

Ice Slushie Ingestion Decreases Core Body Temperature in Male Football Players Prior to a Standard Pre-Season Practice

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Context: An elevated core body temperature (39.5-40°C) associated with exercise in hot environments hinders exercise performance. Therefore, researchers have studied external methods (cold water immersion or cooling vests) of lowering core temperature (T_c) prior to exercise. Recently, ingesting of ice slurry solutions (internal method of decreasing T_c) reduced T_c and improved endurance performance in runners and cyclists. This has never been studied in large subjects such as American football players. **Objective:** First, to investigate the effect of tea slushie (Slushie) versus cold tea (Tea) ingestion on the percent change in resting T_c ($\% \Delta T_c$) in euthermic football players prior to practice; and second, to determine if physical characteristics (mass or BSA/mass) were associated with $\% \Delta T_c$ after slushie ingestion. **Design:** Cross-over study. **Setting:** Controlled laboratory. **Patients or Other Participants:** Nine collegiate football players representing many positions (height=181.5±3.4 cm, mass=100.3±21kg, BSA=2.19±.21m² and BSA/mass=223±24cm²·kg⁻¹) volunteered. **Interventions:** On two occasions in a counterbalanced order the subjects ingested 7.5g·kg⁻¹ body mass of an identical nutritional formula but in the form of either Slushie (-1°C) or refrigerated Tea (7°C) before an afternoon pre-season practice. Every 5 minutes subjects were given 1.25g·kg⁻¹ of either drink to ensure a standardized ingestion rate during which we measured T_c using ingestible sensors every minute for a 30min time period. The players ingested the sensors 12±3 hr prior to data collection to ensure that they were in the intestinal tract and therefore would not be directly affected by fluid temperature. The data was collapsed into 4 time periods: 0 to 7.5min (7.5min), 7.5 to 15 min (15min), 15min to 22.5min (22.5min) and 22.5 min to 30 min (30min) for ease of interpretation. Two-way group (Slushie versus Tea) by time (7.5min, 15min, 22.5min and 30min) ANOVA was used. Separate one-way ANOVA with Tukey's *post-hoc* analysis were used when group differences occurred ($\alpha = 0.05$). **Main Outcomes Measures:** $\% \Delta T_c$. **Results:** Ambient temperature and humidity were not different between trials (22.1±.43°C and 27±3.7%). Two-way ANOVA revealed group differences for $\% \Delta T_c$, $P=.013$. In Slushie, $\% \Delta T_c$ was significant over time ($P<.001$) and was different from 0min at 22.5min ($\% \Delta T_c = -.366 \pm .34^\circ\text{C}$) and 30min ($\% \Delta T_c = -.425 \pm .37^\circ\text{C}$), both $P=.01$. Additionally, the $\% \Delta T_c$ at 15min ($-.116 \pm .17^\circ\text{C}$) was different from 30min ($-.425 \pm .37^\circ\text{C}$), $P=.05$. No differences in $\% \Delta T_c$ over time occurred in Tea and there were no correlations between $\% \Delta T_c$ and mass or $\% \Delta T_c$ and BSA/mass. **Conclusions:** We could not measure performance (energy output) during practice but clearly consuming slushie solutions (-1°C) successfully decreased T_c compared to identical refrigerated fluids. This may be clinically important prior to the afternoon practice when resting T_c are usually higher than in the morning. Ingesting slushies prior to pre-season football practice may enhance performance by decreasing pre-exercise T_c . **Word Count:** 450