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Muscularity and adiposity in addition to net acid excretion as predictors of 24-h urinary pH in young adults and elderly.

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OBJECTIVE:

In patients with nephrolithiasis, an inverse relationship between 24-h urinary pH (24h-UpH) and body weight has been reported. Whether body composition indices and 24h-UpH are similarly associated in healthy subjects needs investigation.

DESIGN:

Cross-sectional, retrospective analysis.

SETTING:

Dortmund, Germany and Gothenburg, Sweden.

SUBJECTS:

Healthy young adults (18-23 years; n=117) and elderly (55-75 years; n=85) having a mean body mass index (BMI) of 22.80+/-3.4 and 25.3+/-3.9 kg/m2, respectively.

METHODS:

Anthropometric data, 24h-UpH, and 24-h urinary excretion rates of net acid (NAE), creatinine, and urea were determined. After adjusting for urea (reflecting protein intake), renal creatinine output was used as a biochemical marker for muscularity. The BMI served as a marker of adiposity.

RESULTS:

NAE, body weight, and BMI were significantly ($P<0.05$) higher, and height and creatinine significantly lower in the elderly, whereas body-surface area (BSA) was not different. Step-wise multiple regression analysis using BSA-corrected urinary variables revealed NAE as the primary predictor of 24h-UpH (with R2 values of 0.64 and 0.68 in young adults and elderly, respectively, $P<0.0001$), followed by urea ($P<0.0001$), creatinine ($P<0.05$), and BMI ($P<0.05$ for the young adults and $P=0.12$ for the elderly). These associations were negative for NAE and BMI, and positive for urea and creatinine.

CONCLUSIONS:

Muscularity (i.e. creatinine adjusted for urea) and particularly in the group of young adults, adiposity (i.e. BMI) proved to be modest, but significant predictors of 24h-UpH. Future research should focus on more obese subjects in whom insulin resistance and particular kidney functions should also be examined to further substantiate the role of obesity in low-urine pH-associated conditions, for example, nephrolithiasis.