Since ammonium is the crucial component of renal acid excretion, the measurement of its urinary concentration represents a major diagnostic step in conditions affecting the urinary acid excretion [1-3]. The very cumbersome formaldehyde titration has been traditionally used for the measurement of urinary ammonium [4]. Colorimetric assays are technically simpler [5]. However, in most clinical laboratories, both formaldehyde titration as well as colorimetric assays are unsuitable for a bedside determination of urinary ammonium. An indirect estimate of urinary ammonium, the modified urine osmolal gap, has been more recently suggested [6]. The usefulness of the mentioned estimate was, therefore, evaluated in 34 healthy subjects (25 males and 9 females, age 5-44 years). The urinary ammonium concentration was assessed colorimetrically using a modification of the Berthelot reaction, replacing phenol by sodium salicylate [7]. In addition, the urinary ammonium concentration (mmol/l) was indirectly estimated using the modified urine osmolal gap [6]:

\[
\text{Osmolality} - \frac{2(\text{sodium} + \text{potassium}) + \text{urea} + \text{glucose}}{2}
\]

Standard laboratory methods were used for the determination of osmolality (mmol/l), potassium, glucose, and urea concentrations (mmol/l) in urine. The agreement between measured and estimated urinary ammonium was assessed...
Fig. 1. Relationship between measured urinary ammonium and modified urine osmolal gap (estimated ammonium) in 34 subjects. The left panel depicts the linear correlation between measured and estimated ammonium concentrations ($y = 0.864x$, $r=0.621$, $p < 0.01$). The right panel depicts the difference against the mean value diagram suggested by Bland and Altman [7]. The urinary ammonium level estimated using the modified osmolal gap was on the average lower by 4.5 mmol/l than the measured one (–). The 95% limits of agreement are -43.2 and 34.4 mmol/l.

References


