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# MASTER THESIS

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Late, treatment-induced cardiac morbidity after  
breast-conserving surgery in breast cancer patients

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**MASTER HEALTH SCIENCES**

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# Late, treatment-induced cardiac morbidity after breast-conserving surgery in breast cancer patients

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*A retrospective cohort study*

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Source: Medisch Spectrum Twente



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## Abstract

**Background:** Breast cancer patients treated with radiotherapy (RT) and/or adjuvant systemic therapy may have a higher risk of cardiovascular diseases (CVDs) due to cardiac toxicity years after their oncological treatment. Understanding these long-term side effects is increasingly important, especially if breast cancer survival continues to improve.

**Method:** This retrospective cohort study considered randomly selected breast cancer patients treated with breast-conserving surgery (BCS) followed by RT and adjuvant systemic therapy (n=62), and patients treated with BCS followed by RT (n=61) in Ziekenhuisgroep Twente (ZGT) and Medisch Spectrum Twente (MST), between 1989 and 2000. Medical history prior to breast cancer treatment and subsequent cardiac morbidities were extracted from the hospital's electronic data systems between March and May 2018. Incidence of cardiac morbidities and cardiovascular interventions were compared between the two treatment groups and right- and left-sided breast cancer patients by using chi-square. Disease-free survival (DFS) and overall survival (OS) of the treatment groups were evaluated by the Kaplan-Meier method with log rank tests. Cox regression analyses were performed to evaluate the oncological treatment, treated-breast-side and possible confounders affecting the development of cardiac morbidities

**Results:** In the 62 patients treated with BCS, RT and adjuvant systemic therapy in total 62 cardiac events were observed in 19 patients, and 54 cardiac events were observed in 21 patients treated with BCS and RT (n=61). No significant differences in the total number of cardiac events, development of a major adverse cardiac event (MACE), or cardiac events separately between the two treatment groups could be revealed. Moreover, no significant differences in DFS and OS were observed between the two treatment groups up to 28 years after BCS (DFS p=0.756; OS p=0.437). Also no difference was observed in the total cardiac events, development of a MACE, or cardiac events separately by laterality.

**Conclusion:** There is no difference in the development of cardiac morbidity and the need for cardiovascular interventions between women treated with BCS followed by RT and adjuvant systemic therapy, and women treated with BCS followed by RT only. Next to that, laterality was not shown as a significant risk factor for the development of CVDs in patients treated with BCS followed by RT with or without adjuvant systemic therapy.

**Keywords:** Breast-conserving therapy, radiotherapy, adjuvant systemic therapy, treatment-induced complications, cardiac morbidity, cardiovascular interventions, laterality