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 (%ΔT_c) in euthermic football players prior to practice; and second, to determine if physical characteristics (mass or BSA/mass) were associated with %ΔT_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±21 kg, BSA=2.19±.21 m² and BSA/mass=223±24 cm²·kg⁻¹) volunteered. Interventions: On two occasions in a counterbalanced order the subjects ingested 7.5 g·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 1.25 g·kg⁻¹ of either drink to ensure a standardized ingestion rate during which we measured T_c using ingestible sensors every minute for a 30 min 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 7.5 min (7.5 min), 7.5 to 15 min (15 min), 15 min to 22.5 min (22.5 min) and 22.5 min to 30 min (30 min) for ease of interpretation. Two-way group (Slushie versus Tea) by time (7.5 min, 15 min, 22.5 min and 30 min) ANOVA was used. Separate one-way ANOVA with Tukey’s post-hoc analysis were used when group differences occurred (α = .05). Main Outcomes Measures: %ΔT_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 %ΔT_c, P=.013. In Slushie, %ΔT_c was significant over time (P<.001) and was different from 0 min at 22.5 min (%ΔT_c = -366±.34°C) and 30 min (%ΔT_c = -.425±.37°C), both P=.01. Additionally, the %ΔT_c at 15 min (-116±17°C) was different from 30 min (-.425±.37°C), P=.05. No differences in %ΔT_c over time occurred in Tea and there were no correlations between %ΔT_c and mass or %ΔT_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