Coarctation of the Aorta
Register and imaging studies

Daniel Rinnström

Akademisk avhandling

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Fakultetsopponent: Professor Gerhard-Paul Diller,
Faculty of Medicine, National Heart & Lung Institute, Imperial College,
London, England
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Abstract

**Background** Coarctation of the aorta (CoA) constitutes 5-8% of all congenital heart disease (CHD) and is associated with long-term complications such as hypertension (HTN) and left ventricular hypertrophy (LVH). Factors associated with HTN, LVH, and diffuse myocardial fibrosis, are not yet fully explored in this population.

**Methods** Papers I-III: The Swedish national register of congenital heart disease (SWEDCON) was used to identify adult patients with repaired CoA.

Paper IV: Data on 2,424 adult patients with CHD was extracted from SWEDCON and compared to controls (n = 4,605) regarding height, weight and body mass index (BMI).

Paper V: Adults with CoA (n = 21, age 28.5 (19.1-65.1) years, 33.3% female) referred for CMR were investigated with T1 mapping to determine left ventricular extracellular volume fraction (ECV).

**Results** Papers I-II: Out of 653 patients, 344 (52.7%) had HTN. In a multivariable model, age (years) (OR 1.07, CI 1.05-1.10), sex (male) (OR 3.35, CI 1.98-5.68) and BMI (kg/m²) (OR 1.09, CI 1.03-1.16) were associated with having HTN, and so was systolic arm-leg blood pressure (BP) gradient where an association was found at the ranges [10, 20] mmHg (OR 3.58, CI 1.70-7.55) and > 20 mmHg (OR 11.38, CI 4.03-32.11), in comparison to the range [0, 10] mmHg.

When investigating 243 patients with diagnosed HTN, 127 (52.3%) had elevated BP (≥ 140/90 mmHg). Age (years) (OR 1.03, CI 1.01-1.06) was associated with elevated BP, and so was systolic arm-leg BP gradient in the ranges (10, 20] mmHg (OR 4.92, CI 1.76-13.79), and > 20 mmHg (OR 9.93, CI 2.99-33.02), in comparison to the reference interval [0, 10] mmHg.

Patients with elevated BP had more classes of anti-hypertensive medication classes prescribed (1.9 vs 1.5, p = 0.003).

Paper III: Out of 506 patients, 114 (22.5%) were found to have LVH. Systolic BP (mmHg) (OR 1.02, CI 1.01-1.04), aortic valve disease, (OR 2.17, CI 1.33–3.53), age (years) (OR 1.03, CI 1.01–1.05), and HTN (OR 3.02, CI 1.81–5.02), were associated with LVH, while sex (female) (OR 0.41, CI 0.24–0.72) was negatively associated with LVH.

Paper IV: There was no difference in height, weight, or BMI between patients with CoA (n = 414) and the reference population.

Paper V: In the population of 21 patients, an increased left ventricular myocardial ECV was found in 6 cases (28.6%). Of the patients with increased ECV, 5/6 (83.3%) were female (p = 0.002). Patients with increased ECV did not otherwise differ from the rest of the study population.

**Conclusions** In adults with repaired CoA, HTN and LVH were common, and many patients with HTN had elevated BP despite treatment. The potentially modifiable factors BMI and systolic arm-leg BP gradient were associated with HTN, and the gradient was also associated with elevated BP among patients with diagnosed HTN. The gradient’s significance remained even within what the current guidelines consider acceptable ranges. Potentially modifiable factors associated with LVH were systolic BP and aortic valve disease. We found no general difference in height, weight, or BMI between patients with CoA and the reference population. While LVH was more common among men, increased myocardial ECV was more common among women.

**Keywords**
cocartation of the aorta, adult congenital heart disease, hypertension, left ventricular hypertrophy, body mass index, height, weight, register, CMR

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