

## Right ventricular dysfunction parallels left ventricular functional involvement in women with breast cancer experiencing subclinical cardiotoxicity

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**Background:** Cancer therapy related cardiac toxicity disease (CRCTD) of the left ventricle (LV) can influence the outcome of oncologic patients. Little is known on CRCTD related right ventricular (RV) dysfunction even though RV involvement has been proven to be a remarkable prognosticator in heart failure.

**Purpose:** To analyse parallel changes in LV and RV function occurring during the course of cancer therapy in women affected by breast cancer by using both standard and speckle tracking echocardiography.

**Methods:** Fifty Her-2 positive breast cancer women (age =  $53.6 \pm 11.7$  years) underwent sequential cancer therapy protocol including anthracycline (ANT) epirubicine + cyclophosphamide (4 cycles) followed by a total amount of 18 cycles with trastuzumab (TRZ) + paclitaxel. A complete echo-Doppler exam, including LV and RV global longitudinal strain (GLS) as well as RV septal and free wall longitudinal strain (SLS and FWLS respectively) assessment, was performed at baseline, after ANT end and after TRZ completion. Patients with overt heart failure and LV ejection fraction < 50%, coronary artery disease, atrial fibrillation, hemodynamically significant valve disease and inadequate echo were excluded. Overt CRCTD was defined according guidelines and both subclinical LV and RV CRCTD as a LV and RV GLS drop from baseline >15%.

**Results:** None of the patients experienced overt CRCTD but 6 patients (14%) showed subclinical LV dysfunction and 33 (66%) had a significant drop of RV longitudinal function. The comparison of standard echo-Doppler exam at baseline and after ANT and TRZ completion did not show significant changes of LV and RV systolic and diastolic parameters. Conversely, a progressive significant reduction of RV GLS ( $p < 0.002$  after TRZ), SLS and FWLS and, with a lower extent, of LV GLS ( $p < 0.02$  after TRZ) was observed after ANT and TRZ completion (Figure). Percentage reduction in RV GLS (DRV GLS) from baseline to ANT end correlated with LV GLS both at EC end ( $r = -0.40$ ,  $p = 0.006$ ) and after TRZ completion ( $r = -0.62$ ,  $p < 0.0001$ ).

**Conclusions:** Detrimental cardiac effects of cancer therapy involve both LV and RV systolic longitudinal function. Progressive RV dysfunction is evident through ANT and TRZ treatment. Early RV dysfunction parallels LV involvement and predicts subsequent LV subclinical dysfunction. A comprehensive LV and RV longitudinal function assessment might better predict the onset of CRCTD in breast cancer patients.

Abstract Figure.

