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Monitoring of Cardiotoxic Effects of Anthracycline Chemotherapy in Childhood Malignancies

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INTRODUCTION: Cardiotoxicity is a known complication of anthracyclines' therapy in children treated for malignancies. Regular monitoring of heart function enables the identification of heart damage at a subclinical level.
METHODS: This is a retrospective study based on the analysis of data obtained by echocardiographic monitoring of patients treated for malignant diseases in University Children's Hospital Zagreb from 2003 to 2016. The systolic function of the left ventricle was observed through shortening fraction (FS), while the diastolic function was studied through early (E) and late(A) diastolic filling velocities and their ratio (E / A). We also measured the dimensions of the left ventricle correlated with age, gender and the anthracyclines dose.
RESULTS: The study included 378 children, 234 of which were boys (62%), with an average age of 8.8 years (±7.36). The most common diagnosis was sarcoma, followed by hematologic malignancies. Total cumulative dose of anthracyclines was <100 mg/ m2 in 67 (20%) patients, 207 (61%) patients received a dose of 101-300 mg /m2, and 66 (19%) patients received a dose higher than 301 mg /m2. None of the patients had clinical signs of heart failure. Subclinical damage of the systolic function was found in 18% of children, mainly (13.8%) during the chemotherapy and within 6 months of its completion. In 4.2% of patients the damage was still present and /or observed 6 months after the end of the chemotherapy. There was a clear correlation between reduced systolic function and the anthracyclines cumulative dose ($p < 0.01$). Diastolic dysfunction was registered in 5% of patients, but no statistically significant correlation was found between reduced dyastolic function and cumulative dose ($p = 0.213$). A total of 55 (14.5%) children received cardiac medication, ACE inhibitors and /or beta blockers.
CONCLUSION: Subclinical damage of the systolic cardiac function in children treated for malignancies was present in a significant percentage and correlated with the cumulative dose of anthracyclines, despite the normal cardiac status, which highlights the importance of regular cardiac monitoring of these patients.