EDITORIAL

Coronary artery disease and cardiovascular risk factors in adults with congenital heart disease

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Advances in pediatric cardiology and pediatric cardiac surgery have contributed to prolonged survival of patients with congenital heart diseases (CHDs). In recent decades, more than 90% of individuals with CHD have reached adulthood. Consequently, adults with CHD progressively outnumber the pediatric CHD population.[1] Although surgical outcomes of CHD patients are generally satisfactory, their long-term survival rates are lower than those observed in the non-CHD population. Moreover, knowledge about functioning and clinical status of these patients in long-term follow-up is limited. Currently, 90% of patients with mild, 75% of those with moderate, and 40% of those with complex heart disease reach the age of 60 years, and we should expect a gradual increase in these rates in the coming decades.[1,2]

With age, there is an increased risk of both long-term complications of a given defect and of lifestyle-induced diseases typical of the general population, including ischemic heart disease.[3] Moreover, adult CHD (ACHD) patients are a heterogeneous group in terms of pathophysiology and probability of early development of atherosclerosis.

There are scarce literature data concerning the prevalence of coronary artery disease (CAD), its risk factors, and use of secondary prevention pharmacotherapy among older patients with ACHD. In this issue of *Polish Archives of Internal Medicine*, Kowalik et al[4] try to fill this knowledge gap. Their study shows that CAD is common in older patients with ACHD. Male sex, dyslipidemia, and systemic hypertension were identified as independent predictors of CAD. The authors also observed the occurrence of the obesity paradox in the study population.[4]

Obesity, sedentary lifestyle, and metabolic syndrome, which increase the risk of atherosclerosis-derived cardiovascular diseases, are more common in patients with ACHD than in the general population. Moreover, metabolic syndrome, hypertension, diabetes mellitus, obesity, and CAD can negatively influence the original CHD.[5,6] In accordance with the European Society of Cardiology guidelines, recommendations regarding physical exercise and sport activity should be adapted to the patient's individual capabilities, their current hemodynamic status, risk of sudden circulatory system decompensation, and previous physical fitness level.[7] Many doctors are often overly conservative when advising patients about physical exercise; in particular, when they decide to excuse children with CHD from physical education classes. Another factor that may influence development of CAD in the ACHD population is chronic stress. Data show that approximately 12%–31% of children undergoing cardiac surgery develop post-traumatic stress disorder related to painful or frightening medical procedures and hospitalization.[8]

The largest group of ACHD and coexistent CAD in the presented publication were patients with bicuspid aortic valve (BAV), the most common congenital cardiac malformation. BAV is associated with a number of cardiac pathologies, including coarctation of the aorta, aortic dilation, and aortic stenosis. However, there are no data suggesting an increased risk of premature CAD in this group.[1,9]

Among patients with ACHD, coarctation of the aorta is the most common defect associated with hypertension. Despite effective surgical treatment, these patients are at a risk of hypertension, with an average prevalence rate of 32.5% (range, 25%–68%), as well as of ischemic heart disease, atherosclerosis, and chronic heart failure.[10] Development of hypertension in the individuals with aortic coarctation is triggered by multifactorial mechanisms. Disturbances in the structure of the thoracic aortic wall proximal to stenosis, with the number of collagen fibers exceeding the number of elastin fibers and smooth muscle cells, lead to increased wall stiffness, reduced

compliance, and acceleration of pulse-wave velocity.[11] A cascade of pathophysiologic processes is triggered, with baroreceptor dysfunction, predominant sympathetic nervous system activity, and activation of the renin-angiotensin-aldosterone system, which lead to an increase in blood pressure.[12]

In summary, the ACHD group is highly heterogeneous in terms of severity of the defect, type of repair procedures performed, clinical condition, and occurrence of long-term complications. Extensive, multicenter studies are needed to assess the risk of cardiovascular complications in particular defects. ACHD patients require regular monitoring to identify and reduce CAD risk factors. They should be educated about the need to lead a healthy lifestyle. Early identification of patients requiring treatment of long-term complications is also necessary.

ARTICLE INFORMATION

DISCLAIMER The opinions expressed by the author(s) are not necessarily those of the journal editors, Polish Society of Internal Medicine, or publisher.

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