

Meeting abstract

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## **I057 Pulmonary artery size and function after Fontan operation at young age: assessment with phase contrast magnetic resonance imaging**

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from 11<sup>th</sup> Annual SCMR Scientific Sessions  
Los Angeles, CA, USA. 1–3 February 2008

Published: 22 October 2008

*Journal of Cardiovascular Magnetic Resonance* 2008, **10**(Suppl 1):A182 doi:10.1186/1532-429X-10-S1-A182

This abstract is available from: <http://jcmr-online.com/content/10/S1/A182>

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### **Introduction**

little is known about the effects of long-term non-pulsatile flow on pulmonary artery (PA) growth after Fontan operation. Furthermore, the effects on flow variables and shear stress have not been studied in a patient group operated on at young age.

### **Purpose**

In this study, we assessed PA size, flow variables, and shear stress long-term after Fontan operation at young age and compared them with healthy controls, using cardiovascular magnetic resonance (CMR) imaging.

### **Methods**

14 patients (9 males, aged  $13.1 \pm 4.0$  years, follow-up after Fontan completion 9.7 (5.4–16.8) years) and 17 healthy controls (9 males, aged  $13.3 \pm 2.3$  years) were included. Flow measurements in the branch PA were made during a CMR study, using phase contrast velocity-encoded imaging. In patients, flow measurements were repeated during low-dose dobutamine stress of  $7.5 \mu\text{g}/\text{kg}/\text{min}$ . Shear stress was determined according to a previously published method [1].

### **Results**

CMR scanning and dobutamine administration was well tolerated by all subjects without side effects. Results of the flow studies and shear stress determination are summarized in Table 1 (NS = not significant).

### **Conclusion**

PA diameter is normal in patients long-term after Fontan operation at young age. However, flow variables, distensibility and shear stress are significantly lower compared to healthy controls, implicating pulmonary endothelial and/or vascular dysfunction.

### **References**

1. *J Am Coll Cardiol* 2005, **45**:846-854.

**Table 1:**

	controls	patients, rest	patients, stress	p-value (controls vs patients)	p-value (rest vs stress)
Heart rate (/min)	72 ± 12	69 ± 12	93 ± 17	NS	<0.001
Stroke index (ml/m <sup>2</sup> )	31 ± 7	19 ± 7	19 ± 7	<0.001	NS
Total flow (ml/min/m <sup>2</sup> )	2189 ± 463	1244 ± 74	1705 ± 308	<0.001	<0.001
Average flow (ml/s)	56 ± 15	28 ± 6	39 ± 13	<0.001	<0.001
Peak flow (ml/s)	187 ± 48	55 ± 31	71 ± 44	<0.001	<0.001
Diameter (mm)	16.2 ± 1.7	15.1 ± 2.7	15.2 ± 2.8	NS	NS
Distensibility	0.41 ± 0.09	0.22 ± 0.06	0.20 ± 0.07	<0.001	NS
Shear stress (N/m <sup>2</sup> )	0.84 ± 0.14	0.38 ± 0.15	0.50 ± 0.18	<0.001	<0.001

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