The effect of resveratrol on aortic growth and function in patients with Marfan syndrome

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Background: Patients with Marfan syndrome (MFS) have an increased risk of life-threatening aortic complications, mostly preceded by aortic dilatation. Resveratrol, a dietary supplement that intervenes in cellular metabolism has been shown to reduce aortic dilatation rate in a rodent study (1).

Purpose: To investigate if treatment with Resveratrol reduces aortic dilatation rate in patients with MFS.

Methods: In this investigator-initiated, prospective, pre-post observational, multicenter trial, we analysed Resveratrol treatment in adults with MFS. Primary endpoint was the change in aortic dilatation rate at five predetermined locations along the thoracic aorta following the daily intake of 500 mg Resveratrol for one year. Aortic dilatation rate was calculated using diastolic Magnetic Resonance Imaging (MRI) aorta diameters acquired at three time points: the most recent MRI examination available prior to inclusion and two Dixon 3D examinations on a 3 Tesla MRI system acquired at baseline and after one year Resveratrol administration. Additionally, we quantified and investigated regional changes in aortic hemodynamics (wall shear stress (WSS), flow velocity and pulse wave velocity (PWV)) determined by 4D-flow MRI.

Results: A total of 57 participants, mean age of 37 ± 9 years, of which 28 males (49%) were included in the study. Twenty-six (46%) had undergone aortic root replacement prior to the study. All aortic dimensions remained stable after 1.2 ± 0.3 years follow-up. A significant decrease in growth rate (mm/year) in the ascending aorta was observed during the trial compared to pre-trial, from 0.54 (IQR: 0.09–1.39) to 0.00 (IQR: -0.99–0.67), p=0.004. Global PWV and regional mean WSS and velocity did not change after one year of Resveratrol use. PWV (m/s) was significantly higher for patients with a history of aortic root surgery (9.83 ± 1.8 versus 8.42 ± 1.91, p=0.034). Additionally, using Spearman’s ρ correlation coefficient, a positive correlation between PWV and age was found; r=0.452, p=0.003.

Conclusion: In adult patients with MFS, Resveratrol treatment shows promising results towards stabilizing aortic growth rate after 1.2 year follow up, without major changes in aorta hemodynamics. These findings may warrant a subsequent larger study with a longer follow-up period.

RESVcue study summary figure