

Midwest Pediatric Cardiology Society Abstract

Cardiac Biomarker – Can we use N-Terminal Pro B-type Natriuretic Peptide to Screen for Cardiac Dysfunction in Asymptomatic Pediatric Cancer Survivors?

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Background: Oncologists recommend periodic assessment of cardiac function for patients treated with anthracycline chemotherapy or chest radiation for pediatric cancer. Such screening for heart failure is usually done using 2 dimensional echocardiography [2DE] and m-mode [MM] in Pediatric hospitals. Our study aims to show the validity and feasibility of cardiac biomarkers as a screening tool, and of 3 dimensional echocardiography [3DE] measurements in pediatric cancer patients in comparison to cardiac MRI, as well as MM and 2DE.

Methods: The study population consisted of children and young adults being followed up after cancer remission at our center. Families with children older than 10 years of age who have survived > 2 years after completion of cancer treatment were enrolled to participate in the study after informed consent was obtained.

MRI and Echocardiograms (MM, 2DE, and 3DE) were performed as clinically indicated. LV function and volume from these imaging modalities was quantified and analyzed using Xcelera and QLab (Philips) and blinded to cardiac MRI measurements. Simultaneous blood testing was performed for cardiac biomarker N-terminal pro B-type Natriuretic Peptide levels [NT pro BNP].

Results: For the 41 subjects studied, age ranged from 10 to 22 years with a median duration of cancer remission of 10 years. Forty had received anthracyclines [median dose of 175 mg/m² of body surface area and 9 subjects receiving dosage of =300 mg/m²], 32 had received alkylating agents, 20 had radiation therapy, 20 were girls and 39 were Caucasians. No subjects had notable valvular dysfunction and all subjects were asymptomatic [NYHA class I]. The mean NT pro BNP level was 75 pg/ml. Only one subject had an elevated NT pro BNP level >300 to a level of 453 pg/ml with normal Left Ventricle Ejection Fraction [LV EF]. This patient had received high dose Doxorubicin [300 mg/m²] and alkylating agents for chemotherapy. Satisfactory 3DE images were obtained in 37/41 subjects; MRI was obtained in all 41. LV end-diastolic volume by 3DE had a stronger correlation with MRI [r=0.71, p<0.01] as compared to 2DE [r=0.59, p<0.01] and MM [r=0.64, p<0.01]. Six subjects had mild LV dysfunction [defined as] CMR LV EF of <55%; none had EF<50%.

Conclusion: 3DE measurement of LV volume is feasible and correlates better with MRI than do MM and 2DE. Biomarkers like NT pro BNP can be used as a cost-effective screening test for asymptomatic cancer survivors for surveillance of their cardiac function.