

당뇨병성 신증과 단백뇨가 아침 고혈압 및 야간혈압감소의 둔화에 미치는 영향

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Diabetic Nephropathy and Proteinuria are associated with Morning Hypertension and Nocturnal Non-dipping

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Objectives: Morning hypertension (HTN) and nocturnal non-dipping are closely associated with target organ damage and risk of cardiovascular events. Alteration in the circadian variation of autonomic tone and blood pressure (BP) have been reported in diabetics. And proteinuria (PU) is a marker of reflecting the severity of diabetic nephropathy and endothelial dysfunction. We evaluate the risks of abnormal BP patterns according to the amount of PU in diabetics and non-diabetics.

Methods: A total of 1,276 patients were prospectively recruited from 21 centers in Korea between October 2009 and May 2011. We included hypertensive patients who had an estimated glomerular filtration rate (eGFR) between 15 and 89 ml/min/1.73m². Ambulatory 24 hour BP and urine protein creatinine ratio (UPCR) were assessed.

Results: We stratified patients according to the presence of diabetes (DM) and PU (UPCR≥500 mg/g); DM-PU- (N=506), DM-PU+ (N=341), DM+PU- (N=189), and DM+PU+ (N=240). The adjusted systolic BP was the highest in DM+PU+ group during nighttime (22:30-5:00) and morning time (8:00-10:30). DM+PU+ group showed the highest prevalence of sustained HTN, non-dipping, and morning HTN (p<0.001). Although only morning HTN was significantly the highest in DM+PU+ group in patients with eGFR≥60 ml/min/1.73m² (p=0.002), sustained HTN, non-dipping, and morning HTN were the highest in DM+PU+ group in patients with eGFR <60 ml/min/1.73m² (p<0.001). The degree of PU significantly correlated with non-dipping and morning HTN both in diabetics and non-diabetics (p<0.02). In multivariate analysis, the significant risk factor for non-dipping was only DM+PU+ group, and DM+PU+ group showed the 1.58-fold risk increase for non-dipping compared with DM-PU- group (95% CI 1.10-2.27). Morning HTN was significantly associated with age, ECG score, and DM+PU groups (p<0.02). The adjusted risks of morning HTN were 1.68 (95% CI 1.09-2.59) and 3.15 (95% CI 2.01-4.93) in DM-PU+ group and DM+PU+ group, compared with DM-PU- group, respectively.

Conclusions: Diabetic nephropathy was significantly associated with non-dipping and morning HTN. And PU was significant risk factor for morning HTN in CKD stage 2- 4 patients irrespective of the presence of diabetics.

Key Words: 당뇨, 아침 고혈압, 단백뇨

Diabetes, Morning hypertension, Proteinuria