Purpose/Objective(s): The purpose of this study is to provide longitudinal follow-up and to assess the intermediate outcomes in breast cancer patients treated with the MammoSite radiation therapy system.

Materials/Methods: Between June 2002 and March 2007, 165 patients were treated with APBI using the MammoSite system. The present study is a subset analysis of 66 patients evaluated by a radiation oncologist, medical oncologist, and/or surgical oncologist every 3-6 months for a minimum of 24 months. Fifty-one (77%) of patients were treated with intraoperative placement of the MammoSite catheter; the remainder had postoperative ultrasound-guided placement. Treatment prescription was 3.4 Gy b.i.d. over 5 days using high-dose rate afterloading. Patients received prophylactic antibiotics for the duration of treatment. Staging included Tis to T2 and N0 to N1 disease. All surgical margins were at least 2 mm. The clinical and dosimetric parameters including D90 (dose to 90% of the PTV), V100 (Volume of PTV receiving 100% of dose), V150, V200, PTV volume and dose homogeneity index (DHI) were analyzed as variables correlating with late effects. Median follow-up time was 30 months (range 24 - 54 months).

Results: All patients received the prescribed radiation dose of 34 Gy. Acute RTOG Grade 1 dermatitis occurred in 18 patients (27%) and Grade 2 dermatitis in 2 (3%) pts. Nearly all patients had an acute seroma with median size of 4 cm (1.6 - 8cm). The symptomatic seroma was aspirated in 9 patients, 3 of which developed abscess requiring incision and drainage. Four patients developed cellulitis, two of whom did not have a seroma. The total number of infected patients was therefore 7 (11%). Eleven patients received chemotherapy after completion of APBI, and one of these patients developed radiation recall dermatitis. Forty-four patients had hormonal therapy. The persistence of seroma (clinical and/or radiological) at the median follow-up of 30 months was seen in 44 (67%) patients. The only clinical or dosimetric variable predictive for seroma was intraoperative placement of the catheter (84% vs. 47%, p=.005). Telangiectasia in the treatment area was observed in 9 patients. The median time of appearance of telangiectasia was 23 months (range 4-52 months). Telangiectasia was significantly increased in patients with maximum skin dose of $\geq 100 \%$ (41% vs. 2%, $p=.0002$) and $\geq 125\%$ (71% vs 6.7%, $p=0.0001$). Seven patients had fat necrosis (mammographic and clinical) at a median of 23 months (range 13-48 months.) Cosmetic outcome was excellent in 44 (67%), good in 20 (30%) and fair in 2 (3%) of patients. The presence of telangiectasia had a significant impact on cosmetic outcome grading. The presence of seroma did not affect cosmesis. To date, no patient has had local or systemic recurrence of cancer, although one patient developed contralateral DCIS 10 months after treatment.

Conclusions: The MammoSite Radiation Therapy System continues to demonstrate excellent local control and cosmetic outcome with extended follow-up. The maximum skin dose should be kept below 100% to reduce late effects on skin and improve cosmetic outcome. The persistence of seroma is higher with intraoperative placement of the catheter, and at our institution ultrasound guidance is the preferred method of placement.

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