

Blood, Urine and Body Mass Measures of Fluid and Electrolyte Balance in NFL Players Supplemented with Sodium Chloride but No Potassium during Pre-season

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Context: We previously reported hypovolumic hyponatremia in un-supplemented college and professional football (NFL) players. We subsequently supplemented NFL players with Rehydralyte and pickle juice and successfully maintained fluid balance however hyperkalemia and hyperchloridemia were a concern. **Objective:** To supplement NFL players with sodium chloride (NaCl) drinks containing no potassium during the first week of pre-season practices and assess blood, urine and body mass measures of fluid and electrolyte balance. **Design:** Observational cohort study. **Setting:** Data were collected during the first 11 days of an NFL pre-season training camp. **Patients or Other Participants:** Ten NFL players with age=26.3±3, height=187.7±6cm, mass=121±25kg, BSA=2.45±0.26m², BSA/mass=205.7±0.26cm²·kg⁻¹, and 14.3±9% body fat volunteered and signed consent forms. **Interventions:** For the first 5 days players were supplemented at 4 meals/d with fruit drinks containing no K⁺ but added NaCl and received 4500mg of Na⁺ and 6926mg of Cl⁻ above normal dietary intake. Body mass and blood samples were obtained for baseline measures when players' arrived to camp and prior to the morning practice on Days 3, 5 and 11, and urine samples were provided before all morning (pre-AM) and afternoon (pre-PM) practices and then again after practices. Determination of blood and urine sodium (Na⁺), potassium (K⁺) and chloride (Cl⁻) were made via ion-selective electrodes and percent change in plasma volume (%ΔPV) was calculated from hematocrit and hemoglobin. Urine specific gravity (USG) and osmolality were measured by refractometry and freezing point depression. Pre and post-practice mass was recorded for all practices and percent change in mass (%Δmass) was calculated from baseline. Players practiced once on Day 1, twice on Days 2, 3 and 4, and then alternated one or two daily practices on Days 5 through 11. Data were analyzed with repeated measures ANOVA. **Main Outcome Measures:** Blood and urine Na⁺, K⁺ and Cl⁻, USG, urine osmolality, %ΔPV and %Δmass. **Results:** No differences between days existed for blood Na⁺, K⁺ or Cl⁻ and all were within normal clinical range. There were no differences in pre-AM or pre-PM %Δmass. Pre-AM USG was higher on Day 3 (1.0256±0.008) and Day 5 (1.0271±0.0078) compared to baseline (1.0183±0.007) but there were no differences in urine osmolality or K⁺ excretion. Daily urine Na⁺ excretion was lower than baseline (158±21mmol/l) on Day 3 (85±16mmol/l), Day 5 (72±21mmol/l) and Day 11 (79±16mmol/l), p<0.001, as was Cl⁻ excretion (152±17 mmol/l versus 100±11 mmol/l, 89±18 mmol/l and 104±13 mmol/l). PV expanded 12% on Day 11 which approached significance, p = 0.08. **Conclusions:** Sodium supplementation of 4.5g/d without added potassium was successful in helping NFL players maintain fluid and electrolyte balance as evidenced by normal pre practice mass without causing hyperkalemia or hyperchloridemia. The decrease in daily Na⁺ excretion is indicative of normal aldosterone mediated sodium conservation. **Word Count** 449