

Coronary Artery Disease in Female Breast Cancer Patients Subjected to Radiotherapy

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When it comes to breast cancer patients, several questions may rise regarding their health status after radiation therapy [1-4]. One of the issues consists of the cardiac effect of radiation therapy in female patients treated for breast cancer. It is advocated that postponing of radiation therapy after mastectomy and chemotherapy in a patient with localized breast cancer may not increase the local recurrence rate or affect the prognosis [5]. In addition, delaying the irradiation in a patient with left breast cancer may also delay the possible cardiac toxicity [6,7].

In the paper by Takx RAP, *et al.* (2017), the authors studied the coronary arterial calcium deposition of irradiated breast cancer patients. The study was performed utilizing an automated algorithm on chest CT of 54 irradiated breast cancer patients compared with the CT of 279 breast cancer patients who had either CT prior to radiation therapy or no radiation therapy. The CT scans in the irradiated patients were performed more than 6 months after the start of radiation therapy with a median time between CT and radiation therapy of 2 years. The statistical analysis did not find any correlation between the radiotherapy and coronary calcification and the authors concluded that there was no evidence of irradiation-provoked coronary artery disease [6]. Similar conclusions reported in a single institutional observational study that found no association between left breast irradiation but rather hypertension and diabetes and subsequent cardiac events [8].

However, other well designed and executed studies have demonstrated definite cardiac injury after irradiation of the left breast. Taylor C., *et al.* (2018), undertook a detailed cross-sectional study in 456 women irradiated in the left breast that subsequently developed a major coronary event. After obtaining information on the radiotherapy regimen they received and on the exact site of their cardiac injury, they were able to determine that higher radiation doses were significantly linked to injury, but also that all cardiac segments (inferior, lateral, septal, anterior, and apex) were susceptible to irradiation [7].

Another method for screening the myocardial status in various diseases consists of myocardial perfusion imaging (MPI) with single-photon emission computed tomography (SPECT) [9-11]. MPI SPECT, has been reported to possess a sensitivity of 85%, specificity of 83%, positive predictive value of 66%, negative predictive value of 94%, and an accuracy of 84% for revealing coronary abnormalities, comparable with coronary artery angiography [12]. We have previously evaluated the existence of myocardial ischemia with MPI in breast cancer patients treated with radiotherapy. Twenty eight patients with left and 18 patients with right breast cancer were enrolled and evaluated. The existence of MPI abnormalities, were found in a rate of 54% and 44.4% respectively, revealing a significant statistical increase in left sided breast cancer patients when compared with right sided cancer [10]. Similarly, a prospective study in 35 irradiated patients with left breast cancer and 36 patients with right cancer revealed increased cardiac risk of irradiation in the left side. The authors recommended screening with MPI-SPECT, even if the patients are clinically asymptomatic, in order to diagnose and more effectively treat silent ischemia [13]. Most of the studies have shown perfusion defects after irradiation of the left breast involving the apical and antero-lateral aspects of the left ventricle that correlates with the percent of the left ventricle inside the radiation field [14].

In conclusion, patients with radiation therapy for left breast cancer must be evaluated cardiologically even when cardiac events are not yet present and they are asymptomatic. MPI SPECT seems to play an important role for non-invasive evaluation of the myocardial status in this group of patients, even when the patients are asymptomatic. This evaluation may provide crucial information for early diagnosis of myocardial ischemia and thus, early treatment.

Bibliography

1. Sioka C., *et al.* "Effects of I-131 therapy on gonads and pregnancy outcome in patients with thyroid cancer". *Fertility and Sterility* 95.5 (2011): 1552-1559.
2. Sioka C., *et al.* "Association of thyroid cancer with breast cancer". *Surgery* 145.1 (2009): 123-124.
3. Sioka C., *et al.* "Menstrual cycle disorders after therapy with iodine-131". *Fertility and Sterility* 86.3 (2006): 625-628.
4. Takalkar UV. "Impact of Breast Cancer Treatment on Ovarian Function and Fertility". *EC Gynaecology* 7.7 (2018): 257-259.
5. Zhang WW., *et al.* "Long-term survival effect of the interval between mastectomy and radiotherapy in locally advanced breast cancer". *Cancer Management and Research* 10 (2018): 2047-2054.
6. Takx RAP., *et al.* "Coronary artery calcium in breast cancer survivors after radiation therapy". *International Journal of Cardiovascular Imaging* 33.9 (2017): 1425-1431.
7. Taylor C., *et al.* "Cardiac Structure Injury After Radiotherapy for Breast Cancer: Cross-Sectional Study With Individual Patient Data". *Journal of Clinical Oncology* 36.22 (2018): 2288-2296.
8. Soran O., *et al.* "No association between left-breast radiation therapy or breast arterial calcification and long-term cardiac events in patients with breast cancer". *Journal of Women's Health* 23.12 (2014): 1005-1011.
9. Giannopoulos S., *et al.* "Detecting Myocardial Ischemia With (99m)Technetium-Tetrofosmin Myocardial Perfusion Imaging in Ischemic Stroke". *Neurohospitalist* 7.4 (2017): 164-168.
10. Sioka C., *et al.* "Myocardial perfusion imaging with (99 m)Tc-tetrofosmin SPECT in breast cancer patients that received postoperative radiotherapy: a case-control study". *Radiation Oncology* 6 (2011): 151.
11. Kotsalou I., *et al.* "A rare case of myocardial infarction and ischemia in a cannabis-addicted patient". *Clinical Nuclear Medicine* 32.2 (2007): 130-131.
12. Ogino Y., *et al.* "A myocardial perfusion imaging system using a multifocal collimator for detecting coronary artery disease: validation with invasive coronary angiography". *Annals of Nuclear Medicine* 29.4 (2015): 366-370.
13. Eftekhari M., *et al.* "Radiation-induced myocardial perfusion abnormalities in breast cancer patients following external beam radiation therapy". *Asia Oceania Journal of Nuclear Medicine and Biology* 3.1 (2015): 3-9.
14. Kaidar-Person O., *et al.* "Early cardiac perfusion defects after left-sided radiation therapy for breast cancer: is there a volume response?" *Breast Cancer Research and Treatment* 164.2 (2017): 253-262.

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