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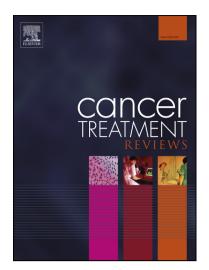
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Cardiotoxicity associated with radiotherapy in breast cancer: A question-based review with current literatures

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Abstract

Radiotherapy is an indispensable unit of multidisciplinary treatment of breast cancer. Although the application of modern techniques has led to a significantly reduction in radiation-induced heart disease, it is still recognized as the leading causes of morbidity and mortality among breast cancer survivors. With the growing number of long-term survivors, it is important to understand the cardiovascular risks associated with radiotherapy. Questions exist regarding the existence or not of a safe radiation threshold dose that the heart (or its substructures) can receive and strategies to minimize risk of radiation. This paper aims to review the current understanding of radiation-induced cardiotoxicity and try to give answers to those unsettled issues based on current literatures.

Keywords

Radiotherapy, Breast Cancer, Cardiotoxicity, Cardiac Events, Mean Heart Dose

Introduction

Breast cancer (BC) is one of the most common cancer in women worldwide (with 5- year overall survival rate of 90%), and for many of them, radiotherapy (RT) has been used¹. An early landmark meta-analysis by Cuzick J et al, comparing outcomes in patients with BC randomized to receive surgery with or without RT, clearly demonstrated the overall survival (OS) beyond 10 years was significantly worse in patients received RT^{2, 3}. According to a meta- analysis of Early Breast Cancer Trialists' Collaborative Group (EBCTCG) published in 2005, the cardiac specific mortality was increased by 27% in patients treated with surgery plus RT in contrast to patients with surgery alone ⁴. The increase in cardiovascular (CV) deaths reported in early studies is mainly due to the high irradiated volumes and high doses to the heart,

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