Intraoperative Radiotherapy for Breast Cancer—A Single-Institution Experience

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Background

Intraoperative Radiotherapy (IORT) was shown to be safe and effective for the treatment of low stage cancers in the TARGIT-A trial.

The use of IORT was further delineated by ASTRO (American Society for Radiation Oncology) Guidelines.

- Which patients may be considered for accelerated partial breast irradiation outside a clinical trial:

Factors	"Suitable"	"Cautionary"	"Unsuitable"
Age	≥60	50-59	≤50
Tumor Size	≤2cm	2.1-3.0cm	≥3cm
Margins	Negative ≥2mm	Close (≤2mm)	Positive
ER Status	Positive	Negative	Negative

Adapted from Smith, B et al "Accelerated Partial Breast Irradiation Consensus Statement from the American Society for Radiation Oncology (ASTRO) *J Am Coll Surg* 2009

Specific Aims

- To determine what population currently receives IORT at our institution
- To evaluate our acute and late toxicity rates

Methods

Retrospective chart review of IORT from 2009-2013 of patient, tumor and treatment factors

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- IORT was delivered by the Zeiss Intrabeam System following tumor excision.
- Radiation dose to the skin was measured using the Nanodot dosimeter.

- Toxicity Scoring
  - *Acute Toxicity:* CTCAE version 4.0 and RTOG cooperative group common toxicity criteria
  - *Late Toxicity*: RTOG/EORTC criteria

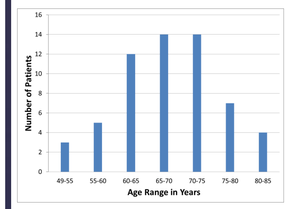
Results: Population Receiving IORT

- 58 Patients received IORT from 2009-2013
- 14 month average follow-up
- One recurrent breast cancer

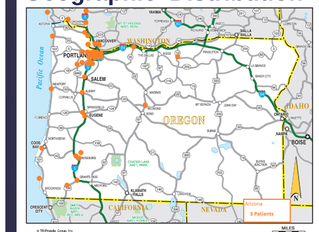
Tumor Factors

	Mean	Range
Tumor Size (cm)	0.99	0.3-2.3
Margins (cm)	0.6	0.1-3.5
Depth from Skin (cm)	3.6	1.6-5.4

Patient Age Distribution



Geographic Distribution



Patient Medical Comorbidities

	# of patients	Percentage
DM	15	26%
HTN	27	47%
Current Smokers	0	0%
BMI>30	18	31%
Previous Radiation	12	21%
Immunosuppression	6	10%
Cardiac Disease (e.g. Atrial fibrillation)	5	12%
Severe Pulmonary Disease	2	3%
Other malignancy	5	10%
Severely limited mobility	6	10%
Contralateral Breast Cancer	7	12%

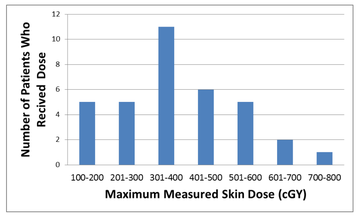
Results: Toxicity

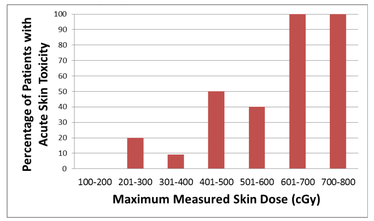
Grade of CTCAE/RTOG Toxicity and Frequency

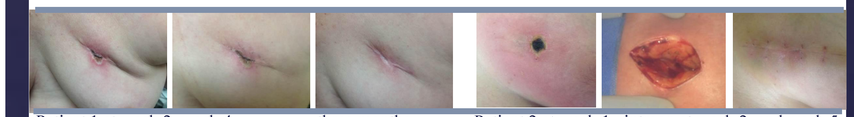
	Grade 2 toxicity	Grade 3 or 4 toxicity	Percentage
Skin Ulceration	7	2	15%
Breast Infection	6	1	12%
Radiation Dermatitis	5	2	12%
Wound complication	2	0	3%
Seroma	10	0	17%
Late Radiation Toxicity	3	4	12%
Overall Acute Skin Toxicity	**15**	**4**	**19%**

- Acute and Chronic Toxicity were not related to patient, tumor or procedure-associated factors including comorbidity, BMI, age, tumor depth, number of excisions or sphere size.
- Late radiation toxicity was related to acute toxicity.

- Increased radiation dose measured at the skin was related to increased skin toxicity p=0.025







Patient 1 at week 2 week 4, three months Patient 2 at week 1, intraop at week 2, and week 5

Two examples of acute skin toxicity following IORT. These complications were noted on post-operative visit.

Conclusions

- Patients currently undergoing IORT are:
  - Older with many medical comorbidities
  - Live throughout Oregon
  - Have small tumors with favorable features
- Moderate complications are common and may be related to skin radiation exposure.
- Severe toxicity is rare.
- Many women who would otherwise undergo mastectomy are able to have breast preservation with IORT, but they should be made aware of the acute and late toxicities.