

### Stents in Aortic Coarctation: Beyond Gradients and Pressures

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Percutaneous treatment of aortic coarctation is usually evaluated by residual pressure gradient and persistence of systemic hypertension. Evaluation of other parameters may provide valuable data to determine the effect of treatment on ventricular and arterial function. Longitudinal strain study can be used to assess improvement in left ventricular (LV) myocardial deformation and function. Valvular and arterial factors that oppose LV ejection can be assessed by valvulo arterial impedance (VAI).

Eight patients (5 with native aortic coarctation, 3 with recoarctation), submitted to aortic stenting from July to December 2011, were studied. Invasive pressures and gradients and  $dP/dt$  assessed by pressure wire in LV, ascending and descending aorta, were calculated before and immediately after stenting. Conventional echocardiographic evaluation, pulsed tissue Doppler, speckle tracking longitudinal strain and myocardial velocities and evaluation of VAI were performed before intervention, 24 hours after, and at medium term follow up (3 to 6 months). Statistical analysis was performed with SPSS 17.0.

Median (range) age was 25 years (6 to 57), 4 were female. Mean (SD) invasive pressure gradient varied significantly from 48,4mmHg (28,3) before to 7,8mmHg (11,8) after treatment ( $p=0,01$ ). Mean (SD) of global longitudinal strain varied significantly from -18,9% (2,79) before intervention to -21,9% (1,71) 24 hours after ( $p=0,02$ ), and this was maintained at follow up ( $p=0,02$  compared to pre cath). This trend was also seen in patients who remained hypertensive. Mean (SD) VAI varied significantly from 5,2mmHg/ml.m<sup>2</sup> (1,21) before intervention to 4,6mmHg/ml.m<sup>2</sup> (0,98) at follow-up ( $p=0,02$ ). Changes in longitudinal strain achieved with intervention did not correlate with initial or final gradient nor with VAI changes.  $E/E'$  did not change. Mean  $dP/dt$  increased from 1548mmHg/s to 1831mmHg/s in LV and from 305mmHg/s to 581mmHg/s in descending aorta. Median number of antihypertensive drugs in patients under medication reduced from 3 to 1.

Stenting provided excellent immediate hemodynamic results, with low residual gradients and statistically significant systemic pressure reduction. Longitudinal strain and VAI improved significantly after percutaneous treatment. This multiparameter evaluation may provide a better knowledge of cardiovascular physiology after stenting and a more accurate evaluation of the benefits of percutaneous treatment.