

NOCTURNAL BLOOD PRESSURE RISE ASSOCIATED WITH DIABETES AND BRAIN NATRIURETIC PEPTIDE LEVELS IN PATIENTS WITH CHRONIC KIDNEY DISEASE

Kentaro Nakai, Hideki Fujii, Rie Awata, Mikiko Yoshikawa, Ken Kitamura, Keiji Kono, Yuriko Yonekura, Shunsuke Goto, Shinichi Nishi

Division of Nephrology and Kidney center, Kobe University Graduate School of Medicine

OBJECTIVES

Hypertension is a crucial risk factor for mortality, cardiovascular events, and decline of kidney function in patients with and without chronic kidney disease (CKD). However, the patterns concerning 24 hour-monitoring of hypertension were not fully evaluated in patients with moderate to severe CKD. The aim of our study was to assess the circadian variation of blood pressure in CKD patients.

METHODS

Among patients who were hospitalized in our unit from 2009 to 2012, those who had a 24 hour ambulatory blood pressure monitoring (ABPM) and an estimated glomerular filtration rates (eGFR) under 45ml/min/1.73m² were enrolled and observed for a median period of 249 days.

Patients with the following characteristics were excluded : 1) rapidly progressive glomerulonephritis, 2) acute kidney injury, 3) kidney transplantation, 4) maintenance dialysis therapy.

RESULTS

- The ABPM revealed that 46% of patients had non-dipper pattern, 34% had riser pattern, 19% had dipper pattern, and 1% had extreme-dipper pattern (Figure 1).
- Diabetes mellitus, BNP, and eGFR were significantly associated with the likelihood of riser blood pressure pattern (Table 1, 2).
- Kidney survival rates were significantly worse in patients with riser pattern than in those with non-riser pattern (Figure 2).

CONCLUSIONS

The results of our study suggested that diabetes, high BNP and low eGFR were related to nocturnal blood pressure rise. The riser pattern may be a strong predictor of decline of kidney function in CKD patients.

Figure 1. Distribution of ABPM patterns

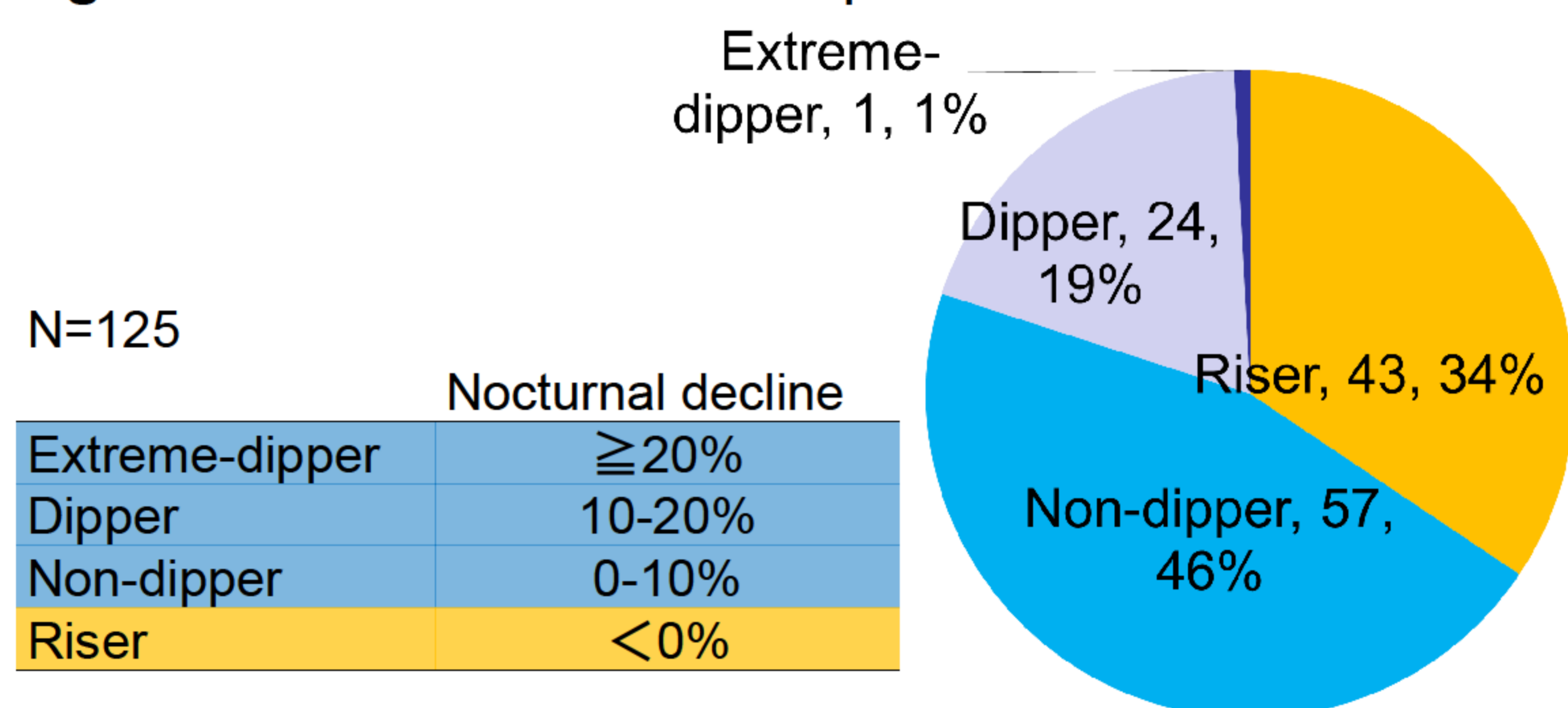


Table 1. Clinical characteristics

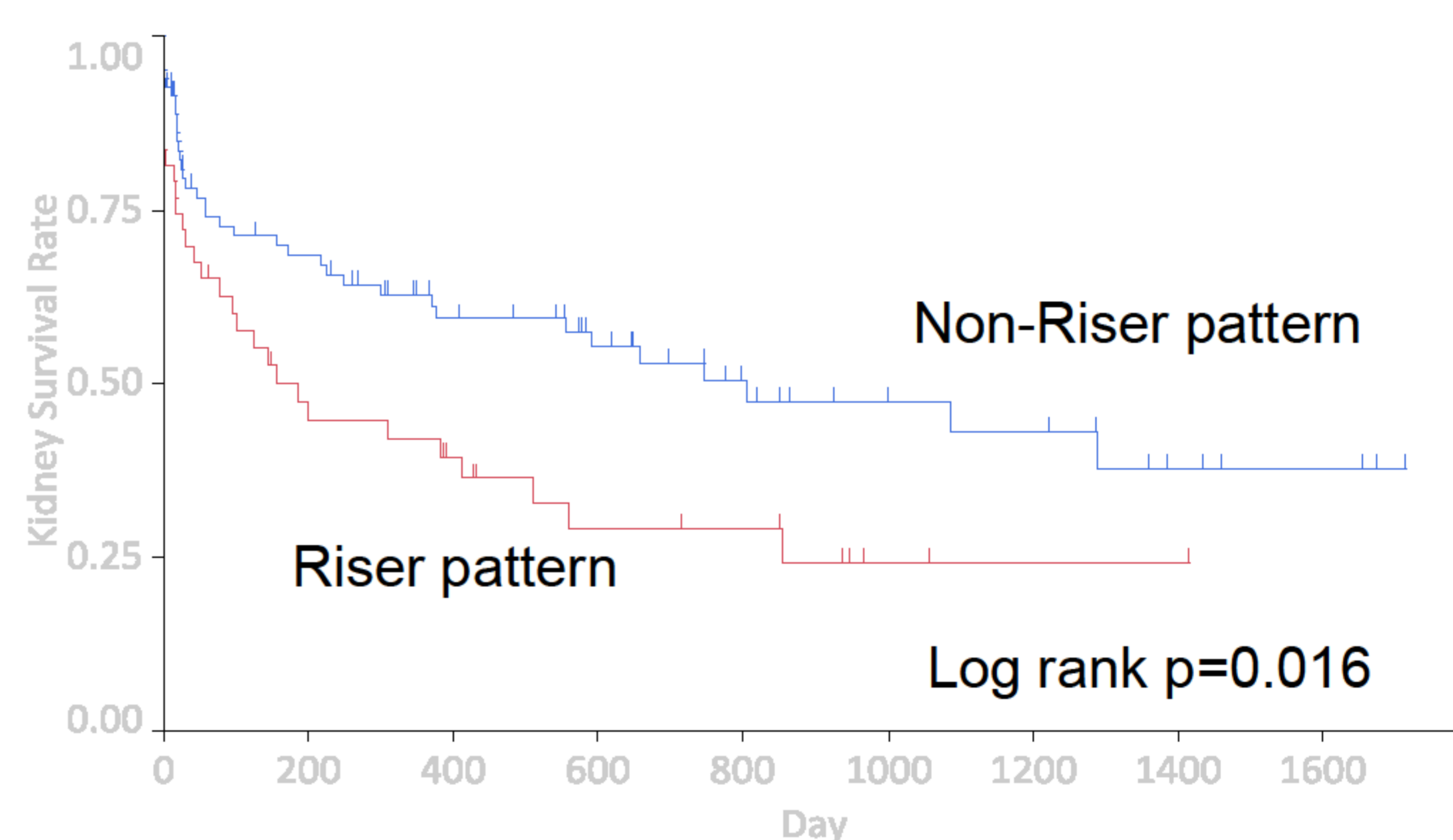
| | Riser | Non-Riser | p | All patients |
|-----------------------------------|-------------|-------------|-------|--------------|
| Age (years) | 66±11 | 63±16 | ns | 64±14 |
| Male gender (%) | 27 (63) | 45 (55) | ns | 72 (58) |
| Diabetes mellitus (%) | 25 (58) | 29 (35) | 0.01 | 54 (43) |
| Smoking (%) | 21 (49) | 47 (57) | ns | 68 (54) |
| eGFR (ml/min/1.73m ²) | 12.2±8.2 | 18.0±11.7 | <0.01 | 16.0±11.0 |
| Medications (%) | | | | |
| RAS-I | 27 (63) | 49 (60) | ns | 76 (61) |
| β blocker | 9 (21) | 11 (13) | ns | 20 (16) |
| Calcium channel blocker | 35 (81) | 60 (73) | ns | 95 (76) |
| Diuretics | 20 (47) | 26 (32) | ns | 46 (37) |
| Blood pressure (mmHg) | | | | |
| Wake SBP | 143±18 | 144±18 | ns | 144±18 |
| Wake DBP | 79±10 | 81±10 | ns | 80±10 |
| Sleep SBP | 152±21 | 134±18 | <0.01 | 140±21 |
| Sleep DBP | 82±12 | 73±10 | <0.01 | 76±11 |
| Laboratory data | | | | |
| Hemoglobin (g/dl) | 9.7±1.6 | 10.2±2.0 | ns | 10.0±1.9 |
| Albumin (g/dl) | 3.4±0.6 | 3.4±0.7 | ns | 3.4±0.7 |
| Corrected calcium (mg/dl) | 8.8±0.7 | 9.0±0.9 | ns | 8.9±0.9 |
| Phosphorus (mg/dl) | 4.6±1.3 | 4.2±1.4 | ns | 4.4±1.3 |
| UPCr (g/gCr) | 4.7±3.6 | 3.8±3.6 | ns | 4.1±3.6 |
| BNP (pg/ml) | 393.2±612.1 | 169.4±225.0 | <0.01 | 246.6±414.1 |

Continuous variables presented as mean±SD. ns, not significant at 0.05level.

Table 2. The association between the riser pattern and covariates in univariate and multivariate logistic analyses

| Valuable | Univariate | | Multivariate | |
|--|------------------|------|------------------|------|
| | OR (95% CI) | p | OR (95% CI) | p |
| Age (per increase in 10 years) | 1.16 (0.90-1.54) | 0.27 | 1.16 (0.85-1.64) | 0.36 |
| Male | 1.39 (0.66-2.99) | 0.39 | 1.68 (0.69-4.26) | 0.25 |
| eGFR (per decrease in 10 ml/min/1.73m ²) | 0.56 (0.36-0.83) | 0.01 | 0.56 (0.32-0.90) | 0.02 |
| Diabetes mellitus | 2.54 (1.20-5.48) | 0.01 | 2.76 (1.18-6.75) | 0.02 |
| BNP (per increase in 10 pg/ml) | 1.02 (1.00-1.03) | 0.03 | 1.02 (1.00-1.03) | 0.03 |

Figure 2. Kidney survival curves of CKD patients with riser and non-riser blood pressure pattern.



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All authors declare that they have no conflict of interest.

