

INTRA-INDIVIDUAL VARIATION OF RENAL FUNCTION PROFILES.

Hypothesis / aims of study

A renal function profile (RFP) is a 24h-urinalysis, used to discriminate between water and solute diuresis as pathophysiologic mechanisms of nocturnal polyuria (NP). It complements frequency volumes charts and can facilitate optimal individualized treatment of patients with NP (1). The aim of this study is to evaluate the intra-individual variation of RFPs.

Study design, materials and methods

This prospective observational study was executed between November 2013 and February 2015. Participants were asked to collect a RFP on two different days. This is a collection of 8 urine samples over 24h, with an interval of 3h between each urine sample (U1:10h - U2:13h - U3:16h - U4:19h - U5:22h - U6:01h - U7:04h - U8:7h). Voided volume per interval and levels of urinary osmolality, sodium and creatinine were recorded. Participants were asked to complete the female or male version of the ICI questionnaire on lower urinary tract symptoms (ICIQ-FLUTS and ICIQ-MLUTS, respectively) to assess storage (0-15), voiding (0-12 in women; 0-20 in men) and incontinence symptoms (0-20 in women, 0-24 in men), with 0 being no symptoms.

Medians and interquartile ranges are recorded as descriptive statistical parameters. Linear regression was carried out with the results of the RFP of day 1 (D1) and 2 (D2) as dependent and independent variables. A p-value <0.05 was considered statistically significant.

Results

A total of 25 participants collected two RFPs, with a mean time interval of 7 (3-8) days between the two dates. Mean age was 33 (26-61) years and 68% (n=17) were female. Mean voiding score was 1 (0-2) on the FLUTS and 4 (1-7) on the MLUTS, mean incontinence score was 0 (0-2) of the FLUTS and 1 (0-3) on the MLUTS, and mean filling score for the FLUTS was 1 (0-3).

Correlation of diuresis rate (ml/min), urinary osmolality (mosm/kg), solute excretion (mosm/kg per mg/dl creatinine) and sodium excretion (mmol/l per mg/dl creatinine) between the 2 RFPs are represented in table I for all 8 urine samples, and in figure 1 only for the nighttime urine samples (U6:01h - U7:04h - U8:7h).

Interpretation of results

The strongest correlations between the 2 RFPs were found for the nighttime samples (U6:01h - U7:04h - U8:7h), with a significant positive correlation between the two days for each of the analysed parameters: diuresis rate, osmolality, solute and sodium excretion.

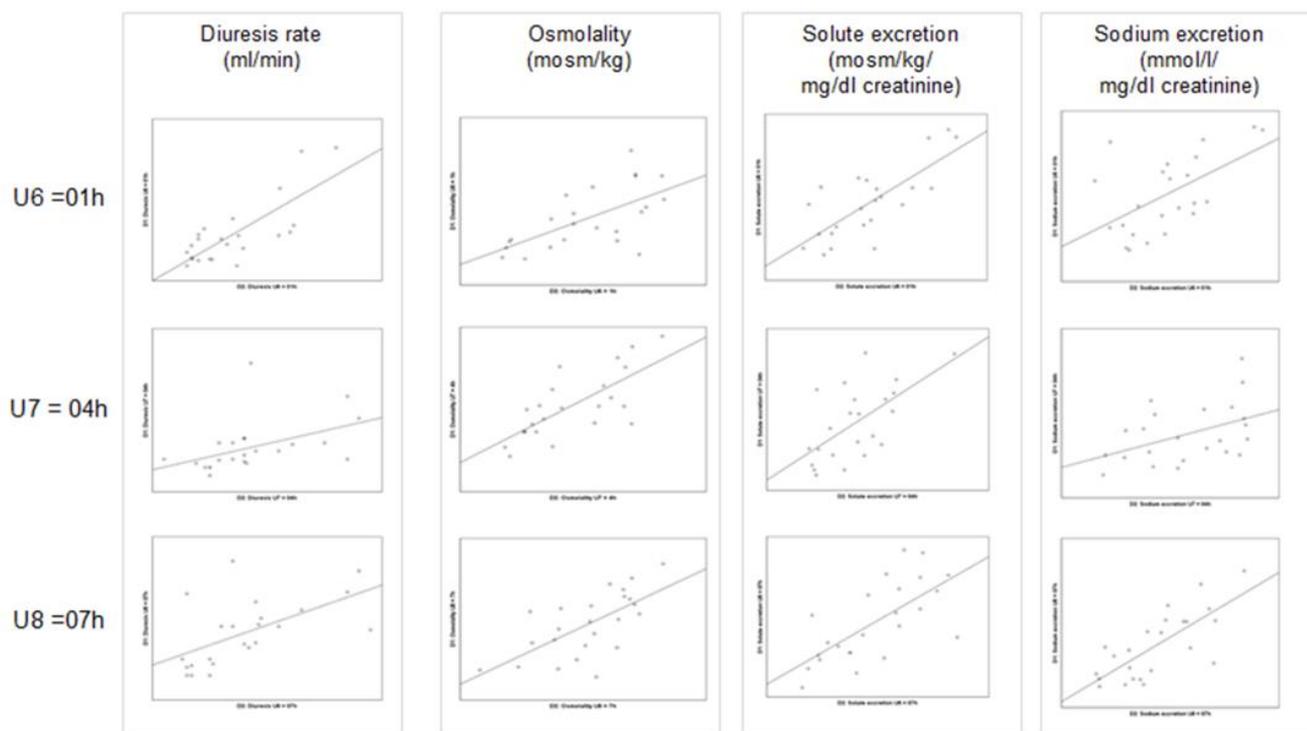
Concluding message

This interim analysis shows that the results of a RFP, collected at 2 different times, are comparable for all nighttime parameters: diuresis rate, nighttime osmolality, solute excretion and sodium excretion. Further research is required to confirm these results, also for the daytime samples.

Table I: Linear regression for diuresis rate (ml/min), urinary osmolality (mosm/kg), solute excretion (mosm/kg per mg/dl creatinine) and sodium excretion (mmol/l per mg/dl creatinine) between the two RFPs (n=25)

| | | R ² (%) | P-value | | | R ² (%) | P-value |
|-------------------|------------------|--------------------|------------------|-------------------|------------------|--------------------|------------------|
| U1 10h | Diuresis rate | 38 | 0.002 | U5 22h | Diuresis rate | 8 | 0.205 |
| | Osmolality | 26 | 0.010 | | Osmolality | 2 | 0.565 |
| | Solute excretion | 44 | <0.001 | | Solute excretion | 26 | 0.011 |
| | Sodium excretion | 36 | 0.002 | | Sodium excretion | 9 | 0.154 |
| U2 13h | Diuresis rate | 52 | <0.001 | U6 01h | Diuresis rate | 61 | <0.001 |
| | Osmolality | 48 | <0.001 | | Osmolality | 40 | 0.001 |
| | Solute excretion | 25 | 0.014 | | Solute excretion | 57 | <0.001 |
| | Sodium excretion | 14 | 0.070 | | Sodium excretion | 31 | 0.005 |
| U3 16h | Diuresis rate | 9 | 0.172 | U7 04h | Diuresis rate | 21 | 0.026 |
| | Osmolality | 21 | 0.024 | | Osmolality | 52 | <0.001 |
| | Solute excretion | 32 | 0.004 | | Solute excretion | 39 | 0.001 |
| | Sodium excretion | 21 | 0.024 | | Sodium excretion | 20 | 0.032 |
| U4 19h | Diuresis rate | 19 | 0.038 | U8 07h | Diuresis rate | 34 | 0.004 |
| | Osmolality | 28 | 0.008 | | Osmolality | 44 | <0.001 |
| | Solute excretion | 11 | 0.113 | | Solute excretion | 47 | <0.001 |
| | Sodium excretion | 8 | 0.194 | | Sodium excretion | 56 | <0.001 |

Figure 1: Linear regression for diuresis rate (ml/min), urinary osmolality (mosm/kg), solute excretion (mosm/kg per mg/dl creatinine) and sodium excretion (mmol/l per mg/dl creatinine) between nocturnal urine samples of the two RFPs (n=25)



References

- Goessaert AS, Krott L, Hoebeke P, Vande Walle J, Everaert K. Diagnosing the pathophysiologic mechanisms of nocturnal polyuria. *European urology*. 2015;67(2):283-8.

Disclosures

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K Everaert: Grant from Astellas, AMS, Allergan, Bard, Coloplast, Ferring, Hollister, Pfizer, Medtronic and Wellspect **Clinical Trial:**

Yes **Public Registry:** No **RCT:** No **Subjects:** HUMAN **Ethics Committee:** Ethics committee Ghent University Hospital

(EC/2013/802) **Helsinki:** Yes **Informed Consent:** Yes