

## INCREASED NOCTURNAL URINE VOLUME IS ASSOCIATED WITH A GONADOTROPIN-INDEPENDENT REDUCTION OF NIGHTTIME SERUM TESTOSTERONE LEVEL IN MALE NOCTURIA PATIENTS

### Aims of Study

Nocturia is common in the aging male. One factor is an increased nocturnal urine volume. However, the reasons for the increased urine amount in the night remain unclear. Sex steroid hormone has been found to play a role in regulation of water/solute excretion. It would be valuable to know that is there any correlation between androgen status and nocturnal urine production in men with nocturia.

### Methods

The study includes 22 male patients (mean age 75.3 years old) with nocturia (> 2 micturition per night). All record a voiding diary and collect urine for 3 successive days. The urine voided immediately following wakeup in the morning is included in the nighttime urine sample. Samples of urine collected separately at daytime and nighttime are sent for assay of sodium and calcium. Serum samples at 7am and midnight are obtained and sent for determination of testosterone and luteinizing hormone (LH) with radioimmunoassay. Sodium and calcium excretion are calculated and normalized as meq/Kg/hour and mg/Kg/hour respectively. We correlate the ratio of nocturnal urine volume over 24-hour urine volume with various parameters using Pearson's correlation test.

### Results

Patients void  $4.6 \pm 2.1$  (range 2.0-9.5) times per night. The ratio of nocturnal urine volume ranges from 0.22 to 0.69, with a mean of 0.43. There is a significant positive correlation between nighttime sodium excretion and the ratio of nocturnal urine volume ( $R=0.438$ ,  $P<0.05$ ). However, excretion of calcium, either in daytime or in nighttime, does not have significant correlation with the ratio of nocturnal urine volume. Interestingly, patients with higher ratio of nocturnal urine volume have lower serum testosterone level in the midnight ( $R=-0.562$ ,  $P=0.008$ ) (figure). But in the morning, serum testosterone level does not have significant correlation with the ratio of nocturnal urine volume. Serum LH level, either at 7am or at midnight, shows no significant correlation with the ratio of nocturnal urine volume.

### Conclusions

This study shows that the increased nocturnal urine excretion is mainly due to an increased nighttime sodium excretion. We also demonstrate that more nocturnal urine volume is associated with a gonadotropin-independent reduction of serum testosterone level in the nighttime. Future studies are required to determine the significance of and causes for the decreased nighttime serum androgen level in male patients with nocturnal polyuria.

**Figure. Correlation between midnight testosterone level and nocturnal urine production**

