

Abstract Type : Oral

Abstract Submission No. : OR-1361

Optimal blood pressure control in patients with chronic kidney disease

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Objectives: Recent guidelines suggest to lower target blood pressure (BP) to reduce cardiovascular risk in general population. However, optimal BP level is uncertain in chronic kidney disease(CKD) patients. We comprehensively studied the association of BP control with clinical outcomes in participants in the KoreaN cohort study for Outcome in patients with Chronic Kidney Disease(KNOW-CKD).

Methods: Among 2,238 patients, total 2,226 patients with baseline BP measurements were enrolled. The main exposures of interest were baseline and time-updated systolic BP(SBP) categorized into 10 mmHg increments; <110, 110-119, 120-129, 130-139, 140-149, and ≥ 150 mmHg. Study endpoints were 1) composite kidney outcome of a 50% decline in estimated glomerular filtration rate GFR(eGFR), or end stage renal disease(ESRD), 2) all-cause deaths, or 3) cardiovascular events(CVEs). We used Cox proportional hazard model for baseline SBP and time-varying Cox model for time-updated SBP.

Results: During 7461.3 patient-year of follow-up, kidney outcome events, CVEs, and all-cause deaths occurred in 583(26.80%), 133(6.12%), and 84(3.75%) patients, respectively. Multivariable Cox models using baseline SBP, there was a graded association between higher SBP and risk of CKD progression: Compared with SBP of 120-129 mmHg, hazard ratios(HRs) for SBP <110, 110-119, 130-139, 140-149, ≥ 150 mmHg were 0.89 (0.60-1.30), 1.05(0.78-1.39), 1.27(0.99-1.62), 1.19 (0.87-1.63), and 1.73(1.30-2.31), respectively. As an outcome of mortality, there was a U-shaped association between SBP and risk of death. Corresponding HRs for the noted SBP categories were 3.05 (1.14-8.13), 2.05(0.88-4.82), 2.26(1.05-4.85), 2.44(0.95-6.28), and 4.46(2.00-9.94). However, there were no significant differences in risk of CVEs among the BP categories. These associations were consistent in time-updated SBP models.

Conclusions: In CKD patients, SBP<130 mmHg was associated with lower risk of CKD progression compared with SBP ≥ 150 mmHg. Both lower and higher SBP was associated with higher risk of death with lowest risk in SBP of 120-129 mmHg, suggesting excessive BP control may also contribute to adverse clinical outcomes.