Creatinine excretion is lower in Inuit than in non-Inuit and the influences on iodine nutrition classification

Stig Andersen¹, Peter Laurberg¹

¹Aalborg University Hospital, Denmark, stiga@dadlnet.dk

Background

Human contamination and iodine excretion is commonly assessed by the analysis of urine. A 24 hour urine sample is ideal but it is inconvenient, inaccurate and unreliable. Thus, spot urine sampling with creatinine to adjust for differences in void volume is widely used. Still, the importance of ethnicity and the timing of spot urine samples need to be settled.

Methods

We collected 104 spot- and 24 hour urine samples from Greenland Inuit and non-Inuit. We measured creatinine using the Jaffe method, iodine using the Sandell-Kolthoff reaction, and para-amino benzoic acid (PABA) by the HPLC method for estimation of completeness of sampling.

Results

Population based recruitment was done from the capital city, a major town and a settlement (n=36/48/20). Participants were 78 Inuit and 26 non-Inuit aged 30 through 69 years. Inuit were smaller than non-Inuit (weight, 71 vs 84 kg, p<0.001). Urinary creatinine excretion was lower in Inuit than in non-Inuit (men, 1344/1807mg/24h; women 894/1259mg/24h; p=0.002; 0.02). Creatinine excretion was influenced by age (p<0.001), gender (p<0.001), weight (p<0.001) and ethnicity (p=0.047) while unaffected by Inuit diet. Data suggest a similar influence of age on creatinine excretion in Inuit and non-Inuit.

Iodine excretion in Inuit/non-Inuit 24-h urine (median, 25-75 percentiles) was 153, 97-251µg/102, 73-138µg (p=0.026) when compensated for incomplete sampling (40% of samples). It increased with rising intake of traditional Inuit foods (p=0.005). Iodine was lower in morning spot urine than in 24-h urine samples (p<0.001). This difference associated with iodine intake levels (p<0.001) and led to misclassification of iodine excretion when iodine nutrition was above the recommended level.

In conclusion, creatinine excretion was lower with Inuit ethnicity. This influences estimates of 24-h excretions from spot urine samples. The nutrition level was misclassified from morning spot urine samples with higher levels of iodine.