Abstract: 480

Right ventricular dysfunction is associated with late mortality in severe aortic stenosis: results from a multi-centre outcome study in patients undergoing aortic valve replacement

Authors:
M Rigolli¹, TA Musa², TA Treibel², M Loudon¹, VS Vassiliou¹, G Captur³, A Singh⁵, C Chin⁶, LE Dobson², SPica³, T Malley⁴, JRJ Foley², P Bijsterveld², GR Law², SG Myerson¹, ¹University of Oxford Centre for Clinical Magnetic Resonance Research, Radcliffe Department of Medicine - Oxford - United Kingdom of Great Britain & Northern Ireland, ²University of Leeds, Institute for Cardiovascular and Metabolic Medicine - Leeds - United Kingdom of Great Britain & Northern Ireland, ³University College London, Barts Health National Health Service Trust - London - United Kingdom of Great Britain & Northern Ireland, ⁴Imperial College London, Royal Brompton Hospital - London - United Kingdom of Great Britain & Northern Ireland, ⁵University of Leicester, Department of Cardiovascular Science - Leicester - United Kingdom of Great Britain & Northern Ireland, ⁶University of Edinburgh, Centre for Cardiovascular Science - Edinburgh - United Kingdom of Great Britain & Northern Ireland,

On behalf: BSCMR Valve Consortium

Topic(s):
Valvular Heart Disease – Epidemiology, Prognosis, Outcome

Citation:
British Heart Foundation and National Institute of Health Research

Background: The right ventricle (RV) is relatively understudied and often not routinely assessed in aortic stenosis (AS). However, there are several potential reasons for its importance. RV function is sensitive to left-sided afterload changes which can result in pulmonary hypertension (PH) in severe AS. PH is also a recognised predictor of poor prognosis in AS, but RV afterload and function can be difficult to assess. Cardiovascular magnetic resonance (CMR) may reveal unrecognised RV dysfunction and simultaneously evaluate other prognostic markers in AS.

Purpose: To investigate preoperative RV function assessed by CMR in severe AS and its association with mortality after aortic valve replacement (AVR).

Methods: 674 severe AS patients listed for either surgical or percutaneous AVR at six cardiothoracic centres underwent preoperative CMR (for ventricular function, mass and scar) along with echocardiography for valve severity. Scans were core-lab analysed for LV and RV volumes, function and scar quantification. Eight patients were excluded due to inadequate RV image quality for a total of 666 patients finally included. All-cause mortality was tracked for a minimum of 2 years after AVR.

Results: 107 (16%) of severe AS undergoing invasive AVR had a RV ejection fraction (RVEF) <55%. CMR detected overt RV dysfunction (RVEF <50%) in 61 (9%) patients. During a median 3.6 years follow-up, 145 (22%) patients died. Baseline RV dysfunction was the most powerful predictor of all-cause mortality (hazard ratio [HR] 2.5, 95% CI 1.6-3.9, p<0.0001). RV function was independent from other clinical characteristics but associated with signs of LV maladaptation (LV ejection fraction [LVEF] and late gadolinium enhancement [LGE]). The strongest Cox multivariable model for all-cause mortality accounted for RV dysfunction, age and LGE (adjusted HRs 1.7, 1.1, 2.2, respectively). Even early stages of pre-procedural RV dysfunction (RVEF 45-50%) were associated with reduced long-term survival.

Conclusion: One out of 6 patients with severe AS undergoing valve replacement manifests a reduction in RV function.
function detectable by CMR. Those with RV dysfunction (RVEF<50%) have a 2.5-fold increase in all-cause mortality after AVR at 3.6 years. Whilst RV dysfunction is associated with LV maladaptation (LGE, LVEF), it is a powerful independent factor associated with all-cause mortality and impacts survival even at early stages. Thus, the RV appears to be important in cardiac adaptation to AS and longevity after AS intervention.