IMAGING AND DIAGNOSTIC TESTING

EARLY INCREASE IN MYOCARDIAL CARDIOVASCULAR MAGNETIC RESONANCE GADOLINIUM SIGNAL INTENSITY AFTER ANTHRACYCLINES BUT NOT OTHER AGENTS USED TO TREAT BREAST CANCER OR HEMATOLOGIC MALIGNANCY

ACC Poster Contributions
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Background: Although anthracycline (AC) exposure predisposes one to cardiotoxicity, early subclinical markers are largely unavailable. In a recent animal model, we identified a cardiovascular magnetic resonance (CMR) method for measuring gadolinium signal intensity (Gd-SI) changes that identified early histopathologic evidence of myocellular injury after AC therapy that subsequently forecasted a decrement in left ventricular ejection fraction. The purpose of this study was to determine in patients if Gd-SI changed after AC versus non-AC therapy.

Methods: As part of a National Cancer Institute funded cohort study, 33 patients aged 49 ± 13 years (75% women) with breast cancer, lymphoma or leukemia received AC (n=25) or herceptin, cytoxan or taxol (n=8). Demographic and historical cardiovascular data was recorded. Gradient echo inversion recovery CMR scans (TR/TE/T1 = 821.6/3.3/260 ms) were acquired before start of therapy and again 1, 3, and 6 months thereafter. Gd-SI was determined in 3 short axis views (base, middle, apex) 20 mins after Gd was given (0.1 mmole/kg gadobenate). A longitudinal mixed model was to fit the data treating patients as a random effect.

Results: Variables were similar in patient groups including age, gender, cancer type, and history of hypertension, diabetes, hyperlipidemia and coronary artery disease (p=NS for all). Left ventricular ejection fraction in AC and non-AC groups were similar at baseline (58.6 ± 8.0 and 55.9 ± 4.8, respectively) without decrements at 6 months (p=NS). Mean (+ std error) Gd-SI in non-AC patients remained unchanged from baseline to 6 months (13.8 ± 4.1 to 14.3 ± 4.3; p=NS) while mean Gd-SI in AC patients increased from 12.2 ± 1.7 to 16.9 ± 3.2, (p<0.0001). We tested for time interaction by AC use and found it significant suggesting that the rate of increase was higher in AC patients than in non-AC patients (p<0.0001).

Conclusions: CMR gadolinium signal intensity (Gd-SI) increases in patients with breast cancer or hematologic malignancy after anthracycline chemotherapy (AC) but not necessarily non-AC therapy. Changes in Gd-SI in patients may serve as an early subclinical marker of AC cardiotoxicity prior to changes in left ventricular ejection fraction.