
Cardiac toxicity after radiotherapy for breast cancer: a cardiovascular update

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Radiotherapy (RT) in the treatment of breast cancer uses ionizing radiation to kill malignant cells. Radiation treatment following breast cancer surgery-breast conserving surgery (BCS) or mastectomy-is associated with significant improvement in locoregional control. However, the beneficial effects of RT in reducing breast cancer death and recurrence are offset by the increased risk of cardiac toxicity. Radiation-induced cardiac toxicity is a well-documented sequela of radiation treatment that can occur immediately, or manifest months or years after completion of radiation therapy. The damaging effects to any structure of the heart, including the pericardium, vasculature, myocardium, valves, and conduction system depends on total dose of radiation received by the heart, volume of the heart exposed, and radiation technique used. Another factor that potentiates the risk of cardiac toxicity is whether patients are receiving RT for left-sided breast cancer vs. those receiving RT for right-sided tumors. The damaging effects include: acute and chronic pericarditis, pericardial effusion, constrictive pericarditis, coronary artery disease, cardiomyopathy, valvular heart disease, conduction system abnormalities, etc. Techniques to limit radiation exposure such as image-guided therapy; 3-dimensional treatment planning; respiratory gating; and intensity modulated RT, enables the selection of the most optimum treatment method when planning and administering RT. However, understanding patients' risk of an event and stratifying patients according to cardiovascular risk for these events would be useful in identifying those patients most likely to benefit from management plans, as well as strategies to reduce cardiotoxicity.

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