The efficacy of anthracycline chemotherapy is undermined by potentially life threatening cardiotoxicity. Cardiotoxicity is dependent upon several factors, and its timing is variable. Moreover, as adjuvant therapy with trastuzumab often follows anthracycline therapy, close monitoring of cardiac function in those treated with anthracyclines is mandatory. LVEF by echocardiography is currently used to monitor for cardiotoxicity, however LVEF has numerous limitations. Myocardial strain imaging has been shown to detect left ventricular (LV) systolic dysfunction in several diseases prior to noticeable changes in LVEF, but not in the context of anthracycline therapy. The aim of the present study was to compare LVEF and LV systolic strain before and after anthracycline chemotherapy.

Fifty two women with histologically confirmed breast cancer were prospectively studied. Echocardiographic LVEF (by Simpson’s method), global and regional peak longitudinal, radial and circumferential 2D speckle tracking myocardial systolic strain were measured 1 week before chemotherapy and 1 week after completion of anthracycline chemotherapy (prior to any thoracic radiotherapy or adjuvant trastuzumab).

Global longitudinal LV systolic strain was significantly reduced after treatment; global longitudinal strain decreased from -17.7% to -16.3% (p < 0.01) with 48% of global measurements reduced by >10%. Global radial LV systolic strain after treatment was also significantly reduced; global radial strain dropped from 40.5% to 34.5% (p < 0.01) with 59% of global measurements reduced by >10%. In contrast, no reduction of clinical significance (defined as a reduction >10%) in LVEF was observed after chemotherapy. Circumferential strain was not changed significantly after chemotherapy.

Values expressed as mean ± SD, * p <0.01 vs. before chemotherapy

There was significantly reduced global LV systolic strain 1 week after anthracycline treatment, prior to clinically significant reductions in LVEF. This may indicate early impairment of myocardial function. Early identification of impaired cardiac function may permit targeted therapy to reduce cardiotoxicity in patients who require treatment with trastuzumab.

Declaration of interest: The authors have no conflict of interest to declare.