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Serum Osmolal Gap in Healthy Persons. Comparison of Eleven Formulas for Calculating Osmolality

Abstract

Serum osmolal gap, the difference between measured and calculated osmolality, has been determined on 64 healthy individuals (32 males and 32 females). The calculation of calculated osmolality as well as osmolal gap utilized eleven formulas taken from the literature. Measured osmolality was determined by osmometer. The results showed that the mean ± SD of measured osmolality of males and females were 283.50 ± 5.75 and 284.28 ± 3.66 respectively; however there was no significant difference between males and females. Calculated osmolality was determined by calculation using eleven formulas (formula A,B,C,D,E,F,G,H,I,J, and K) utilization data of serum sodium, potassium, glucose, and urea/urea N. The osmolal gap of healthy males and females was obtained as a difference between measured and calculated osmolality determined by each formula. All the osmolal gaps obtained showed significant difference between males and females except for the formula H. Using the formula H, however, it was shown that the difference between males and females and also the difference between measured and calculated osmolality (osmolal gap) were not significantly different. In the present study it was concluded that formula H (1.89Na + 1.38K + 0.03SUN + 1.08Glucose + 7.45) was the most accurate formula for calculating calculated osmolality. The reference (normal) value of osmolal gap was less than 13.4 mosmol/kg H2O (males and females). The author recommends using the formula H for calculating calculated osmolality as well as osmolal gap for clinical purposes.

Keyword: osmolality, osmolarity, osmolal, gap, osmometry,