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## Scientific Formal (Paper) Presentations

CODE: SSC02-06

SESSION: SSC02

**Caffeine and Taurine Containing Energy Drink Improves Systolic Left-ventricular Contractility in Healthy Volunteers Assessed by Strain Analysis Using Cardiac Magnetic Resonance Tagging (CSPAMM)**

### Date/Times

- **DATE: Monday**
- **TIME: 11:20 -11:30 AM**
- **LOCATION: S502AB**

### PARTICIPANTS

- Jonas Doerner undefined - Nothing to disclose.
- Daniel Kuetting undefined - Nothing to disclose.
- Claas P Naehle MD - Consultant, Medtronic, Inc.
- Hans H Schild MD - Nothing to disclose.
- Daniel K Thomas MD - Nothing to disclose.

### SUBSPECIALTY CONTENT

- Cardiac Radiology

### PURPOSE

Energy drinks (ED) usually contain a high amount of caffeine, taurine, and sugar as their main ingredients. Although their consumption appears not uncritical, there is little or no regulation on ED sales so far. Concerns about adverse side effects especially focus on heart function in adolescents and young adults. In this study, we investigated the effect of ED consumption on myocardial function in healthy volunteers using MRI tagging and strain analysis.

### METHOD AND MATERIALS

18 healthy volunteers (15 male, 3 female, mean age: 27.5 years) were investigated using cardiac magnetic resonance imaging (CMR). CMR was performed on a 1.5-Tesla whole body scanner directly before and 1h after consumption of a taurine (400 mg/ 100 ml) and caffeine (32 mg/100 ml) containing ED (168 ml/m<sup>2</sup> body surface area). For left-ventricular (LV) myocardial tagging, complementary spatial modulation of magnetization (CSPAMM) was used. Strain was calculated for peak strain (PS), peak systolic strain rate (PSSR) and peak diastolic strain rate (PDSR) using TagTrack (Gyrotools, Zurich, Switzerland). Steady state free precession (SSFP) cine imaging was used for determination of LV-function. Additionally vital parameters such as heart rate (HR) and blood pressure (BP) were recorded throughout the investigation.

### RESULTS

PS and PSSR as parameters for systolic LV-contractility were significantly increased 1h after ED consumption compared to baseline (PS: w/o ED  $-22.33 \pm 1.7$ ; w ED  $-24.15 \pm 2.4$ ;  $p=0.01$ ; PSSR: w/o ED  $-1.18$  1/s  $\pm 0.08$ ; w ED  $-1.30$  1/s  $\pm 0.16$ ,  $p=0.01$ ). PDSR as a parameter for diastolic LV-relaxation was slightly, but not significantly higher compared to baseline (PDSR: w/o ED  $1.90$  1/s  $\pm 0.33$ ; w ED  $2.09$  1/s  $\pm 0.44$ ,  $p=ns$ ). No significant changes were found for LV-function (LV-EDV: w/o ED  $141$  ml  $\pm 31$ ; w ED  $145$  ml  $\pm 33$ ; LV-EF: w/o ED  $64$  %  $\pm 4$ ; w ED  $66$  %  $\pm 8$ ) and vital parameters (HR: w/o ED  $63$  1/min  $\pm 9$ ; w ED  $62$  1/min  $\pm 7$ ; BP: w/o ED  $113/62$  mmHg; w ED  $117/64$  mmHg).

### CONCLUSION

This work reveals that ED consumption has a short-term impact on cardiac contractility, therefore further studies have to evaluate the impact of long-term ED consumption and the effect of ED on patients with heart disease to determine potential risks or benefits of ED consumption.

### CLINICAL RELEVANCE/APPLICATION

ED consumption lead to changes in LV-contractility, which can be assessed by CMR tagging and strain analysis.