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Letter to Editor

Letter to the Editor: Herceptin-2 Receptor Blocker for the Treatment of Breast Cancer in a Rural Population

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The use of anti-human epidermal growth factor receptor-2 (HER-2) antibody is a well-established therapy for the treatment of breast cancer expressing the HER-2 gene. The age-adjusted rate of HER-2 expression among patients with breast cancer is approximately 18.1 cases per 1000,000 [1]. Overexpression of the HER2 receptor is associated with increased proliferation and angiogenesis and decreased apoptosis. The current guidelines for the treatment of all HER-2 positive breast cancers include the use of HER-2 target therapy trastuzumab, with either adjuvant chemotherapy and/or endocrine therapy in early-stage disease or with the addition of pertuzumab and adjuvant chemotherapy and endocrine therapy for advanced staged disease [2]. Trastuzumab is a recombinant human monoclonal antibody directed against the extracellular domain IV of HER-2, leading to HER-2 deregulation [3,4].

One of the known adverse effects of Trastuzumab therapy is cardiomyopathy. *In vitro* and *in vivo* animal studies have revealed risk of cardiomyocyte toxicity and reduced fractional shortening [5]. As opposed to anthracycline-induced cardiomyopathy, trastuzumab-induced cardiotoxicity is assumed to be ErbB2 mediated due to its presence on cardiomyocytes [5]. Retrospective studies of seven phase II and III trials from 2002 revealed cardiac dysfunction in 7% receiving trastuzumab alone, 13% when in conjunction with paclitaxel and 27% in patient receiving trastuzumab and doxorubicin [6].

Various studies have sought to identify at-risk demographics, and biomarkers for predicting early signs of the cardiotoxicity. The likelihood of cardiotoxicity secondary to trastuzumab use is increased in older patients, those with concomitant or previous use of an anthracycline, prior chest wall dysfunction or known cardiac dysfunction [6]. Tissue velocity imaging and left ventricular (LV) strain have been shown to detect a pre-clinical fall in LV systolic function in patients receiving adjuvant Herceptin chemotherapy [7].

We aim to assess the suitability of LV strain imaging on transthoracic echocardiography as a predictive means for those receiving Herceptin adjuvant chemotherapy admitted to a regional NSW Hospital (Manning Base Hospital). The study population was identified from a retrospective database review of all patients undergoing Herceptin adjuvant chemotherapy for HER2 positive breast cancer and referred for transthoracic echocardiography for the sole-service provider in the at Manning region from 1st of July 2014 to the 30th of June 2019.

There was a total of 53 patients treated with trastuzumab over the period, 38 of which we had transthoracic echocardiography data from a single center available for review. In these 38 patients, only 28 patients had strain imaging completed. Of these patient's cardiovascular risk factors of hypertension, diabetes mellitus, dyslipidaemia and smoking history was present in 23.7%, 10.5%, 10.5% and 31.6% respectively. All patients were treated with a combined chemotherapy with 34.2% having combined paclitaxel, 10.5% having combined docetaxel and 26.3% having combined carboplatin and 26.3% having combined pertuzumab.

Due to the small sample size, it is impossible to predict any correlation between LV strain and early and long-term cardiotoxicity of trastuzumab in a regional centre with limited resources. Additional funding and dedicated research work targeting this unique cohort is important given 40% of Australians live in regional and rural parts.

N = 38	
Female	38 (100%)
HTN	9 (23.7)
Diabetes Mellitus	4 (10.5%)
Dyslipidaemia	4 (10.5%)
Smoker or Ex-smoker	12 (31.6%)
Radiotherapy	21 (55.3%)
Combination Chemotherapy	
• Pertuzumab	10 (26.3%)
• Carboplatin	10 (26.3%)
• Docetaxel	4 (10.5%)
• Paclitaxel	13 (34.2%)

Table 1: *No. of cycles of trastuzumab - mean = 24.7 (SD19.16).*

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