Does the number of surgical excisions before delivering intraoperative radiotherapy (IORT) affect skin toxicity?

Charlotte Dai Kubicky, Cory Donovan, Brian Diggs, Arpana Naik, Carol Marquez, Susha Pillai, John T. Vetto, Rodney F. Pommier

Departments of Radiation Medicine and Surgery, Oregon Health & Science University

Background

The TARGIT-A trial allowed administration of IORT both pre- and post pathology. The advantage of post-pathology is the ability to determine eligibility based on margins, pathologic tumor size and nodal status, prior to delivering radiation. However, it is unclear whether having more than one operation before IORT is associated with worse skin toxicity. In this study, we aimed to examine the relationship of the number of operations and skin toxicities in women receiving IORT.

Methods

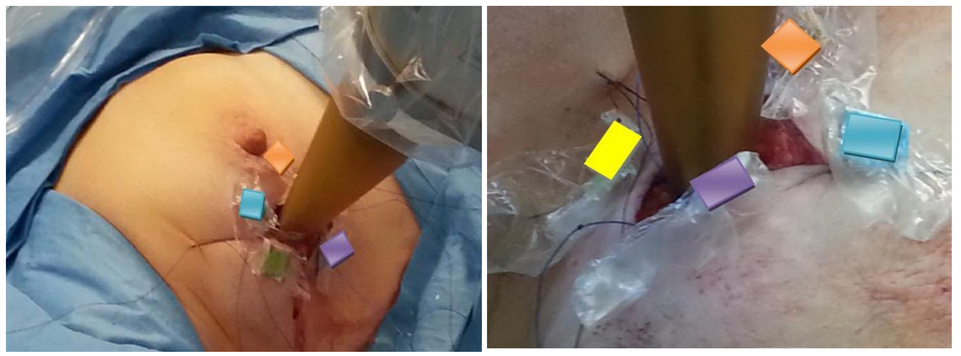
We conducted a retrospective analysis of 57 consecutive patients who underwent IORT from 2009-2013. All patients received 20 Gy in 1 fraction prescribed to the applicator surface using the Carl Zeiss Intrabeam System. Skin toxicities were determined using CTCAE 4.0 and RTOG criteria. In addition, infection, skin erythema, desquamation, symptomatic seroma, and necrosis were scored individually and used as outcome measures. Pearson's Chi-squared test was used to assess the association of the number of operations and skin toxicities. A multivariate analysis was performed and included age, applicator size, max skin dose, number of operations, DM, HTN, BMI, co-morbidity**,** and depth from skin on mammogram as variables.

Results

The median follow-up was 11 months (range 1-33). The median age was 68 yrs (range 49-85) . The median applicator size was 4 cm (range 2.5-5). 20 (35%) patients had 1 operation (lumpectomy, SLNB and IORT all in 1 setting). 36 (63%) patients had 2 operations (initial surgery, followed by margin re-excision and IORT. 1 (2%) patient had 3 operations (initial surgery, margin re-excision, followed by IORT). On univariate analysis, the number of operations was associated with increased infection (P=0.044), but not other skin toxicities. On multivariate analysis, the association was no longer significant (P=0.97).

Table 1: Multivariate Analysis

			P Value		
Variable	**Infection**	**Sx seroma**	**Skin Erythema**	**Desquamation**	**Necrosis**
Age	1	0.32	0.42	0.98	0.94
Applicator Size	0.99	0.89	0.66	0.88	0.75
Max Skin Dose	1	0.96	0.73	1	0.99
# of Operations	0.97	0.86	0.17	0.94	0.95
DM	0.99	0.79	0.19	0.89	0.88
HTN	0.98	0.78	0.31	0.93	0.90
BMI	0.98	0.41	0.88	0.90	0.94
Co-morbidity	0.94	0.87	0.65	0.98	0.93
Depth from skin on Mammogram	0.99	0.12	0.97	0.93	0.77



Conclusions

Our study suggests that delivering IORT post-pathology was not associated with worse acute or late skin complications. Delivering IORT after the initial operation decreases the uncertainty of margin status and avoids the controversy of excising an irradiated positive margin and/or the need for additional whole breast radiation.

Knight Cancer Institute
at Oregon Health & Science University