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40-year trends in incidence of simple congenital heart disease: a nationwide study

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Background: The methods for diagnosing congenital heart diseases (CHD) have changed radically over the last two decades. Since 2004, foetuses have been screened nationwide for congenital diseases in Denmark. In addition, the use of echocardiography has increased considerably during the last decades, facilitating the diagnosis of asymptomatic CHD. Despite the increased diagnostic possibilities, novel research regarding the incidence of simple CHD is lacking.

Purpose: To examine temporal trends in the incidence of simple CHD in the Danish population.

Methods: All Danish residents diagnosed with a ventricular septal defect (VSD), atrial septal defect (ASD) or patent ductus arteriosus (PDA) between 1 January 1977 and 31 December 2016 were identified by linking nationwide registers. Patients with simple CHD were defined as individuals diagnosed with an isolated VSD, ASD or PDA. Excluded was patients who had genetic disorders, other CHDs or developed a clinically significant morbidity such as myocardial infarction and chronic kidney disease before the age of 15 years.

Results: We included 10,464 patients diagnosed with simple CHD of whom 4,766 (45.5%) were men. During the study period, 4,317 (41.3%) were diagnosed with VSD, 4,148 (39.6%), with ASD and 1,999 (19.1%) with PDA.

Crude incidence rates (IR) of ASD (Figure 1, panel A) remained unchanged between 1977–2004, after which ASD rates increased markedly until reaching a plateau between 2013–2016. Between 1997–2016, the median age at diagnosis of ASD increased substantially (Figure 1, panel B) (median age in 1997 = 19 years (IQR 11–45); in 2016 = 40 years (IQR 1–56); in 1977–1996: 18 years (IQR 5–44); in 1997–2016: 31 years (IQR 1–52)). VSD rates did not change between 1977–1991, increased until 1994 (IR in 1991 = 14.46 per 1 mil person years (PY); in 1994 = 26.06 per 1 mil PY) and subsequently slowly decreased until 2016 (IR in 2016 = 13.99 per 1 mil PY). The median age at diagnosis of VSD was consistent throughout the study period and was overall 1 years (IQR 0–17). The rates of PDA were consistent during the study period, and the overall median age at diagnosis of PDA was 1 months (IQR 1–40).

Conclusion: In this nationwide study of simple CHD, the incidence rates and age at time of diagnosis of VSD and PDA remained stable during the 40-year period. Contrastingly, the incidence rates and age at time of diagnosis of ASD increased markedly from 2004 and onwards.

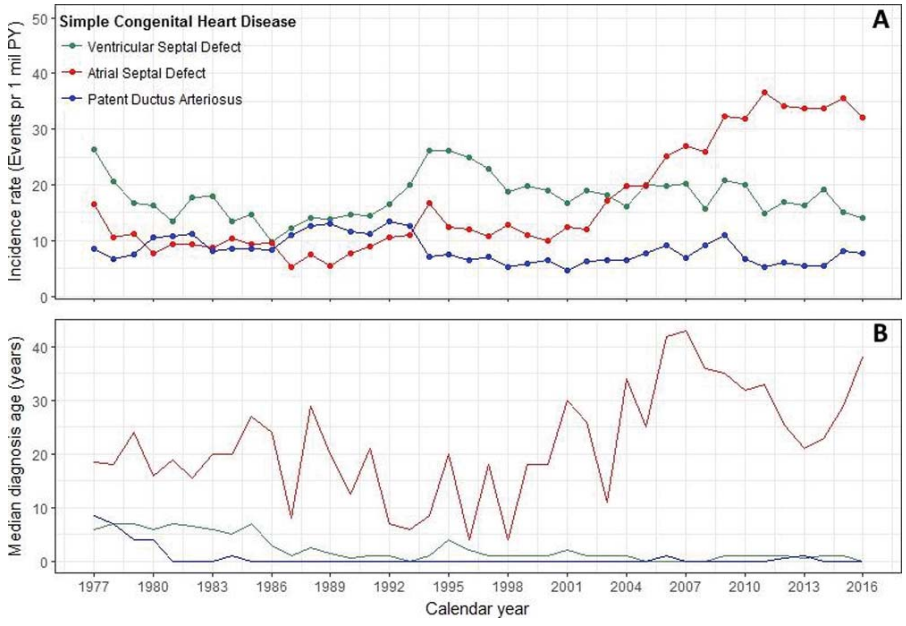

Figure 1