Cardiac resynchronization therapy as a bridge to adult congenital heart surgery

Karolina Borowiec[1], Elżbieta Katarzyna Biernacka[1], Mirosław Kowalski[1], Olgierd Woźniak[1], Maciej Sterliński[2], Artur Oręziak[2], Jacek Różański[3], Mariusz Kuśmierczyk[3], Piotr Hoffman[1]

[1]Department of Congenital Heart Diseases, National Institute of Cardiology, Warszawa, Poland
[2]Department of Arrhythmia, National Institute of Cardiology, Warszawa, Poland
[3]Department of Cardiac Surgery and Transplantology, National Institute of Cardiology, Warszawa, Poland

Correspondence to:
Karolina Borowiec, MD, Department of Congenital Heart Diseases, National Institute of Cardiology, Alpejska 42, 04–628 Warszawa, Poland, phone: +48 22 343 44 00, e-mail: kborowiec@ikard.pl

Kardiol Pol. 2021. 79 (7–8): 895–896; DOI: 10.33963/KP.a2021.0029

Received: April 30, 2021

Revision accepted: June 1, 2021

Published online: June 2, 2021

A 28-year-old woman after anatomic correction of transposition of the great arteries with ventricular septal defect and left ventricular outflow tract obstruction at the age of 9 years, and aortic valve replacement (AVR) with bioprosthesis 21 mm due to aortic regurgitation at the age of 22 years reported a dramatic deterioration of exercise capacity (from New York Heart Association [NYHA] class I to class III). Echocardiography demonstrated enlarged left ventricle (left ventricular end-diastolic volume [LVEDV] = 258 ml), with advanced mechanical asynchrony and severely impaired systolic function (left ventricular ejection fraction [LVEF] = 22%, whereas two years earlier it was 40%) (Figure 1A, Supplementary material, *Video S1*). The mean gradient across the aortic valve was 35 mm Hg, and the aortic valve area was 0.8 cm^2. N-terminal pro-brain natriuretic peptide (NT-proBNP) was 2519 pg/ml. A 12-lead electrocardiogram showed sinus rhythm with left bundle branch block. No further cardiac pathologies were found. The heart team decided that aortic valve replacement would be hazardous because of severe left ventricular systolic impairment. Instead, due to left bundle branch block (QRS duration, QRSd = 160 ms) (Figure 1A) and advanced heart failure the patient was referred for cardiac resynchronization therapy (CRT). Following the implantation of the CRT pacemaker, QRS complexes narrowed to 132 ms (Figure 1B), NT-proBNP dropped to 839.5 pg/ml,

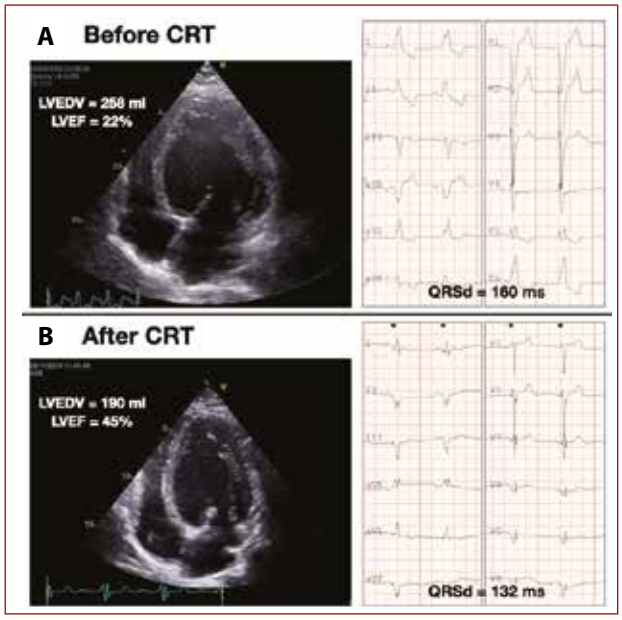

Figure 1. Echocardiography and electrocardiogram; **A.** Before and **B.** after cardiac resynchronization therapy

Abbreviations: CRT, cardiac resynchronization therapy; LVEDV, left ventricular end-diastolic volume; LVEF, left ventricular ejection fraction

and echocardiographic parameters improved (LVEF 45%, LVEDV 190 ml) (Figure 1B; Supplementary material, *Video* S2). A mean gradient across the aortic valve prosthesis was 60 mm Hg. Consequently, aortic valve replacement (re-AVR) with a 21 mm mechanical prosthesis was performed, along with the LeCompte maneuver and reconstruction of the pulmonary artery with vascular graft. Six months after the surgery, NT-proBNP dropped to 272 pg/ml, LVEF raised to 48%, and LVEDV decreased to 179 ml. Exercise capacity was restored (NYHA class I). The patient returned to her normal activities, reporting a great improvement in her quality of life.

Implantation of the CRT pacemaker as a bridge to surgery is an innovative approach. So far, only one report has been published on the use of CRT as a bridge to surgery in patients with aortic valve stenosis and left ventricular dyssynchrony [1]. Our case is the first to describe such treatment in a patient with congenital heart disease. Since the decision regarding CRT implantation relies mainly on the physicians' experience [2], we believe our case will inspire other clinicians to use this approach in different groups of patients.

Supplementary material

Supplementary material is available at https://journals.viamedica.pl/kardiologia_polska.

Article information

Conflict of interest: None declared.

How to cite: Borowiec K, Biernacka EK, Kowalski M, et al. Cardiac resynchronization therapy as a bridge to adult congenital heart surgery. Kardiol Pol. 2021; 79(7–8): 895–896, doi: 10.33963/KP.a2021.0029.

REFERENCES

1. Garnier F, Eicher JC, Jazayeri S, et al. Usefulness and limitations of contractile reserve evaluation in patients with low-flow, low-gradient aortic stenosis eligible for cardiac resynchronization therapy. Eur J Heart Fail. 2014; 16(6): 648–654, doi: 10.1002/ejhf.78, indexed in Pubmed: 24639092.
2. Łasocha D, Sterliński M, Tajstra M, et al. Do we differ in terms of indications and demographics in cardiac resynchronisation recipients in Poland? Insights from the European CRT Survey II Registry. Kardiol Pol. 2019; 77(1): 40–46, doi: 10.5603/KP.a2018.0215, indexed in Pubmed: 30406939.