KSN 2019
Seoul, Korea · May 23 - 26

Abstract Type : Oral
Abstract Submission No. : OR-1228

Time-updated systolic blood pressure and progression of chronic kidney disease in patients with glomerulonephritis

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Objectives: Many guidelines on optimal target of blood pressure in chronic kidney disease are largely based on studies in diabetic and hypertensive patients. However, there is lack of evidence that this blood pressure goal can also be applied to patients with glomerular diseases. The aim of this study was to clarify the longitudinal association between blood pressure and CKD progression in patients with glomerulonephritis.

Methods: We studied 1,016 biopsy-proven patients who were diagnosed with primary glomerular diseases such as IgA nephropathy (n=756 [74.4%]), membranous glomerulonephritis (n=144 [14.2%]), and focal segmental glomerulosclerosis (n=116 [11.4%]) from 2005 to 2017. The main exposure of interest was baseline and time-updated systolic blood pressure (SBP). The primary outcome was a composite of a ≥50% decrease in eGFR from baseline or end-stage kidney disease. We used time-varying cox model and marginal structural model for time-updated SBP.

Results: During 1,607 person-years follow up, the primary outcome occurred in 658 (64.8%) patients. The mean age was 43.6±14.7 years and baseline eGFR was 90.4±28.0 ml/min/1.73 m^2. 665 (65.5%) patients had the history of previous hypertension. Using time-varying cox model, compared with SBP of 120 to 129 mmHg, the hazard ratios for the primary outcome were 1.01 (95% CI, 0.84 to 1.22), 1.11 (95% CI, 0.88 to 1.40), 1.36 (95% CI, 1.04 to 1.78), respectively. The marginal structural model also showed consistent results. The corresponding HRs for the noted SBP categories were 1.04 (95% CI, 0.87 to 1.24; p=0.68), 1.14 (95% CI, 0.92 to 1.41; p=0.24), 1.43 (95% CI, 1.08 to 1.89 p=0.01), respectively. This association was consistent regardless of subgroups by age (<60 vs. ≥60), gender, previous hypertension, baseline eGFR (≥45 vs. <45), and proteinuria (<1g vs. ≥1g).

Conclusions: Among patients with glomerular diseases, SBP >140 mmHg was significantly associated with higher risk of CKD progression.