Göteborg, 2020

Congenital Heart Disease, Type 1 and Type 2 Diabetes Mellitus

Akademisk avhandling

Som för avläggande av medicine doktorsexamen vid Sahlgrenska akademin, Göteborgs universitet kommer att offentligen försvaras i hörsal Arvid Carlsson, Medicinaregatan 3, 413 90 Göteborg, den 29 Maj 2020, klockan 09.00. Disputationen kan även ses online på följande webbadress: https://play.gu.se/media/0_x1bohu2q.

av Anna Björk

Fakultetsopponent:

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Karolinska Institutet, Sverige

Avhandlingen baseras på följande delarbeten.

I. Dellborg M, Björk A, Pirouzi Fard N M, Ambring A, Eriksson P, Svensson A-M, Gudbjörnsdottir S. *High mortality and morbidity among adults with congenital heart disease and type 2 diabetes.* Scand Cardiovasc J. 2015;49(6):344-50

II. Björk A, Svensson A-M, Pirouzi Fard N M, Eriksson P, Dellborg M. *Type I diabetes mellitus and associated risk factors in patients with or without CHD: a case – control study.* Cardiol Young. 2017 May 29:1-8

III. Björk A, Mandalenakis, Z, Giang W K, Rosengren A, Eriksson P, Dellborg M. *Incidence of Type 1 Diabetes Mellitus and effect on mortality in young patients with congenital heart defect – a nationwide cohort study*. Int J Cardiol 2020 10 Jan, in print

IV. Björk A, Mandalenakis, Z, Giang W K, Rosengren A, Eriksson P, Dellborg M. *Incidence of Diabetes Mellitus and effect on mortality in adults with congenital heart disease – a nationwide cohort study.* In manuscript

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Congenital Heart Disease, Type 1 and Type 2 Diabetes Mellitus

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Worldwide, 1% of all children are born with a congenital heart disease (CHD) and >95% reach adulthood. Diabetes mellitus (DM), type 1 (T1DM) and type 2 (T2DM) increases worldwide. T2DM is due to decreased insulin sensitivity and insulin production depending on genetics, obesity and sedentary lifestyle. T1DM is an autoimmune disease which could be due to genetics, exposure to infections and stress-strain.

The aim of this thesis was to in large registers investigate the prevalence, incidence of T1DM and T2DM and influence on mortality and morbidity in a CHD population.

Paper I, a retrospective cohort study, investigated the risk of concurrent CHD in patients with T2DM, regarding T2DM onset with matched controls. The coexistence of CHD and T2DM was associated with secondary risk factors for cardiovascular disease, sedentary lifestyle and morbidity.

Paper II, a retrospective cohort study, investigated the risk of concurrent CHD in patients with T1DM, regarding T1DM onset, mortality and morbidity with matched controls. Coexistence of CHD and T1DM was associated with an earlier onset of T1DM, a higher frequency of microvascular complications, co-morbidity, and mortality.

Paper III, a nationwide cohort of patients with CHD and population based controls, the incidence of T1DM onset was 50% higher in patients with CHD. A four-fold increase in mortality among patients with CHD and T1DM was seen compared to controls with only T1DM.

Paper IV, from a nationwide cohort of patients with CHD and population based controls, the incidence of developing adult onset DM was almost 50% higher in patients with CHD, showing a significant increase in risk also divided by birth cohort and by CHD lesion. The combination of CHD and DM was associated with a significantly increased mortality compared to controls without CHD.

In conclusion, this thesis has shown that the CHD population have a higher risk of T1DM and T2DM and a higher mortality and morbidity after onset of DM compared to controls without CHD. These findings are of great importance in future preventive and medical care for patients with CHD.

Keywords: Congenital Heart disease; diabetes; T1DM; T2DM; morbidity; mortality

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