

Chemotherapy-Induced Cardiomyopathy in Breast Cancer Patients

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Dear Editor

The globally increasing incidence of cancer and its associated mortality has become a main challenge for humankind. This problem is more serious in developing countries, like Iran. Among different malignancies affecting people, breast cancer continues to be a main and worldwide cause of morbidity and mortality (1).

Parallel to the increasing cancer burden in the modern world, there have been notable progresses in the management and therapy (either medical or nonmedical) of malignancies including breast cancer, leading to a significant increase in the number of survived patients. This necessitates a close follow-up of such patients after their initial management (2). Patients with cancer face daily problems, some of which are difficult to overcome. Among these are possible complications associated with their chemotherapeutic regimens, particularly cardiovascular issues (3).

Cardiotoxic nature of drugs used for the management of patients with cancer puts them at risk of numerous life-threatening cardiovascular events, like pericarditis, cardiomyopathy, cardiac arrhythmias, myocardial ischemia, and some others. Factors including cumulative drug doses, mediastinal radiation, rate of drug administration, younger age, advanced age, female gender, hypertension, and pre-existing heart diseases are the recognized risk factors for developing early (within one year, but not acute) and late chemotherapy-induced cardiotoxicity (Table 1) (4).

A wide variety of chemotherapeutic drugs can cause cardiotoxicity, among which anthracyclines, a main drug class used for patients with breast cancer, are one of the most common etiologies (5). Doxorubicin, a main member of this group, can lead to dose-dependent, irreversible and recurrent cardiotoxicity. It can cause myocardial damage through disorganization of myofibrillar morphology, necrosis and interstitial fibrosis (6). The other instance is Trastuzumab, a monoclonal antibody which inhibits growth of tumor cells that overexpress human epidermal growth factor 2 protein. This medication can cause revers-

ible cardiac side effects regardless of the administration dosage, and with low possibility of recurrence (7).

Some points were suggested to be beneficial in reducing the risk of cardiotoxicity following chemotherapy. Among these are decreasing the cumulative doses of anthracyclines, administration of anthracyclines as infusion (rather than bolus), and the liposomal encapsulation of doxorubicin. Using β receptor blockers (like carvedilol or metoprolol), angiotensin-converting enzyme inhibitors, angiotensin II receptor blockers, and using nutritional supplements (antioxidants like vitamin E) are the other recommendations (4, 8).

Access to cancer medicine is of great importance for patients, also their follow-up for early detection of chemotherapy-induced cardiotoxicity is important. At present, different methods including measurement of left ventricular ejection fraction as the most common screening technique, measurement of serum biochemical cardiac markers, targeted cardiac imaging and some others have been used to reach this purpose. However, each of these methods has its own advantages and disadvantages. In fact, lack of a comprehensive guideline for approaching chemotherapy-induced cardiotoxicity necessitate the need for further investigations in this area of research (9).

The incidence of breast cancer in Iran has increased over the recent years (10). As a point of criticism, a review of the current medical literature reveals no available strong survey for the assessment of forthcoming problems, in particular cardiovascular diseases, facing Iranian patients with breast cancer after their initial treatment. Undeniably, after the diagnosis of such patients, every effort is made to provide them an appropriate care and therapy; however, there is a strong need for a close collaboration between oncologists and cardiologists for a systematic and planned follow-up of patients with breast cancer following receiving their medical therapies. This would be a valuable help in decreasing morbidity in this group of patients from cardiovascular problems and improving their quality of life after the initiation of therapy.

Table 1. Cardiac Review and Evaluation Committee Diagnostic Criteria for Drug-Associated Cardiotoxicity (3)^a

Diagnostic Criteria
Cardiomyopathy recognized by a decrease in cardiac left ventricular ejection fraction (LVEF), either global or more severe in the septum
Symptoms of heart failure (HF)
Signs associated with HF, including (but not limited to) S3 gallop, tachycardia, or both
Decline in LVEF of at least 5% to less than 55% with associated signs or symptoms of HF
Decline in LVEF of at least 10% to below 55% without accompanying signs or symptoms

^a Drug-associated cardiotoxicity can be defined as the presence of one or more of these criteria.

Authors' Contributions

Study concept and design: Dalfardi, Kashy Zonouzy, and Asvadi Kermani; drafting of the manuscript: Dalfardi; critical revision of the manuscript for important intellectual content: Kashy Zonouzy, and Asvadi Kermani; final approval of the paper: Dalfardi, Kashy Zonouzy, and Asvadi Kermani.

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