

Streszczenie w języku angielskim

Abstract

Introduction

The progress in treatment that has been made in pediatric cardiology and cardiac surgery resulted in rise of adult population with congenital heart disease (ACHD), an increasing part of which are people aged ≥ 60 years. This group consists not only of patients with mild defects, but also of heart defects with at least moderate severity. The aging of the ACHD population observed in the 21st century results in a greater burden of classical cardiovascular risk factors and acquired heart diseases. Acquired cardiovascular diseases complicate the course and treatment of CHD in the elderly and they are identified as independent risk factors for overall mortality in this population.

Aims of the study

The aim of the study was to assess the burden of cardiovascular risk factors and selected acquired cardiovascular diseases in patients with ACHD over 60 years of age.

- Evaluation of the burden of cardiovascular risk factors (systemic hypertension, dyslipidemia, body mass index, diabetes and smoking status) among elderly patients with ACHD.
- Assessment of the prevalence of coronary artery disease, its risk factors, and the use of guideline-directed pharmacotherapy among elderly with ACHD.
- Assessment of the burden of atrial fibrillation (AF)/atrial flutter (AFL), risk factors of arrhythmia, and the mode of anticoagulant treatment among older adults with CHD.

Material and methods

A retrospective data analysis was performed on patients hospitalized from July 2013 to March 2020 in a tertiary clinic for ACHD. The inclusion criteria were: (1) ≥ 60 years of age at the time of hospitalization, (2) previously or newly diagnosed CHD.

Demographic and anthropometric data, type of CHD, previous surgical treatment/percutaneous intervention, comorbidities, addictions, and pharmacotherapy were analyzed. CHD was classified as mild, moderate, and severe according to the guidelines of the European Society of Cardiology.

The first publication analyzed the prevalence of cardiovascular risk factors, i.e. hypertension, dyslipidemia, overweight/obesity, diabetes and smoking in the entire study group and according to gender, age and CHD severity.

In the second publication coronary artery disease (CAD) was defined as a history of acute coronary syndrome (ACS; ST-segment elevation myocardial infarction, non-ST-segment elevation myocardial infarction, or unstable angina), a history of planned coronary revascularization (coronary artery bypass grafting [CABG] or percutaneous coronary intervention [PCI]), or more than 50% diameter stenosis in any vessel on invasive coronary angiography or computed tomography angiography.

In the third publication analyzing the prevalence of AF/AFL, every type of arrhythmia (paroxysmal, persistent or permanent) has been taken into account. The diagnosis of arrhythmia was based on electrocardiogram at rest or Holter monitoring. Additionally, ACHD lesions were grouped into 3 categories: left-sided heart defects, right-sided heart defects, and shunt lesions.

The study was conducted on the basis of the research entitled "Cardiovascular risk factors in patients with congenital heart disease over 60 years of age", for which the consent, of the Local Bioethics Committee at the National Institute of Cardiology was obtained (consent no. – IK.NPIA.0021.75.1890/20 dated 04/12/2020).

Results

Data on the prevalence of traditional cardiovascular risk factors, CAD and AF/AFL were collected in 322 patients with CHD ≥ 60 years of age hospitalized in the Department of Congenital Heart Disease of the National Institute of Cardiology in the analyzed period.

Publication number 1: The burden of cardiovascular risk factors among seniors with congenital heart disease: A single tertiary center experience, (Kwiatek-Wrzosek A, Kowalik E, Kowalski M, Hoffman P.); *Kardiol Pol.* 2021;79(11):1251-1255. doi: 10.33963/KP.a2021.0129.

Among 322 patients (median age 66 years; 34% men) with mild (81.4%), moderate (13.9%) and severe (4.3%) ACHD the most common cardiovascular (CV) risk factors were: overweight/obesity (65.5%), dyslipidemia (64.9%), and arterial hypertension (60.6%). Over 21% of patients suffered from diabetes, and 25.8% were smokers. Over 54% of patients had two or three CV risk factors. Patients above 70 years of age were healthier in terms of being overweight/obese (55.7% vs 69%; $p=0.006$), dyslipidemia (53.8% vs 69%; $p=0.02$) and smoking (16.25% vs 28.9%; $p=0.04$) than younger population (aged 60-69 years). Patients with mild ACHD were more likely to be hypertensive compared to individuals with moderate/severe defects (64.3% vs 44.1%; $p=0.006$). The highest prevalence of cardiovascular risk factors was noted in younger men (60-69 years of age) with mild ACHD.

Publication number 2: Coronary artery disease in older adults with congenital heart defects: risk factors and pharmacotherapy, (Kowalik E, Kwiatek-Wrzosek A, Kowalski M, Biernacka E, Hoffman P.); *Pol Arch Intern Med.* 2024; 134: 16641. doi:10.20452/pamw.16641.

Among 322 patients with ACHD aged 60 years or older hospitalized in the Department of Congenital Heart Diseases, 198 individuals with known coronary artery status were included in the analysis. CAD was found in 54 participants (27.3%); 8 patients had a history of ACS, 18 patients had previously undergone planned CABG/PCI procedure, and 31 individuals had documented significant stenosis on coronary angiography. The CAD patients were more often men (64.4% vs 35.4% in the non-CAD patients, $p=0.02$), and they were more likely to be diagnosed with mild CHD (90.7% vs 74%, $p=0.02$), systemic hypertension (79.6% vs 57.6%; $p=0.004$), and dyslipidemia (88.9% vs 66%; $p=0.001$). They were also more often former or current smokers (42.6% vs 24.3%; $p=0.004$). In the multivariable analysis, male sex, systemic hypertension, and dyslipidemia remained strongly—associated with CAD, whereas overweight/obesity was significantly negatively associated with the outcome (so called “obesity paradox”). β -Blockers were prescribed to 87% of patients, angiotensin-converting enzyme inhibitors or angiotensin receptor blockers to 74%, and lipid-lowering agents to 96% of CAD patients. The percentage of CAD patients on antiplatelet or anticoagulant drugs was 89%.

Publication number 3: Enormous burden of atrial fibrillation in older patients with congenital heart disease: do only age and underlying heart defect matter? (Kwiatek-Wrzosek A, Kowalski M, Biernacka E, Hoffman P, Kowalik E.); *Circ Arrhythm Electrophysiol.* 2024;17:e012690. doi: 10.1161/CIRCEP.123.012690.

Among 322 patients with ACHD, AF/AFL (paroxysmal, persistent or permanent) was diagnosed in 157 (49%) of them. The prevalence of AF/AFL increased significantly after the age of 69 years (44.5% in the age group 65-69 to 66.5% in the age group 70-74, $p=0.02$) and reached a plateau. Arrhythmia less often affected patients with left-sided heart defects (34.2%) compared to individuals with shunt lesions (50.7%; $p=0.01$) and patients with right-sided heart defects (67.6%; $p<0.001$). Individuals with AF/AFL were more likely to be diabetic and have a history of CHD-related interventions. In the multivariate regression analysis independent risk factors for arrhythmia were: age, male gender, BMI, history of interventions, presence of non left-sided heart defect, and the presence of right-sided heart defect. The proportion of patients with AF/AFL taking oral anticoagulants was 96%, including 32% who were treated with NOAC.

Conclusions

1. Classical cardiovascular risk factors constitute a significant burden in elderly CHD patients. The most common cardiovascular risk factors in CHD patients include overweight/obesity, dyslipidemia, and hypertension. More than half of patients presented 2 or 3 cardiovascular risk factors. The highest risk factor burden was observed in younger men with mild CHD.
2. CAD is common in patients with ACHD aged 60 years or older and has been found in over 25% of study population. In addition to male gender independent predictors of CAD are systemic hypertension and dyslipidemia. However, the negative correlation between overweight/obesity and the occurrence of CAD in ACHD patients ≥ 60 years of age suggests the presence of so called "obesity paradox" in this population. Guideline-recommended pharmacotherapy for secondary prevention of CAD in elderly people with ACHD proved to be satisfactory.

3. AF/AFL occurs in almost half of elderly patients with CHD, including over 60% of patients over 70 years of age. In addition to non-modifiable risk factors predisposing to the occurrence of arrhythmia (age, male gender, previous surgical treatment, shunt lesions, and right-sided heart defects), an independent risk factor for AF/AFL in this group is the body mass index. Oral anticoagulation is used in almost 100% of patients.

Anne Thiele-Wnose