#138 What's normal? Should urinary creatinine or osmolarity be used to normalise urinary protein measurements?

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INTRODUCTION

- Many scientists are currently attempting to identify a urinary biomarker for Overactive Bladder Syndrome (OAB).
- Urinary creatinine is still commonly used to normalise studies[1] of urinary cytokines.
- Wide variability in urinary creatinine concentration can lead to differing normalised results, leading other studies to shy away from its use[2].
- There has been an increasing trend to use urine osmolarity (as specific gravity) as a normalising factor.

AIMS

To determine the better normalising factor by comparing urinary creatinine and specific gravity with patient age, body mass index (BMI), and clinical history.

METHODS

After standard history taking, mid-stream urine (MSU) samples were collected from women ≥50yrs ($\tilde{x}$= 64 [52, 72]) with urinary incontinence.

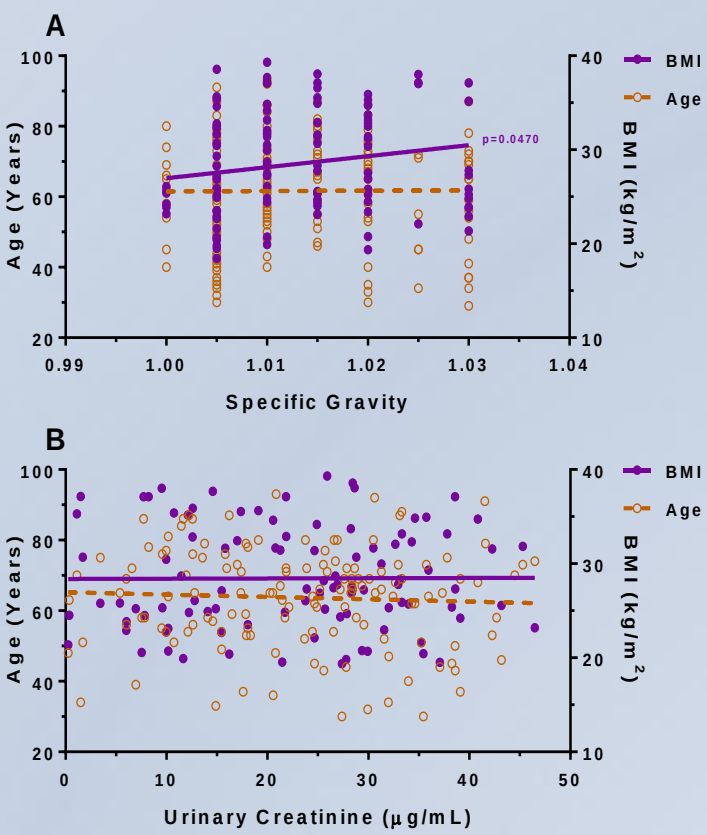
Current urinary tract infection (UTI) was assessed by the hospital Microbiology Department (≥10^7CFU/mL).

Leukocyte presence (pyuria) and specific gravity were determined by dipstick. Creatinine concentrations were quantified by a creatinine ELISA (Sigma).

Between group differences in specific gravity and creatinine: Mann-Whitney t-tests; linear regression for relation to age and BMI (Graphpad Prism 7).

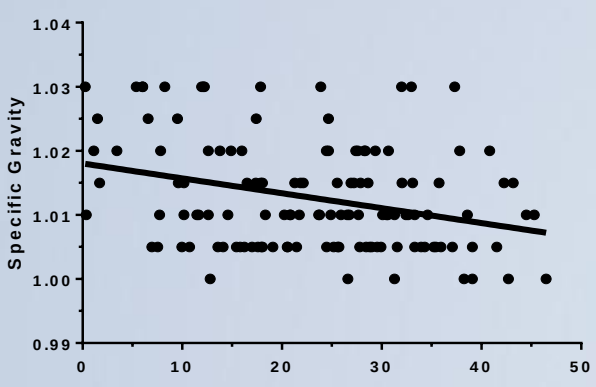
RESULTS

Figure 1: Specific gravity and urinary creatinine (µg/mL) compared to Age and BMI.



A. There was a significant correlation between specific gravity and patient BMI (p=0.0470), but not age. **B.** No correlation was found between urinary creatinine age or BMI.

Figure 2: Specific gravity compared to urinary creatinine (µg/mL).



A significant inverse correlation was observed (r=-30, p=0.0003).

Specific Gravity:

- Samples (n=168) ranged from 1.0 to 1.03.
- Significantly greater in patients with hypercholesterolemia (p<0.01) and those presenting with pyuria (p<0.05); data not shown, refer to abstract.
- Current or history of UTI had no effect.
- Significantly correlated with BMI (p<0.05) but not with age (Figure 1A).

Urinary Creatinine:

- Samples (n=136) had greater variability, ranging from 0.25 to 46.5µg/mL.
- Normal range is 3 to 30µg/mL (WHO Guidelines)[3]; 32% (44/136) of samples fell outside of this range, with 89% (39/44) found to be >30µg/mL.
- No significant difference when compared to patient age, BMI or any of the observed clinical conditions.

Note: Urinary creatinine was found to be inversely correlated with specific gravity (r=-0.30, p=0.0003; Figure 2).

CONCLUSIONS

The results of this study do not clearly demonstrate the superiority of either urinary creatinine or specific gravity as a normalisation factor in this OAB patient sample. The wide variability in urinary concentrations of creatinine causes concern, as does the lack of correlation with age. Specific gravity, on the other hand, showed less variability but was affected by conditions that are common in OAB patients.

REFERENCES

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