ONLINE EXCLUSIVE

Anthracycline Chemotherapy–Induced Cardiotoxicity in Breast Cancer Survivors: A Systematic Review

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PROBLEM IDENTIFICATION: This review identifies specific cardiotoxicity related to anthracycline chemotherapy, specific risk factors related to increased anthracycline chemotherapy–induced cardiotoxicity, and underlying mechanisms of action of anthracycline chemotherapy–induced cardiotoxicity.

LITERATURE SEARCH: PubMed®, CINAHL®, Embase®, and Web of Science were searched in May 2018 using keywords related to heart diseases, anthracycline chemotherapy, and breast cancer.

DATA EVALUATION: Data were extracted, and study quality was assessed according to PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines.

SYNTHESIS: 1,117 articles were identified through the literature search. After a review of the abstracts and articles, 15 clinical studies were identified for the final analysis by using exclusion and inclusion criteria.

IMPLICATIONS FOR PRACTICE: Nurses should recognize the critical elements for prevention and early detection of anthracycline chemotherapy–induced cardiotoxicity.

KEYWORDS anthracycline; cardiotoxicity; breast cancer; survivors

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Anthracycline chemotherapy is commonly indicated for the treatment of breast cancer. These agents include doxorubicin, epirubicin, daunorubicin, and idarubicin (Smith et al., 2010). They are used singularly or in combination with other chemotherapy agents to increase the overall survival rate of breast cancer survivors (BCSs) (Gianni et al., 2009; Menna, Salvatorelli, Gianni, & Minotti, 2008). Anthracyclines are the most frequently used chemotherapy regimen in breast cancer and may reduce mortality from breast cancer by about 33% (Early Breast Cancer Trialists' Collaborative Group, 2012). Research shows that the adoption of anthracycline-based chemotherapy regimens not only increases long-term breast cancer survival rates, but also reduces the risk of relapse and death for people with early-stage breast cancer after surgery (Smith et al., 2010). Because all chemotherapy agents may cause some adverse reactions among BCSs, cardiotoxicity is a concern. The cytotoxic effects of anthracycline agents are from the generation of oxygen-derived free radicals, which can cause myocyte apoptosis. The loss of cardiac myocytes results in cardiomyopathy and cardiac failure (Ewer & Lippman, 2005). The use of anthracyclines among BCSs is restricted because of the severe cardiac side effects.

Although anthracycline chemotherapy–induced cardiotoxicity in people with breast cancer has been identified as a major health concern (Brower, 2013; Smith et al., 2010), a need remains for information about what is known and what is not. Studies have shown that anthracycline chemotherapy may cause a decrease in left and right ventricular systolic and diastolic functioning (Abdar Esfahani, Mokarian, & Karimipanah, 2017; Appel, Jensen, Nielsen, Ryberg, & Zerahn, 2010; Boyd et al., 2017; Narayan et al., 2017; Sawaya et al., 2012; Schneeweiss et al., 2018; Serrano et al., 2015), impaired myocardial contraction measured