Echocardiographic deformation imaging as a substitute for cardiac magnetic resonance imaging in arrhythmogenic right ventricular cardiomyopathy risk prediction

F.P. Kirkels¹, C. Rootwelt-Norberg², L.P. Bosman¹, E.W. Aabel², S. Muller¹, K. Taha¹, N. Van Osta¹, Ø.H. Lie², F.W. Asselbergs³, J. Lumens⁴, A.S.J.M. Te Riele¹, N.E. Hasselberg², M.J. Cramer¹, K.H. Haugaa², A.J. Teske¹

¹University Medical Center Utrecht, Department of Cardiology, Utrecht, Netherlands (The)
²Oslo University Hospital, Rikshospitalet, ProCardio Center for Innovation, Department of Cardiology, Oslo, Norway
³Amsterdam University Medical Center, Department of Cardiology, Amsterdam, Netherlands (The)
⁴Cardiovascular Research Institute Maastricht (CARIM), Maastricht, Netherlands (The)

**Funding Acknowledgements:** Type of funding sources: Public grant(s) – National budget only. Main funding source(s): ProCardio Centre for Innovation supported by the Norwegian Research Council

**Background & aims:** Echocardiography has a central role in diagnosis and follow-up of patients with arrhythmogenic right ventricular cardiomyopathy (ARVC). It is however not included in the risk calculator for ventricular arrhythmia (VA) which was recently developed and validate, since traditional echo parameters were outperformed by RV ejection fraction (RVEF) measured by CMR. CMR is however not as widely available as echocardiography. We aimed to investigate whether echocardiographic RV deformation imaging could be used as a substitute for RVEF by CMR in arrhythmic risk prediction in ARVC.

**Methods & results:** From two referral centres, 150 consecutive patients with a definite ARVC diagnosis, no prior sustained VA and an echocardiogram suitable for deformation analysis were included (aged 41 ± 17 years, 50% female). During a median follow-up of 6.3 (IQR 3.1–9.8) years, 37 (25%) experienced a first-time sustained VA. The current ARVC risk calculator, including RVEF by CMR performed well in this cohort, with an optimism corrected C-statistic of 0.77 (95% CI 0.71 – 0.84). When RVEF was replaced by RV free wall longitudinal strain, the latter was an independent predictor (p = 0.005) and C-statistic changed to 0.80 (95% CI 0.74 – 0.86). The model including RV deformation imaging reduced the Akaike information criterion by >2.

**Conclusions:** This study showed that echocardiographic RV deformation imaging is able to replace RVEF by CMR in ARVC risk prediction without losing discriminative power. In clinical use, repeated yearly risk assessment using echocardiography could be alternated with a CMR every few years.