Diagnostic performance of afternoon urine osmolality to assess optimal hydration status in an adult healthy population

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Abstrak

Background: optimal hydration represents adequate total daily fluid intake to compensate for daily water losses, ensure adequate urine output to reduce the risk of urolithiasis and renal function decline, and also avoid the production of arginine vasopressin (AVP). Twenty four hour urine osmolality has been used to assess hydration status, but it is challenging because of the possibility of spilling urine and limitation of daily activities. This study is aimed to determine the performance of the afternoon urine osmolality to assess the optimal hydration status compared with 24 hour urine osmolality.

Methods: a cross sectional study was conducted on healthy employees aged 18-59 years at Universitas Indonesia Medical Faculty/Cipto Mangunkusumo Hospital, with consecutive sampling method. The ROC curve was analyzed to obtain the optimal cut off point and the accuracy of the afternoon urine osmolality in assessing the optimal hydration status.

Results: between August-September 2016 there were 120 subjects (73.8% female, median age 32 years) who met the study criteria with a median 24 hour urine osmolality 463.5 (95% CI, 136-1427) mOsm/kg H2O and median afternoon urine osmolality 513 (95% CI, 73-1267). We found moderate correlation ($r=0.59$; $p<0.001$) between afternoon urine osmolality and a 24 hour urine osmolality. Using ROC curve, the AUC value was 0.792 (95% CI, 0.708-0.875) with the cut off 528 mOsm/kg H2O. To assess the optimal hydration status, the afternoon urine osmolality had the sensitivity of 0.7 (95% CI, 0.585-0.795) and the specificity of 0.76 (95% CI, 0.626-0.857), Likelihood Ratio (LR) (+) 2.917 (95% CI, 1.74-4.889) and LR (-) 0.395 (95% CI, 0.267-0.583).

Conclusion: afternoon urine osmolality can be used as a diagnostic tool to assess the optimal hydration status in healthy population with cut off 528 mOsm/kg H2O, sensitivity of 0.7, and specificity of 0.76.