**Differentiating Fontan Failure Phenotypes by Cardiac Magnetic Resonance Imaging**

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**Background:** Fontan failure (FF) is a heterogenous group of complications after the Fontan operation. Previous algorithms categorize FF into 4 types: FF with reduced ejection fraction (EF) (Type I), FF with preserved EF (Type II), FF with high cardiac output and cirrhosis (Type III), and FF with abnormal lymphatics (type IV). This phenotype classification can guide the varying management strategies for different types of FF. Cardiac magnetic resonance imaging (CMR) can accurately quantify EF. We sought to utilize CMR to determine FF phenotype, and assess the relationship of this FF phenotype with clinical outcomes.

**Methods:** Single center retrospective review of 48 adult Fontan patients (54% male, 60% systemic left ventricle) undergoing CMR between 2012-2017. CO was measured using ascending aorta flow. EF and CO were used to classify patients into FF phenotypes (Figure 1).

**Results:** Mean age at the time of CMR was 22.6 years. Mean follow-up time from Fontan to CMR was 18.1 years. Based on CMR, patients were categorized as FF type I (21, 44%), Type II (13, 27%), type III (2, 4%), and type IV (1, 2%). Patients that did not meet criteria for any of the FF phenotypes were regarded as compensated (11, 23%). There was no significant difference among the compensated and FF phenotypes with regards to age, diagnosis, type of Fontan, or length of follow-up since Fontan. Patients with Type I FF were significantly more likely to reach the combined outcome of hospitalization, death, or heart transplant compared to compensated patients (p=0.05). All other clinical factors and outcomes were not significant among the groups.

**Conclusion:** CMR can be used to classify FF phenotype. Larger, prospective studies are needed to assess the utility of FF phenotype classifications in guiding management and predicting outcomes.

