

Early Detection of Breast Cancer: Management with Radiotherapy associated with Cardiovascular Disease (CVD), Heart Failure among the Breast Cancer Survivors Woman

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Abstract

Triple diagnosis of breast cancer is based on (a) Clinical examination, (b) Histology/cytology and (c) Mammography/Breast ultrasound. The introduction of breast cancer (BC) screening programs results the early diagnosis of non-invasive BC substantially. Radiotherapy is important for the management of early detected breast cancer. Breast cancer survivors are in greater risk for cardiovascular disease (CVD)-related mortality. Though breast radiotherapy is beneficial for early treatment of breast cancer, it is also cause of CVD among the breast cancer survivors. In this article we present an overview based on current knowledge about the management of early detected breast cancer with radiotherapy and the occurrences of CVD among those survivors. Thus this brief hypothesis had driven analysis of the breast cancer, radiotherapy and occurrences of CVD in the breast cancer survivors.

Keywords: Triple diagnosis; Breast cancer; Radiotherapy; Cardiovascular disease

Introduction

The early stage detection of cancer is helpful for the treatment among the cancer survivors. Cancer detected by screening would be expected to require less treatment because it is diagnosed at an earlier stage. Several screening method have been employed, including clinical and self breast exams, mammography, genetic screening, ultrasound, and magnetic resonance imaging. The use of mammography is increased day by day [1]. The introduction of breast screening programme results the increase in the diagnosis of early stage of breast cancer. It was reported that patient with screen detected cancer have been found to improved overall survival and distant recurrence rate when compared to those with non-screen detected cancer [2]. Radiotherapy is an important part of management of all stage of breast cancer (0, I, II, III) [3,4]. But there were several incidence of cardiovascular disease (CVD) after the irradiation.

Whole Breast Radiotherapy: Conserving Breast of Early Invasive Breast Cancer and Total Mastectomy

Breast radiotherapy is well tolerated by woman. There are two option of early detected breast cancer. It include breast conserving treatment and total mastectomy [5].

- Breast conserving treatment helps to preserve the patient's native breast. Breast conserving treatment removes breast cancer with normal breast tissue, sentinel lymph node biopsy, followed by whole breast radiotherapy. It is feasible and curative treatment option.

- In contrast, patients treated by total mastectomy, who wish to restore normal breast shape need to undertake lengthy breast reconstructive surgery with either breast implant or immediately during mastectomy.

Previous studies showed that the risk of recurrence after breast conserving treatment was slightly higher compared with mastectomy [6].

Post Mastectomy Radiotherapy

Patient with lymph node related to breast cancer size >5 cm needs to surgery [7]. The risk of recurrence is still high despite total mastectomy and axillary clearance. However, though there is a controversy, patients with one to three lymph nodes, post mastectomy radiotherapy were routinely recommended. Post mastectomy radiotherapy is reported to reduce the risk of locoregional recurrence [8].

Side Effect of Radiotherapy

Breast radiotherapy is commonly tolerated by women. But some side effect also generated. Common side effects such as fatigue, skin erythema etc. These symptoms are also reversible within a few weeks from the completion of radiotherapy.

Radiotherapy is associated with Cardiovascular Disease (CVD), Heart Failure

Radiation therapy is essential for the management of breast cancer [9]. Treatment of radiotherapy of breast cancer patient was reported to reduce the mortality rate. There are several incidence of heart failure after the treatment of radiotherapy of breast cancer patient [10]. The

breast cancer survivors had an increase risk of heart attack, angina and heart failure, infarction [11,12].

It was observed that patients who were received the treatment of radiation therapy had a greater risk of cardiovascular disease compared with those who received only surgery. The region of the body that received radiation influenced the risk of heart disease as

well. Women who had received radiation therapy to left or right side of the area between the ribs and the breastbone had a higher risk of heart attacks, heart failure compared with patients who received little or no radiation to the heart.

The incidence of death in breast cancer irradiated patient is mostly due to heart disease [13-16] (Figure 1) (Table 1).

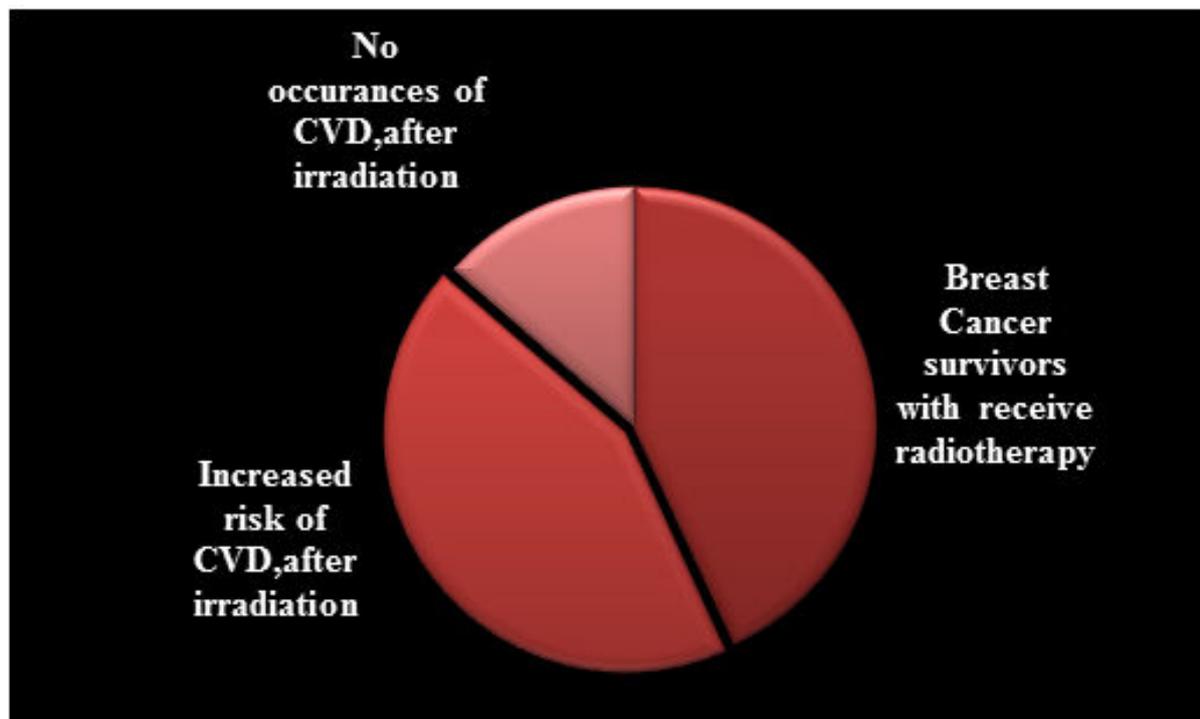


Figure 1: Analytical study and Pliliminary Overview (till 2016 march) of breast cancer survivors with the occurrences of CVD, undergone radiotherapy/Not undergone radiotherapy.

References	No. of patients	Result
Serra et al. [13]	1138 female patients with Breast Cancer, No irradiation	Manifestations of CVD, heart problem
Mc Gale et al. [14]	72,134 women diagnosed with breast cancer, 34,825 women received radiation therapy.	Increased the risk of developing ischaemic heart disease, pericarditis, and infarction, those receive irradiation.
Tan et al. [15]	5514 breast cancer patients identified, 110 (5.7%) from the surgery-alone group, 24 (4.1%) from the RT group, 79 (4.6) from the CT group, and 76 (5.8%) from the CRT group	Breast cancer patients receiving CT and/or CRT have a higher risk of CVD, especially younger patients (aged < 55 years)
Borger et al. [16]	CVD in 1601 patients with T1-2N0 breast cancer (BC)	Patients irradiated for left-sided BC with tangential fields resulted to have a higher incidence of CVD

Table 1: Trials with references containing risk of cardiovascular disease (CVD) among breast cancer survivors with received radiotherapy/without received radiotherapy

Discussion and Conclusions

It was found that when detection and treatment are started at early time, breast cancer is less important to be the primary cause of death among the majority of breast cancer survivors. There are several factors; CVD is a major cause of death among breast cancer survivors. After irradiation the major survivors have a risk of heart disease- which is not only dangerous but also an adverse effect of

radiotherapy. Proper interventions for the primary management of CVD, like diet, physical activity, cessation of smoking and aspirin can reduce the risk of heart disease among the breast cancer survivors. But it should also be a challenging item to scientist and technologist if radiotherapy can be developed in such a manner, where cardiovascular disease risk will be reduced. Currently the management of CVD risk factors is increasing with importance in the management of

breast cancer survivors. Therefore more research and technical development is needed to manage the occurrences of CVD among breast cancer survivors.

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References

1. Anne JE (2002) Increasing Use of Mammography among Older, Rural African American Women: Results From a Community Trial. *Am J Public Health* 92: 646-654.
2. Wishart GC, Greenberg DC, Britton PD, Chou P, Brown CH, et al. (2008) Screen-detected vs symptomatic breast cancer: is improved survival due to stage migration alone? *Br J Cancer* 98: 1741-1744.
3. Wang W (2013) Radiotherapy in the management of early breast cancer. *J Med Radiat Sci* 60: 40-46.
4. Coates AS (2015) Tailoring therapies-improving the management of early breast cancer: St Gallen International Expert Consensus on the Primary Therapy of Early Breast Cancer. *Ann Oncol* 26: 1533-1546.
5. Adedayo A (2015) Survival Comparisons for Breast Conserving Surgery and Mastectomy Revisited: Community Experience and the Role of Radiation Therapy. *Clin Med Res* 13: 65-73.
6. Marissa M, McNatt H (2013) Patients opting for breast reconstruction following mastectomy: an analysis of uptake rates and benefit. *Breast Cancer* 5: 9-15.
7. Beenken WS (2003) Axillary Lymph Node Status, But Not Tumor Size, Predicts Locoregional Recurrence and Overall Survival after Mastectomy for Breast Cancer. *Ann Surg* 237: 732-739.
8. Chang SJ (2015) Do Recent Advances in Diagnostic and Therapeutic Procedures Negate the Benefit of Postmastectomy Radiotherapy in N1 Patients With a Low Risk of Locoregional Recurrence? *Medicine (Baltimore)* 94: e1259.
9. Lin R, Tripuraneni P (2011) Radiation Therapy in Early-Stage Invasive Breast Cancer. *Indian J Surg Oncol* 2: 101-111.
10. Stewart FA, Hoving S, Russell NS (2010) vascular damage as an underlying mechanism of cardiac and cerebral toxicity in irradiated cancer patients. *Radiat Res* 174: 865-869.
11. Konefka ES, Jassem J (2007) Cardiovascular effects of breast cancer radiotherapy. *Cancer Treat Rev* 33: 578-593.
12. Gutt R, Correa CR, Hwang WT, Solin LJ, Litt HI, et al. (2008) Cardiac morbidity and mortality after breast conservation treatment in patients with early-stage breast cancer and pre-existing cardiac disease. *Clin Breast Cancer* 8: 443-448.
13. Serra R, Buffone G, Miglietta AM, Abonante S, Giordano V, et al. (2013) Breast cancer and venous disease: a retrospective cohort study. *Ann Vasc Surg* 27: 7626.
14. McGale P, Darby SC, Hall P, Adolfsson J, Bengtsson NO, et al. (2011) Incidence of heart disease in 35,000 women treated with radiotherapy for breast cancer in Denmark and Sweden. *Radiother Oncol* 100: 167-175.
15. Chao CH, Liu TT, Lin JC, Huang CH, Chang YS, et al. (2016) Breast cancer therapy and age difference in cardiovascular disease risks: A population-based cohort study in Taiwan. *Taiwan J Obstet Gynecol* 55: 98-103.
16. Borger JH, Hoening MJ, Boersma LJ, Keilholz AS, Aleman BM, et al. (2007) Cardiotoxic effects of tangential breast irradiation in early breast cancer patients: the role of irradiated heart volume. *Int J Radiat Oncol Biol Phys* 69: 1131-1138.