Cardiac index during routine cardiovascular magnetic resonance under general anesthesia

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Objectives: Cardiac index (CI) can be measured non-invasively by cardiovascular magnetic resonance (CMR) [1]. Young children need some form of sedation during CMR. However, only scarce information is available of CI during anesthesia. Therefore, the aim of this study was to determine CI levels during routine standard CMR of patients with congenital and acquired heart disease under general anesthesia (GA) and compare them with CI of patients without GA and CI of healthy individuals.

Methods: To assess the impact of GA on CI were retrospectively reviewed one hundred twenty seven measurements of CI and EF in 75 patients with congenital and acquired heart disease, who underwent a routine clinical CMR at our institution over a 7-year period and have a CI and LVEF measurements in the study. As control 15 young healthy volunteers were selected. The entire cohort was divided into three groups: 43 measurements were done in 38 patients with congenital and acquired heart disease with GA, (median age 3.6(0-40) yrs.); 69 measurements in 37 patients with congenital and acquired heart disease without anesthesia, (10(1-17) yrs.); and 15 measurements in 15 healthy controls without anesthesia, (13(7-19) yrs.).

Results: CI was significantly lower in the GA group compared with patients without GA (2.8±0.9 l/min/m² vs. 3.6±0.8 l/min/m² p < 0.0001) and controls (2.8±0.9 l/min/m² vs. 4.0±0.7 l/min/m², p < 0.0003). There was no statistically significant difference between pts. without GA and controls (p=0.223). There was no statistically significant difference in LVEF between groups. There was no correlation between the CI and LVEF.

Conclusions:
CI is significantly lower during any form of anesthesia than without anesthesia. Therefore hemodynamic parameters (e.g. ventricular volumes) under anesthesia may not represent true hemodynamics under resting conditions. Further studies need to determine acceptable levels of CI during any form of anesthesia.