

DECREASED GLOMERULAR FILTRATION RATE IS ASSOCIATED WITH AN INCREASED NOCTURNAL URINE PRODUCTION IN MALE NOCTURIA PATIENTS

Hypothesis / aims of study

Nocturnal polyuria is an important factor in the aging male with nocturia. However, the reasons for the increased urine amount in the night remain unclear. Reversed circadian rhythm of urine production has been reported in patients with renal failure. Increased nocturnal urine ratio might relate to functional status of the kidney. We investigate the hypothesis in the study.

Study design, materials and methods

The study included 23 male patients (76.0 ± 6.8 years old) with nocturia (2 micturition per night). Every patient recorded a voiding diary and collected urine for 3 successive days. The urine voided immediately following wakeup in the morning was included in nighttime urine sample. Samples of urine collected separately in the daytime and nighttime were sent for assay of sodium and calcium. Sodium and calcium excretion were calculated and normalized as meq/Kg/hour and mg/Kg/hour respectively. Glomerular filtration rate (GFR) was predicted by MDRD 2 (modification of Renal Disease equation); $GFR = 186 \times [\text{serum Creatinine}]^{-1.154} \times [\text{Age}]^{-0.203}$ mL/min. We correlated the ratio of nocturnal urine volume over 24-hour urine volume with GFR using Pearson's correlation test.

Results

Patients voided 4.0 ± 1.9 (range 2-8) times per night. The ratio of nocturnal urine volume ranged from 0.25 to 0.65, with a mean of 0.43. Sodium excretion in the nighttime was found to have significant correlation with the ratio of nocturnal urine volume ($p = 0.007$, $r = 0.596$). (figure 1) However, excretion of calcium, either in the daytime or in the nighttime, did not have significant correlation with the ratio of nocturnal urine volume. Patients with higher ratio of nocturnal urine volume had lower GFR ($R = -0.556$, $P = 0.007$). (figure 2)

Interpretation of results

Decreased glomerular filtration rate is associated with an increased nocturnal urine production in male nocturia patients

Concluding message

We have demonstrated that more nocturnal urine volume is associated with a less favourable renal function. Sub-clinical renal functional impairment should be included in the list of factors causing nocturnal polyuria. Further studies are required to determine the detailed mechanism.

Figure 1.

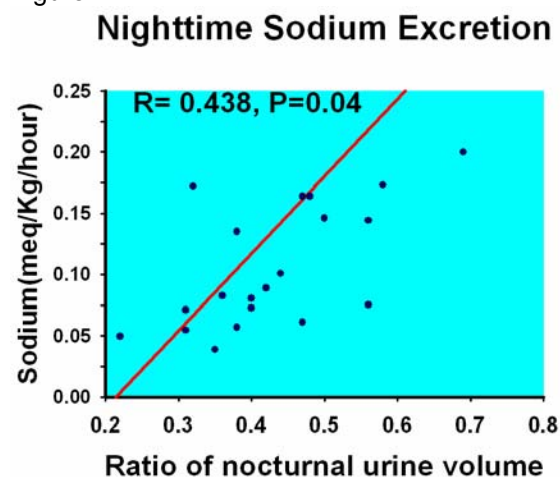


Figure 2.

