

**Detection of right ventricular fibrosis by CMR and plasma levels of procollagen type III N-terminal amino peptide in patients with Tetralogy of Fallot**

*Ylitalo P.(1), Pitkänen O.(1), Lauerma K.(2), Holmström M.(2), Jokinen E.(1)*

*Helsinki University Hospital for Children and Adolescent, Department of Pediatric Cardiology, Helsinki Finland(1); HUS Medical Imaging Center, Helsinki Finland (2)*

Objective: Recently the serum concentration of aminoterminal procollagen type III (PIIIP) was shown to be elevated in patients with congenital heart disease (CHD). Ventricular myocardial fibrosis is also evident in the right ventricle of patients after correction of Tetralogy of Fallot (TOF). The levels of PIIIP are associated with the severity of haemodynamic load or hypoxaemia, which both might induce myocardial fibrosis. We hypothesized that serum levels of PIIIP would correlate with the amount of fibrosis detected by late gadolinium enhancement (LGE) cardiovascular magnetic resonance (CMR). We also hypothesized that the amount of fibrosis would show correlation with other clinical markers such as pro-BNP and the right ventricular volume.

Methods: Serum PIIIP levels were measured in two groups: in 50 pediatric patients (mean age 13.1 years, SD 3.1) who had undergone TOF repair and in 43 healthy age and gender matched controls.

These groups underwent CMR-study and LGE was scored in the right and left ventricle (RV and LV).

Results: PIIIP levels of TOF patients were significantly higher than those of control subjects (12.4 SD 4.9 vs. 8.3 SD 2.9  $p < 0.0001$ ). RV LGE was found in all of the patients but LGE score did not correlate with PIIIP levels ( $p = 0.16$ ). LGE score correlated positively with the RV end diastolic volume (EDV ml/m<sup>2</sup>  $p < 0.016$ ) and with pro-BNP ( $p < 0.015$ ). No LV LGE was shown in any of the patients and both LGE scores were zero in all control subjects. PIIIP levels did not correlate with EDV or pro-BNP.

Conclusions: RV LGE is a common finding in TOF patients already in pediatric age whereas LV LGE is not present at all. Cardiac collagen turnover is known to be active in myocardium under pathological conditions. We suggest that the elevated levels of PIIIP reflect an active turnover process in the RV, but the amount fibrosis can not be estimated by plasma PIIIP levels. Higher LGE score is associated with more dilated right ventricle and suggests that dilatation rather than restriction is common in the right ventricle of TOF patients.