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Incidence and risk factors of acute kidney injury and tumor lysis syndrome in patients with multiple myeloma treated with bortezomib

Seung Min Song, Junseok Jeon, Hye Ryoun Jang, Wooseong Huh, Yoon-Goo Kim, Dae Joong Kim, Jung Eun Lee
Department of Internal Medicine, Samsung Medical Center, Korea, Republic of

Objectives: Nephrotoxicity of bortezomib has not yet been described frequently, while tumor lysis syndrome (TLS) associated with multiple myeloma (MM) has been increased after introduction of the drug. This study compared the incidence and risk factors of acute kidney injury (AKI) and TLS in patients with MM after bortezomib-based chemotherapy to investigate the drug-related nephrotoxicity.

Methods: From 2006 to 2017, 276 patients who underwent first cycle of bortezomib-based chemotherapy for MM were identified in single tertiary hospital. Laboratory TLS was defined according to the Cairo-Bishop definition. Development of AKI was assessed by AKI Network (AKIN) criteria within 7 days after first chemotherapy.

Results: The age was 65 [56-72] years old, and 47% (n=131) of participants were female and baseline estimated glomerular filtration rate (eGFR) was 61.3 [34.1-89.1] mL/min/1.73m^2. The incidences of AKI and laboratory TLS were 17% (n=47) and 13% (n=36), respectively. Ten (3.6%) subjects corresponded to the both AKI and TLS criteria. Multivariate analyses showed that lower eGFR category (30~59, odds ratio [OR]=3.063 [1.278-7.339]; 15~29, OR=3.417 [1.088-10.726]; <15, OR=10.080 [2.677-37.951] vs ≥ 60), lower serum albumin level (OR=0.491 [0.278-0.868], P=0.0144) and renal amyloidosis (OR=11.174 [3.974-31.420], P<0.0001) were predictors of development of AKI. MM stages and β2-microglobulin were not associated with AKI occurrence. Regarding laboratory TLS, MM stage and β2-microglobulin were higher in those with TLS. In multivariate analyses, β2-microglobulin levels (OR=1.194 [1.066-1.337], P=0.0021) and any chromosomes abnormalities at high risk (OR=0.115 [0.026-0.503], P=0.0041) were associated with higher risk of TLS.

Conclusions: Development of AKI was often observed without being accompanied by TLS in patients with MM after treatment of bortezomib. In addition, risk factors of AKI and TLS were widely different. These findings implicated the potential nephrotoxicity of bortezomib besides TLS in patients with decreased kidney function. The efforts to prevent bortezomib associated AKI are needed in patients at high risk.