

Digital assessment of endothelial function and its association with clinical variable in patients with Fontan operation

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Background: Endothelial dysfunction has been demonstrated in prior studies of Fontan survivors. However its clinical determinates remains unclear.

Purpose: To clarify the clinical determinates of endothelial dysfunction in Fontan patients.

Methods and Results: We measured endothelial function using reactive hyperemia-peripheral arterial tonometry (RH-PAT) as RH-PAT index (RHI) in 26 Fontan patients (aged 15 to 32 years, male gender 62%) and 6 healthy control (aged 29 to 38 years, male gender 66%), and compared the result with the clinical variables, including hemodynamics, plasma level of natriuretic peptide, lipid profile, glucose tolerance, and exercise capacity. RHI was converted into a natural logarithmic form. The mean RHI was 0.56 +/- 0.26 in Fontan patients and 0.78 +/- 0.31 in control ($p = 0.09$). RHI in Fontan patients was associated with diastolic blood pressure ($r = -0.37$, $p < 0.05$), heart rate ($r = -0.49$, $p < 0.05$), and hemoglobin A1c level ($r = -0.60$, $p < 0.01$). Medication use, central venous pressure, cardiac output, exercise capacity, plasma level of natriuretic peptide and lipid profile did not associated with RHI.

Conclusion: Endothelial function assessed using RH-PAT in Fontan patients was associated with abnormal glucose tolerance and arterial stiffness rather than hemodynamics and heart failure severity. Glucose regulation might be a potential target for the treatment of endothelial dysfunction in Fontan patients.