection is relatively low in Korea. However, it should be noted that the prevalence of risk factors of renal dysfunction, such as diabetes or age older than 50 years is steadily increasing among patients with HIV infection in Korea.

Conflicts of Interest

No conflicts of interest.

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