

Exercise Doppler gradients in patients with effectively treated aortic coarctation

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Introduction: Aortic coarctation causes abnormal responses to exercise such as induced hypertension and increased gradients in the descending aorta and these may persist despite correction. Different options of treatment may have distinct patterns of cardiovascular response to exercise, and its knowledge may influence management of these patients.

Methods: We performed exercise testing and transthoracic echocardiography before and up to one minute after maximum exercise on patients with effectively treated aortic coarctation (with corrected gradients < 20 mmHg) by surgery or stent implantation. Peak and corrected Doppler gradients at the isthmus were recorded at rest and up to one minute after maximum exercise.

Results: Thirty four patients were included, 28 male (82%), median age 29 years (range 13-53). The last intervention for coarctation treatment was surgery in 11 patients (32%) and stent placement in 23 (68%). Median age at the last procedure was 23 years (1-47). Median time after treatment was 2 years (0.5-22). Twenty one patients had hypertension (62%) and 16 of these were on anti-hypertensives. Exercise tests had a median duration of 10 minutes (7-15). There were 11 exercise induced hypertensive responses (32%). Median peak gradients were 18mmHg (5-40) at rest and 38mmHg (8-74) after exercise. Median corrected gradients were 12mmHg (5-20) and 25mmHg (5-70) respectively. There was no statistically significant difference between surgical or stent groups in terms of hypertensive response or measured Doppler gradients either at rest or after exercise. The group of patients who were treated before 20 years of age had higher gradients before treatment and a significantly higher gradient at rest and after exercise ($p=0.003$ and $p=0.001$, respectively).

Conclusion: These results suggest that response to exercise in patients with effectively treated aortic coarctation by surgery or stent implantation is similar, specifically in terms of exercise induced hypertension and Doppler gradients. There were significantly higher peak gradients at rest and after exercise on patients treated at a younger age, presumably because of higher gradients before treatment.