

# Cardiovascular disease in patients with congenital heart disease

Akademisk avhandling

Som för avläggande av medicine doktorsexamen vid Sahlgrenska akademien, Göteborgs universitet kommer att offentligen försvaras i hörsal Arvid Carlsson, Medicinaregatan 3, Göteborg, den 14:e maj, 2020, klockan 09.00.

Disputationen kan även ses online på följande webbadress:

[https://play.gu.se/media/0\\_x1bohu2q](https://play.gu.se/media/0_x1bohu2q)

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## Avhandlingen baseras på följande delarbeten

I. Fedchenko M, Mandalenakis Z, Rosengren A, Lappas G, Eriksson P, Skoglund K, Dellborg M. Ischemic heart disease in children and young adults with congenital heart disease in Sweden.

*International Journal of Cardiology. 2017;248:143-8*

II. Fedchenko M, Mandalenakis Z, Dellborg H, Hultsberg-Olsson G, Bjork A, Eriksson P, Dellborg M. Cardiovascular risk factors in adults with coarctation of the aorta.

*Congenital Heart Disease. 2019;14(4):549-58.*

III. Fedchenko M, Mandalenakis Z, Hultsberg-Olsson G, Dellborg H, Eriksson P, Dellborg M. Validation of myocardial infarction diagnosis in patients with congenital heart disease in Sweden.

*Submitted.*

IV. Fedchenko M, Mandalenakis Z, Giang WK, Rosengren A, Eriksson P, Dellborg M. Long-term outcomes after myocardial infarction in middle aged and older patients with congenital heart disease – a nationwide study.

*Submitted.*

**SAHLGRENKA AKADEMIN  
INSTITUTIONEN FÖR MEDICIN**



# Cardiovascular disease in patients with congenital heart disease

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## Abstract

**Background:** Today, about 95% of children with congenital heart disease (CHD) survive into adulthood and the survival in patients with CHD has increased considerably during the last decades. With increasing age, patients with CHD are at an increased risk of developing acquired cardiovascular disease, such as ischemic heart disease and myocardial infarction (MI). The overall aim of this thesis was to study ischemic heart disease and MI in patients with CHD, and to assess the prevalence of modifiable cardiovascular risk factors in patients with coarctation of the aorta (CoA).

**Methods:** In paper I, III and IV we used the Swedish National Patient Register and the Cause of Death Register. In Paper I, 21,982 children and young adults with CHD born in 1970-1993 were followed until December 2011. In Paper IV, 17,189 patients with CHD  $\geq$  40 years of age, born in 1930 to 1970, were followed during the years 1970-2017. Each patient with CHD was matched by age and sex with  $\sim$ 10 controls from the total population register. Kaplan Meier and Cox regression analyses were used to calculate the cumulative incidence and hazard ratios for ischemic heart disease/MI in patients with CHD compared with controls. In Paper III we validated the MI diagnoses in patients with CHD by performing a medical chart review. In Paper II, a structured assessment of the prevalence of modifiable cardiovascular risk factors in 72 patients with CoA was performed, including oral glucose tolerance test and cholesterol levels.

**Results:** The risk of ischemic heart disease was 16.5 times higher in children and young adults with CHD than in controls, and also the risk of MI was higher in middle aged and older patients with CHD compared with controls. However, the relative risk compared with controls was markedly higher in younger patients with CHD than in older patients with CHD (Papers I and IV). Most of the MI diagnoses in patients with CHD were correct (Paper III). Almost 9 out of 10 patients with CoA had at least one modifiable cardiovascular risk factor.

**Conclusion:** The risk of ischemic heart disease and MI is increased in patients with CHD compared with controls; however, the mechanisms behind the increased risk may differ between younger and older patients with CHD. Modifiable cardiovascular risk factors are common in patients with CoA and a structured assessment of these should be considered to reduce the burden of atherosclerotic disease in CHD patients.

**Keywords:** congenital heart disease, myocardial infarction, ischemic heart disease, cardiovascular risk factor, coarctation of the aorta