

NOCTURIA IN PATIENTS WITH CHRONIC KIDNEY DISEASE: CORRELATION BETWEEN VOIDING HABITATS AND BIOLOGICAL PROPERTIES.

Hypothesis / aims of study

Nocturia is the frequent symptom in chronic kidney disease (CKD) patients. Nocturnal polyuria, which is one of the main causes of nocturia, is generally thought to be associated with renal dysfunction leading to impaired ability to concentrate urine. However, few reports have evaluated the correlation between various biological properties of CKD patients and their voiding habitats.

In this study, we investigated voiding habitats in CKD patients, and the influence of various biological factors on the voiding habitats in CKD patients.

Study design, materials and methods

We enrolled adult patients (over 50 years) with CKD during hospitalization for diet training. All participants received medical history taking, physical examination, frequency volume chart, blood and urine chemistries. The patients receiving dialysis were excluded from the study. Nocturnal polyuria was defined as nocturnal urine volume greater than 33% of 24-hour production, including the first morning void (NPI: nocturnal polyuria index).

Parameters were analysed to determine correlation with nocturia or nocturnal polyuria using Pearson's correlation coefficient. Multivariate logistic regression analysis was used to evaluate the factors for nocturia and nocturnal polyuria. Differences were considered significant at a p-value less than 0.05.

Results

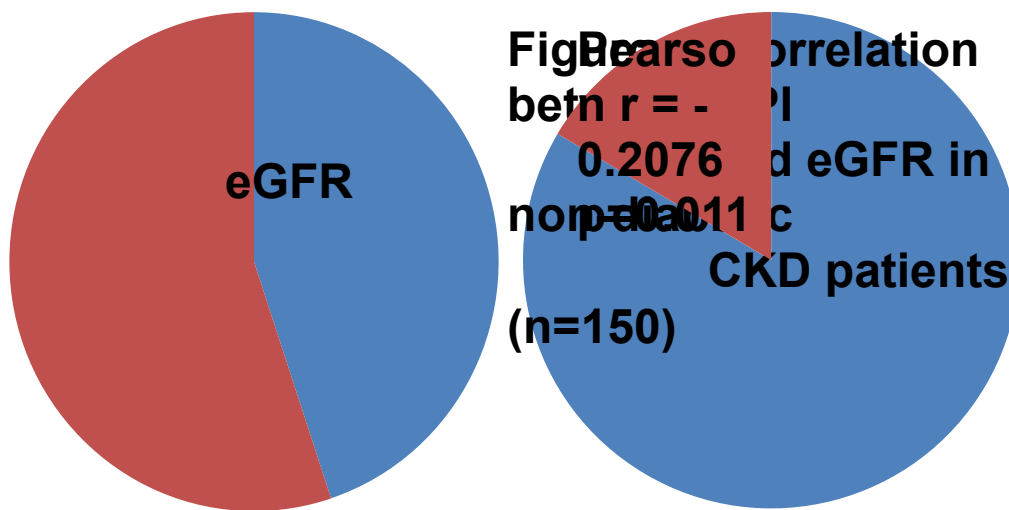
A total of 166 men and 58 women were eligible for analysis (mean age 71.6 ± 0.6 years). Mean estimated glomerular filtration rate (eGFR) of the patients was 29.2 ± 1.1 mL/min/1.73m². Mean Body Mass Index was 23.9 ± 0.3 kg/m².

In the patients without diabetes (n=150), the prevalences of nocturia (2 times or more per night) and nocturnal polyuria (NPI>0.33) were 44.0% and 82.7%, respectively. Night-time frequency correlated positively with 24-hour production, nocturnal urine volume, NPI, day-time frequency, and negatively with 24-hour creatinine clearance (Ccr) and voided volume. NPI correlated positively with night-time frequency, night-time voided volume, day-time urine specific gravity, and negatively with day-time frequency, day-time voided volume, eGFR and 24-hour Ccr. 24-hour production, 24-hour frequency (night-time frequency), mean voided volume and NPI were 22.6 ± 0.8 mL/kg, 7.7 ± 0.2 (1.6±0.1), 182.7±5.4 mL, 0.46±0.01, respectively.

In the patients with diabetes (n=74), the prevalences of nocturia and nocturnal polyuria were 59.5% and 85.1%, respectively. Night-time frequency correlated positively with 24-hour production, nocturnal urine volume, NPI, 24-hour frequency, and negatively with night-time voided volume and night-time urine specific gravity. NPI correlated positively with night-time frequency, night-time voided volume, and negatively with day-time frequency, day-time voided volume and night-time urine specific gravity. 24-hour production, 24-hour frequency (night-time frequency), mean voided volume and NPI were 19.9 ± 0.8 mL/kg, 7.4 ± 0.2 (1.7±0.1), 176.6±7.0 mL, 0.49±0.02, respectively.

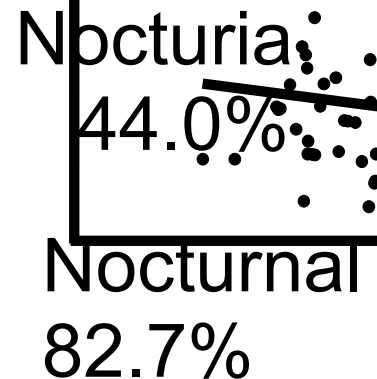
On multivariate analysis, NPI correlated positively with night-time frequency, night-time voided volume, and negatively with day-time frequency and day-time voided volume in the patients without diabetes.

Figure 1: The prevalences of nocturia and nocturnal polyuria in non-diabetic CKD patients (n=150)



0.25

NPI



Interpretation of results

a) In the patients without diabetes,

1. The prevalences of nocturia (2 times or more per night) and nocturnal polyuria (NPI>0.33) were 44.0% and 82.7%, respectively.
2. Both of nocturia and NPI increased as renal function deteriorated.
3. Day-time frequency increased and mean voided volume decreased as nocturia increased.

b) In the patients with diabetes,

1. The prevalences of nocturia (2 times or more per night) and nocturnal polyuria (NPI>0.33) were 59.5% and 85.1%, respectively.
2. Neither nocturia nor nocturnal polyuria was associated with renal function.
3. Mean voided volume increased with NPI.

Concluding message

In the patients with CKD, nocturia is attributed to decreased voided volume and nocturnal polyuria. Furthermore, nocturnal polyuria deteriorates as renal function declines.

Other factors than renal dysfunction may be associated with nocturia in the patients with diabetic nephropathy.

Disclosures

Funding: N/A **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** Nara Prefectural Nara Hospital Ethics Committee **Helsinki:** Yes **Informed Consent:** Yes