

## Right atrial size is a strong predictor of arrhythmia in patients with repaired tetralogy of Fallot.

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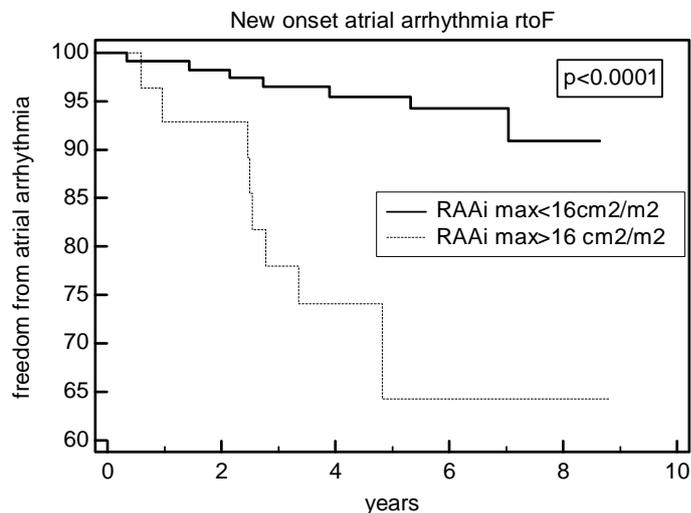
**Introduction:** Patients with repaired tetralogy of Fallot (rtoF) are at risk of arrhythmia, right ventricular (RV) dilatation and dysfunction, and sudden death during long term follow-up. Frequently, pulmonary valve replacement (PVR) and/or defibrillator implantation are indicated. To date, risk stratification focuses on QRS duration and right and left ventricular dysfunction. Recent studies reveal an increasingly important role for atrial size and function in outcomes prediction in non-congenital cardiomyopathies. We hypothesised that atrial dilatation would also relate to outcomes in rtoF.

**Methods:** Retrospective analysis for atrial size was performed in 154 rtoF patients attending cardiovascular magnetic resonance (CMR) imaging from 2002 to 2008. Atrial area was measured on cine CMR 4-chamber view at end-systole. Clinical and echocardiography contemporaneous to CMR were collected. The endpoints were new onset of clinically documented new onset of arrhythmia (atrial and sustained ventricular tachycardia) occurring during follow-up.

**Results:** Median [IQR] age at CMR was 30.8 [21.4-40.2] years. Median follow-up was 6.0 [4.6-6.9] years. During follow-up there were 3 deaths, 26 new onset arrhythmias : 16 atrial tachycardia of which 2 atrial fibrillation, 14 atrial flutters; and 9 sustained ventricular tachycardia. Atrial arrhythmia was correlated with maximal right atrial area indexed to body surface area (RAA<sub>max</sub>) (ROC analysis, AUC 0.72 [0.64-0.79],  $p=0.003$ ), with a cut-off value of  $16 \text{ cm}^2/\text{m}^2$ . On survival curve with this cut off value, there is a strong difference in new onset atrial arrhythmia ( $p<0.0001$ ) (Figure 1). RV end-diastolic volume index (RVEDVi) was not significantly related to atrial arrhythmia but as expected correlated to PVR ( $p<0.0001$ ). Interestingly, the RAA<sub>max</sub> significantly decreased after PVR ( $p=0.0001$ ). Patients with restrictive physiology showed no difference regarding the endpoints but they had a higher RAA<sub>max</sub> ( $p=0.01$ ) and more tricuspid regurgitation ( $p=0.0007$ ). There was no difference in RVEDi, pulmonary regurgitation or pulmonary stenosis compared to the non restrictive physiology population.

**Conclusions:** RAA<sub>max</sub> is a strong predictor of atrial arrhythmia in rtoF. Right atrial area measurement is feasible and widely available to inform clinical decision-making.

Figure 1: Freedom from atrial arrhythmias survival curve with cut off value of  $16 \text{ cm}^2/\text{m}^2$  for the RAA<sub>max</sub>.



rtoF: repaired tetralogy of Fallot, RAA<sub>max</sub>: maximal indexed right atrium area