RADIATION THERAPY IN BREAST CANCER

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OBJECTIVES

01

Describe the role of radiation in breast cancer

02

Describe techniques of radiation delivery

03

Discuss potential side effects of radiation to the breast

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Role for Radiation

- Breast conserving therapy
- Radiation to regional lymph nodes after mastectomy or lumpectomy in locally advanced breast cancer

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BREAST CONSERVING THERAPY (BCT)

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Breast Conserving Therapy (BCT)

- BCT has equivalent survival to mastectomy in early-stage breast cancer
- BCT typically consists of:
  - Lumpectomy with negative margins
  - Radiation to whole breast
    - Radiation to sterilize residual cells in the breast after lumpectomy
    - Has been shown to decrease local recurrence rates. 10Y local recurrence:
      - 20-40% with lumpectomy alone
      - <=5% with adjuvant radiation
    - Fractionation schemes (~equivalent total doses of radiation)
      - Moderate hypofractionation: 15-16 fractions
      - Standard fractionation: 25-28 daily fractions
      - Ultrahypofractionation: 5 fractions
  - Optional boost to lumpectomy bed
    - Additional 4-8 treatments
    - Younger patients
    - Close or positive surgical margins
    - Higher grade

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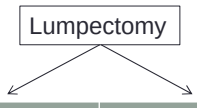
Lumpectomy With Endocrine Therapy

- Some patients can forego radiation
  - >=65 years old
  - <= 3 cm tumor
  - Node negative
  - ER positive, Her2 negative
  - CALGB 9343



	Tamoxifen + RT	Tamoxifen Alone
10 year Local and Regional Recurrence	2%	10%
Overall Survival	67%	66% (NS)

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Linear Accelerator with Positioning for Breast Tx

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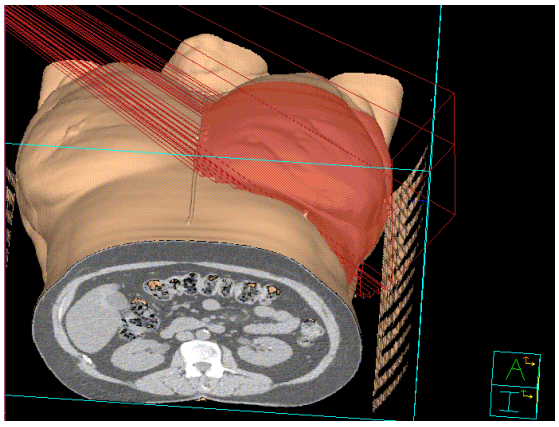
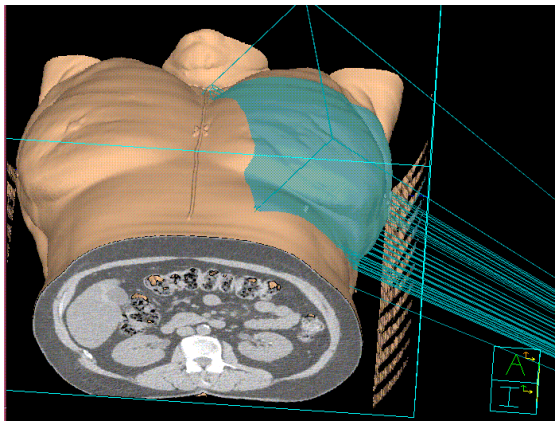
Breast Tangents

Medial Tangent



Lateral Tangent



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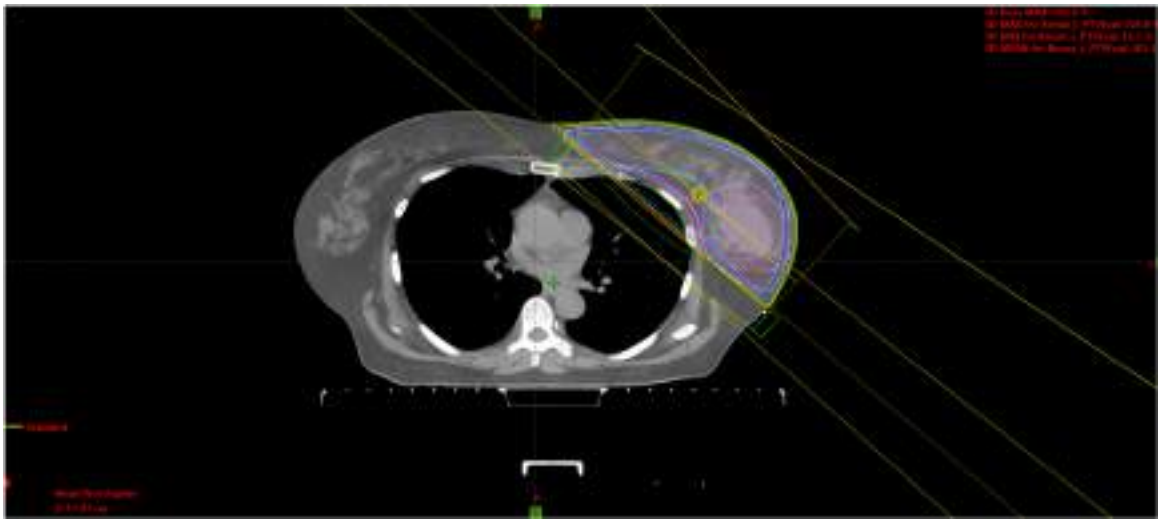
Whole Breast Dose Distribution



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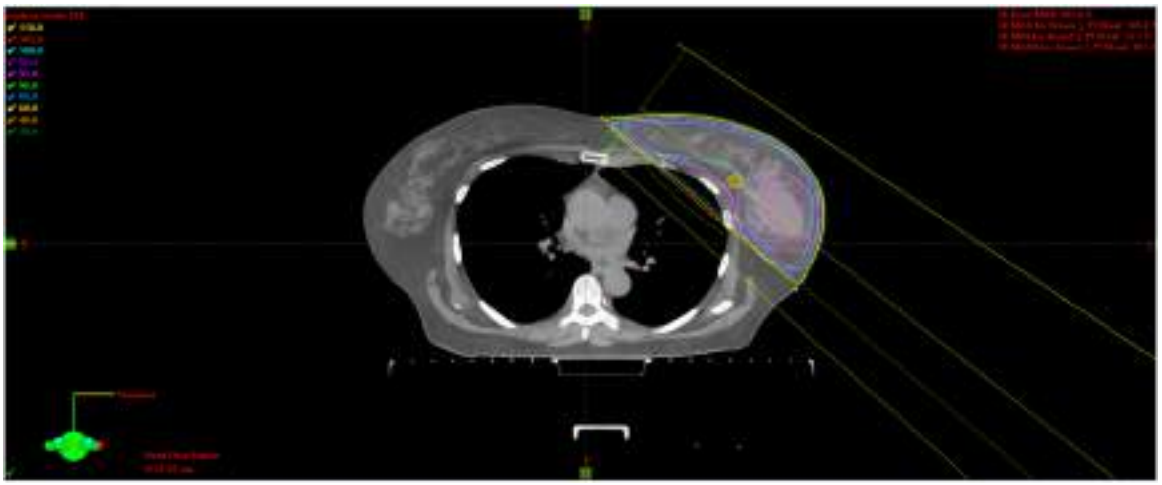

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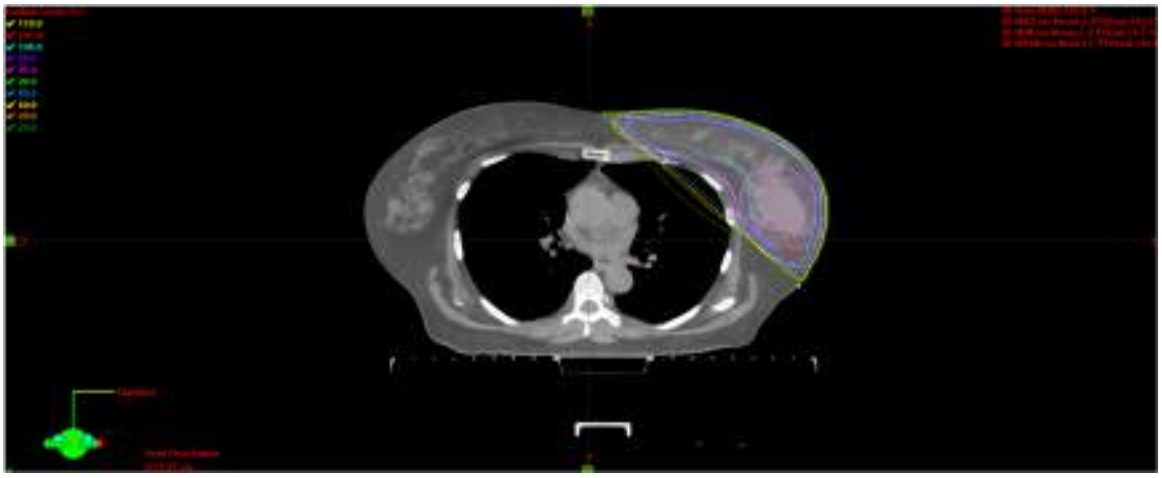
Whole Breast Dose Distribution



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Whole Breast Radiation Side Effects

Erythema/Hyperpigmentation

Late Fibrosis

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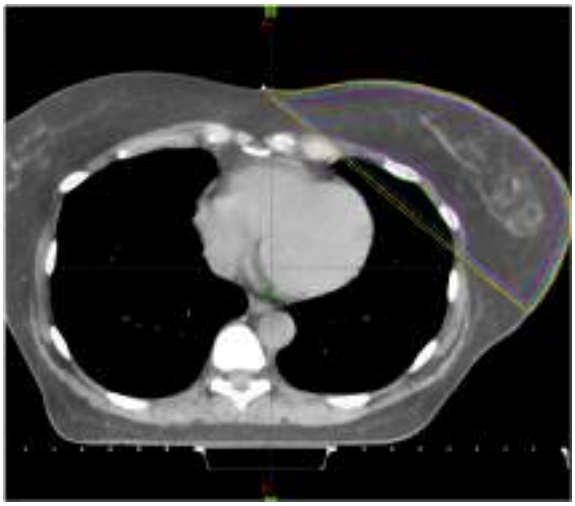
Whole Breast Radiation Side Effects



- Erythema/hyperpigmentation of skin
- Fibrosis of breast or muscle
- Lung scarring/pneumonitis
- Coronary artery disease

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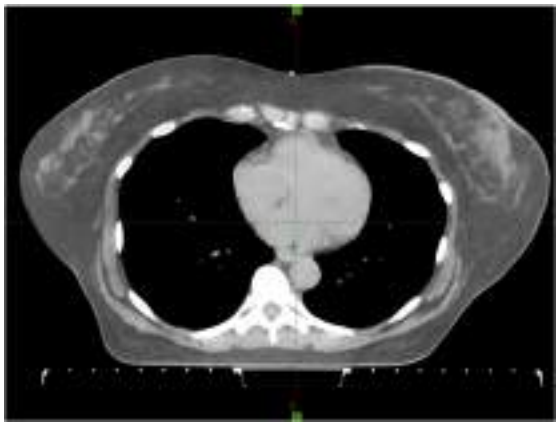
Breath Hold Respiratory Gating to Minimize Radiation Dose to the Heart

Free Breathing

Deep Inspiration Breath Hold



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REGIONAL LYMPH NODE IRRADIATION (RNI) AFTER LUMPECTOMY OR MASTECTOMY FOR LOCALLY ADVANCED BREAST CANCER

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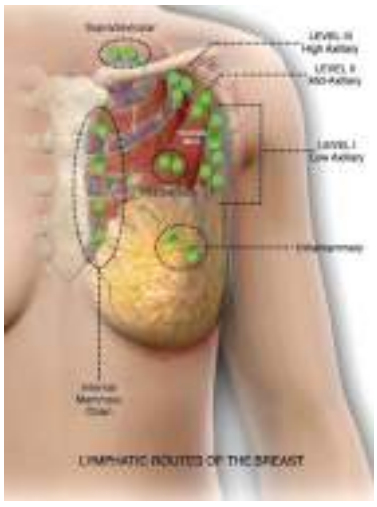
Indications for Regional Lymph Node Irradiation

- Tumor >5 cm with positive lymph nodes (Stage T3N1)
- Multiple positive lymph nodes on axillary lymph node dissection
- Positive lymph nodes after sentinel lymph node biopsy alone
- Positive lymph nodes after neoadjuvant chemotherapy



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Tumors >5 cm or Multiple Positive Lymph Nodes

- 3 randomized trials demonstrated overall survival benefit for postmastectomy radiation ([Overgaard et al. 1997, Overgaard et al. 1999; Ragaz et al. 2005]
- Early Breast Cancer Trialist's Collaborative Group (EBCTCG) meta-analysis:
  - Postmastectomy RT reduced 10 year local regional recurrence rate from 26% to 8%
  - Reduced 20 year breast cancer mortality from 66% to 58%

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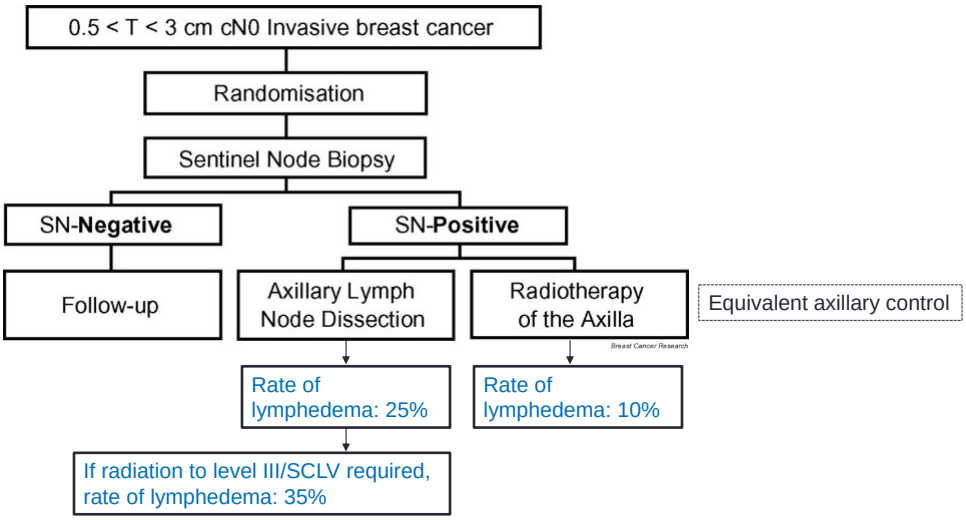
Positive Sentinel Lymph Node Biopsy Management AMAROS Trial



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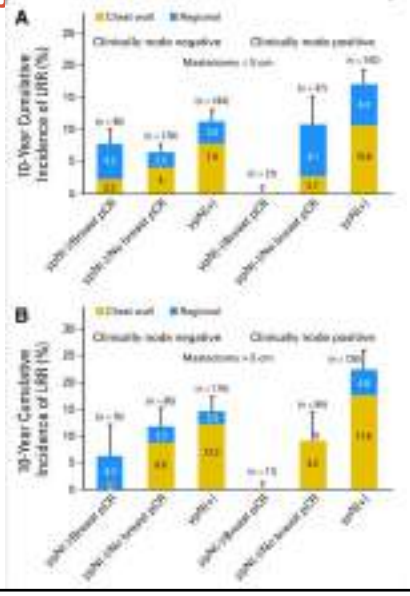
Residual Positive LNs After Neoadjuvant Chemotherapy

- NSABP B-18 and B-27
  - Neoadjuvant chemotherapy trials
  - Did not allow regional lymph node irradiation
  - 10 year local regional recurrence if residual positive lymph nodes after chemotherapy of 17%-22%.



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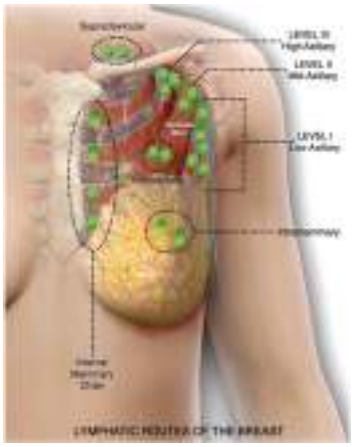
Regional Lymph Node Radiation Fields

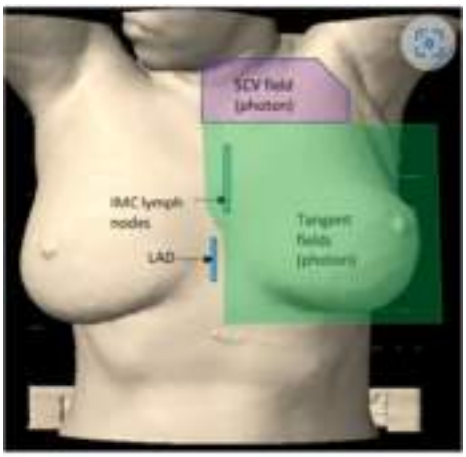
Tangent fields:

- Level I
- Lower level II
- Internal mammary lymph nodes

Supraclavicular field:

- Upper level II
- Level III
- Supraclavicular nodes





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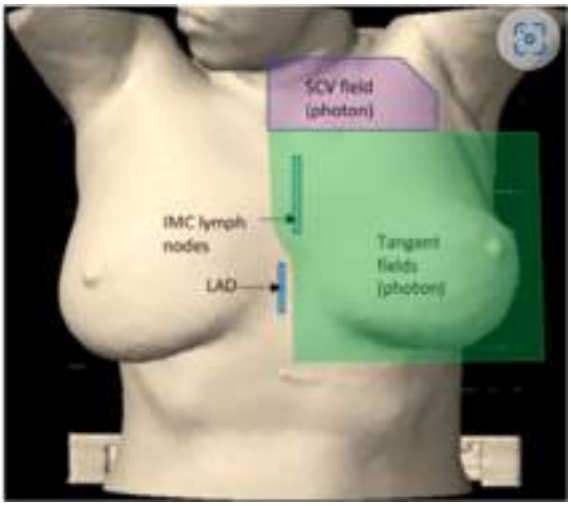
Postmastectomy RT Side Effects

- Erythema/desquamation
- Fibrosis
- Lung scarring/pneumonitis
- Coronary artery disease
- Esophagitis
- Brachioplexopathy <1%
- Lymphedema



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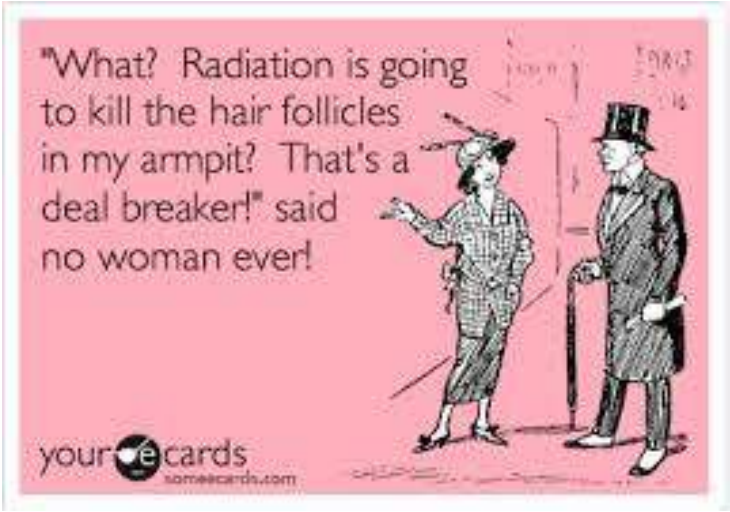

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