Effective cardioprotection with early initiation of sacubitril-valsartan in a patient with breast cancer and cancer treatment-induced heart failure

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We present a case of a young patient with breast cancer, whose oncological treatment resulted in heart failure (HF) and who was successfully treated with modern cardioprotective therapy, including angiotensin receptor-neprilysin inhibitor (ARNI).

A 48-year-old woman with right breast cancer was admitted to a cardio-oncological outpatient clinic due to declining exercise tolerance. Nine months earlier she was treated with doxorubicin (total dose of 240 mg/m^2) and cyclophosphamide, and then with paclitaxel. She had also undergone breast-conserving surgery with sentinel lymph node dissection and been treated with trastuzumab for 7 months and hormone therapy (goserelin with tamoxifen) for a month. Apart from a history of smoking, the patient had no risk factors for cardiovascular disease. Echocardiography performed before the initiation of oncological treatment showed no abnormalities and preserved left ventricular (LV) systolic function with LV ejection fraction (LVEF) of 65% (Figure 1A and Supplementary material). The control echocardiography performed before the visit to the cardio-oncological outpatient clinic revealed deterioration of LV systolic function: LVEF 56% and LV global longitudinal strain (GLS): –15%. Therefore, cardioprotection (ramipril, bisoprolol, atorvastatin) was introduced to enable the continuation of the current oncological treatment and planned radiotherapy. Echocardiography performed after completion of adjuvant radiotherapy (40 Gy/15 F + 10 Gy/1 F) revealed further deterioration in LV function (LVEF, 48%; GLS, –15%) (Figure 1B and Supplementary material). The cardioprotection regimen was modified, and the mineralocorticoid receptor antagonist (MRA) and ARNI were added. It resulted in a significant improvement in the LV systolic function (LVEF, 56%; GLS, –17%) and enabled further treatment with trastuzumab according to the oncological program (Figure 1C and Supplementary material). Currently, the patient continues hormone therapy for breast cancer without symptoms of heart failure.

The cumulative incidence of cancer therapy-induced cardiotoxicity is 20.2% within 2 years after initiation of doxorubicin-containing therapy followed by trastuzumab [1]. Therefore, some authors suggest the preventive use of angiotensin-converting enzyme inhibitors (ACEI) to prevent early post-anthracycline cardiotoxicity [2]. According to the current guidelines, ARNI is recommended for patients with HF and reduced LVEF [3]. Unfortunately, favorable results obtained in the previous randomized trials of the use of ARNI in the treatment of worsening HF have not been independently verified in the cancer population. Data on the use of ARNI in patients with cancer therapy-related cardiac dysfunction are mainly derived from preclinical studies, observational studies, and case reports [4]. In a retrospective, multicenter registry, which included patients treated with ARNI for HF caused by cancer therapy, the beneficial effect of sacubitril-valsartan on the reverse remodeling of LV, LVEF, and N-terminal pro-B-type natriuretic peptide concentration was indicated [5]. The presented case report confirms the beneficial effects of adding MRA and an early switch from ACEI to ARNI in the case of ineffectiveness of the current cardioprotective regimen. What is extremely

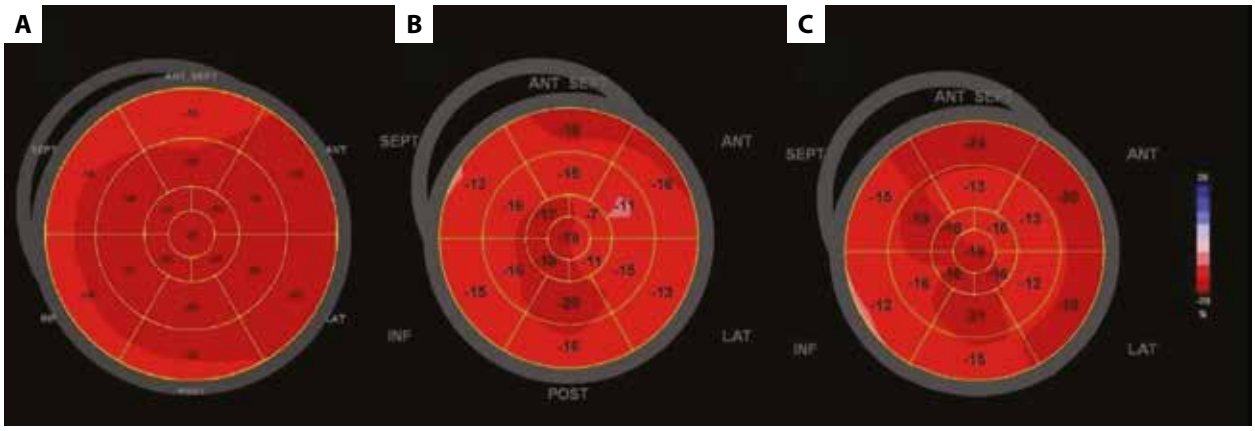

Figure 1. Bull's eye plot of left ventricular global longitudinal strain obtained before initiation of oncological treatment (**A**), during oncological treatment (**B**), and after angiotensin receptor-neprilysin inhibitor implementation (**C**)

Abbreviations: ANT, anterior; INF, inferior; LAT, lateral; POST, posterior; SEP, septal

important for patients, early implementation of such cardioprotection may enable the continuation of current oncological treatment.

ARNI and MRA may be valuable elements of cardioprotective regimens in cancer patients undergoing potentially cardiotoxic oncological therapy. Its proper early application may enable patients to complete their oncological treatment without longer interruptions.

Supplementary material

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

Article information

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