Cardiac Toxicity is Not Increased 25 Years After Treatment of Early-stage Breast Carcinoma with Mastectomy or Breast Conservation Therapy from the National Cancer Institute Randomized Trial

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NCI Breast Conservation Trial

Trial Registration Number: 79-C-0111

6 major randomized trials show BCT = MRM for outcomes for early stage breast cancer

NCI Breast Conservation Trial

- 237 patients with stage I-II breast cancer randomized from 1979-1986
  - Arm 1: Modified radical mastectomy + axillary dissection (level I/II)
  - Arm 2: Lumpectomy + axillary dissection (level I/II) → radiation
    - RT: 45-50.4 Gy whole breast +/- regional nodes, boost (Ir-192 or electrons)
    - CT simulation with dose inhomogeneity corrections
  - Node (+) patients (40%): AC (6-11 cycles)
  - TAM for postmenopausal N+ patients after 1985

Might treatment toxicity be causing separation of curves?
Cardiac Assessment

- 50/102 (26 BCT, 24 MRM) remaining patients returned for follow-up
  - Detailed history and physical exam
  - Cardiac labs:
    - Lipid, CRP, homocysteine, HbA1c
    - ProBNP, creatinine, cystatin-c
  - Imaging:
    - Cardiac MRI - evaluate anatomy and function
    - CT angiogram – evaluate coronary artery disease and coronary arterial calcium (CAC) score
Results

• Arms similar for pt characteristics, exam, and labs

• Cardiac MRI
  – Left ventricular mass in BCT pts (91 gm vs. 110 gm, p=0.02)
    • Not significant after adjusting for systolic blood pressure
  – Peak midwall strain and chamber mass, volume and function all similar between arms

• CT Angiogram
  – Median CAC was similar [BCT 25 (IQR 0, 86) vs. MRM 0 (IQR 0, 354), p=0.65]
  – Atherosclerosis - no significant difference
    • MRM vs. BCT
    • Left vs. right side no change in LAD or any other vessel
  – Visible atherosclerosis with chemo (HR 2.4, 95% CI 0.94-6.32, p=0.07)
Conclusions

• 25 yrs after breast radiation, cardiac toxicity does not seem to be responsible for slight decrease in patient survival in the BCT arm

• No difference noted for left-sided vs. right-sided tumors

• Cardiac morbidity has been attenuated in patients treated with CT simulation and 3D planning

*Patients with early-stage breast cancer treated with radiotherapy do not have a higher risk of long-term cardiac morbidity compared with patients having mastectomy*