Breast Preservation in Stage I/II Breast Cancer Patients

Use of external radiation therapy, in combination with a lumpectomy, is a viable alternative to major surgery to address Stage I/II breast cancer, and is preferred by patients.

The National Cancer Institute, 90 percent of women who had undergone breast-conserving treatment – a lumpectomy (L) and external radiation therapy (XRT) – reported that their cosmetic result was good to excellent (JNCI, 1992; 11:27). In the same interviews, 98 percent of women stated they would still choose to undergo lumpectomy + radiation therapy if they had to choose again between that and a mastectomy. As a result, the National Institutes of Health convened an expert panel, which noted that "breast conservation treatment is an appropriate method of primary therapy for the majority of women with Stage I/II breast cancer, and is preferable because it provides survival equivalent to total mastectomy and axillary node dissection, while preserving the breast."

There have been six major trials around that world that compare mastectomy to breast conservation in Stage I/II breast cancer. These studies have demonstrated that mastectomy offers no benefit over breast conservation treatment, both in regard to cure and local-regional control of the cancer. With lumpectomy alone, the National Surgical Adjuvant Breast and Bowel Project (NASBP) reported that 40 percent of patients experienced a local recurrence within 10 years after treatment. However, the six trials reported an aggregate rate of 7 percent chest wall and regional node recurrence after mastectomy, compared to 8 percent after breast conservation (see chart below).

RANDOMIZED TRIALS
MASTECTOMY (MRM) VS. LUMPECTOMY + XRT

				LOCAL/REGIONAL RECURRENCE (Chest Wall, Nodes, Breast)		
STUDY	#PTS	T-SIZE	DFS	MRM	L + XRT	F/U
NSABP	1219	≤ 4 cm	NSD	8%	8%	8 yrs
Milan	701	≤ 2 cm	NSD	2%	3%	10 yrs
WHO	179	≤ 2 cm	NSD	10%	5%	13 yrs
EORTC	882	≤ 5 cm	NSD	9%	13%	8 yrs
DBCG	859	≤ 5 cm	NSD	6%	5%	6 yrs
NCI	237	≤ 5 cm	NSD	10%	18%	8 yrs
TOTAL				**7%**	**8%**	

Source: NEJM, 1995 ; 332 : 907

While the most common method of breast conservation has been L + XRT, in recent years, some clinicians have used high-dose rate (HDR) brachytherapy instead of XRT. While the results of HDR combined with lumpectomy have shown local recurrence rates at least comparable to XRT (see chart below), HDR still requires patients to undergo another invasive procedure.

BREAST CONSERVATION RESULTS WITH HDR

BREAST

AUTHOR	#PTS	RECURRENCE	F/U
Baglan	37	2.6%	31 months
Polgar	44	2.4%	20 months
King	51	2.0%	75 months
Pevera	39	2.5%	20 months
Kuske	26	0%	20 months
Clarke	45	8.8%	18 months
Vicini	79	1.3%	52 months
RTOG	66	1.5%	32 months
Wazer	32	3.0%	33 months
Mark	283	4.2%	72 months
Polgar*	128 (HDR)	5.9%	120 months
	130 (XRT)	5.1%	120 months
Rodriguez*	51 (HDR)	0%	60 months
	51 (XRT)	0%	60 months
Nelson (Mammosite Registry Trial)	1,449	2.2%	36 months
Stasser (SAVI)	596	3.8%	39 months
Yashar (SAVI)	200	3.0%	57 months
Kuske (SAVI)	100	3.0%	60 months

*Randomized trial of partial breast HDR vs. whole breast XRT.

While HDR enables more rapid delivery of radiation treatment, clinicians are applying the same principle of hypofractionation to XRT in several randomized trials (see chart below).

BREAST CONSERVATION RANDOMIZED TRIALS
HYPOFRATIONATED XRT

STUDY	AUTHOR	#PTS	T-Stage	XRT	FX	LR	F/U
START-A	Bentzen	2236	T1-3	5000	25	3.6%	5-YRS
				4160	13	3.5%	
				3900	13	5.2%	
p-value					NSD		
START-B	Bentzen	2215	T1-3	5000	25	3.3%	5-YRS
				4000	15	2.2%	
p-value					NSD		
Gloucestershire	Owen	1410	T1-3	5000	25	12.1%	10-YRS
				3900	13	14.8%	
				4290	13	9.6%	
p-value					NSD		

Hypofractionation has been extended to accelerated partial breast irradiation using external beam radiation therapy methods. The idea is to give radiation treatment to the same volume as an HDR implant non-invasively. An intergroup randomized trial, NSABP-B39/RTOG 0413, has been launched, which randomizes patients to standard daily 6 ½ weeks of qd XRT vs. HDR Implant

given bid x 5 days vs. partial breast accelerated 3-Dimensional Conformal Radiation Therapy (3-D CRT) given bid x 5 days. At least six retrospective studies have been published using partial breast accelerated 3-D CRT (see chart below).

ACCELERATED PARTIAL BREAST 3-D CRT

STUDY	#PTS	STAGE	LR	F/U
Vicini	58	I/II	6%	5 yrs
Lewin	36	I/II	3%	4 yrs
Berrang	104	I/II	1%	3 yrs
Chen	94	I/II	1.1%	4 yrs
Formenti	100	I	1.0%	5 yrs
Shah	192	I/II	0%	5 yrs

Results from these studies compare favorably to the longer courses of whole breast daily XRT x 6 ½ weeks, and accelerated partial breast invasive HDR Implant twice daily x 5 days. On the methods of delivering hypofractionated treatment is via stereotactic body radiation therapy (SBRT) with daily Cone Beam CT Scan verification, which can produce the same radiation dose distribution as an HDR implant, but with better radiation dose homogeneity and lower skin doses.