

CMR-derived Cardiac Index (CI) is associated with adverse outcomes in patients with single-ventricle Fontan circulation.

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Introduction: Fontan patients are exposed to multi-organ dysfunction (liver malignancy, chronic kidney disease, protein-losing enteropathy and others) and low exercise capacity. They also have reduced heart rate reserve. We hypothesized that a MRI-derived cardiac index may be a good tool for an overall assessment of function of Fontan circulation.

Methods: We calculated and investigated a CMR-CI in 34 adult Fontan patients retrospectively. There was no significant relationship between cardiac index and investigated parameters of organs dysfunction. Over a median follow-up of 4 years, 16 events occurred: 9 arrhythmias, 5 non-elective hospitalizations and 1 death.

Results: Average CMR-CI was 3,58 L/min/m² (min. 2,1 L/min/m², max. 6,1 L/min/m²). Maximal oxygen uptake ranged from 13,16 ml/min/kg to 28,37 ml/min/kg, mean 19,14 ml/min/kg. Statistical analysis of correlation between CMR-CI and organ dysfunction parameters was performed. Achieved results are depicted in the table below.

Conclusions: Reduced CMR-CI is predictor of nonelective hospitalizations in this group of patients. CMR-CI does not correlate with organ dysfunction parameters. It suggests development of some degree of multiorgan functional tolerance despite chronic organ hypoperfusion. Whether it results from decreased cardiac output rather than venous congestion should be elucidated in further studies.

Laboratory tests	N	R	p-value
CI & ALT	34	-0,048402	0,785751
CI & AST	34	-0,085811	0,629426
CI & bilirubin	33	0,080589	0,655726
CI & serum iron level	30	-0,040716	0,830839
CI & creatinine level	34	-0,017049	0,923759
CI & TSH	33	-0,163490	0,363294
CI & Hgb	34	-0,150134	0,396718
CI & Mcv	34	-0,135117	0,446124
CI & RBC Count	34	-0,146101	0,409667
CI & Platelet Count	34	0,239493	0,172509
CI & WBC Count	34	-0,032431	0,855522
Exercie capacity			
CI & pVO2	33	0,272750	0,124612

CI	GFR < 90 ml/min/kg			GFR > 90 ml/min/kg			p
	Mean	SD	n	Mean	SD	n	
	3,425000	0,938749	10	3,642083	0,977250	24	0,508267
CI	Stable NYHA class			Increase of NYHA class			p
	Mean	SD	n	Mean	SD	n	
	3,632083	0,920255	24	3,010000	0,381838	2	0,193856
CI	pVO2 decrease			pVO2 increase			p
	Mean	SD	n	Mean	SD	n	
	3,916000	0,931574	5	3,609444	0,873394	18	0,576056
CI	Lack of nonelective hospitalizations			Nonelective hospitalizations			p
	Mean	SD	n	Mean	SD	n	
	3,754286	0,879509	21	2,870000	0,653758	5	<0,5000
CI	Lack of arrhythmia			Arrhythmia present			p
	Mean	SD	n	Mean	SD	n	
	3,903158	1,041778	19	3,194444	0,692209	9	0,115406