used schedule for whole breast irradiation after breast concerving surgery is 2 Gy daily fractions given 5 times a week to a total dose of 50 Gy over 5 weeks with the optional addition of a boost to the primary site to 10 Gy in 5 daily fractions over 1 week. We present our clinical trial utilizing radiation therapy to deliver accelerated hypofractionated whole breast irradiation in patients with early-stage breast cancer treated with breast conserving therapy.

Methods and Materials: Between March 2002 and March 2003, 70 patients with Stage 0−3 breast cancer were enrolled at National Cancer Center Hospital, Japan, institutional review board-approved. Eligibility criteria included invasive ductal and lobular histologies as well as ductal carcinoma in situ, lumpectomy, and written patients consent. The prescribed dose was 40 Gy in 16 fractions given over 3 weeks to whole breast using 4MV or 6MV X-ray. Addition of a boost to the primary site to 10 Gy in 5 daily fractions over 1 week was delivered patients with closed surgical margin (<5 mm). All patients were treated once a day.

Table: Patients and tumor characteristics

Characteristic	
Median age (range)	54 yrs (30−76)
Clinical stage	
0	7 patients
1	24
2	33
3	3
Pathohistology	
Intraductal carcinoma	7 patients
Invasive ductal carcinoma	53
Others	7
Median pathological tumor size (range)	19 mm (5−67)
Surgical margin	
Negative	45 patients
Close or positive	22
Axillar dissection	
yes	60 patients
Sentinel lymph nodes biopsy	
Yes	6
No	1
Lymph node metastasis	
no	62 patients
1−3	7
4−	0
Grade	
1	8 patients
2	36
3	23
Estrogen receptor status	
Positive	48 patients
Negative	19
Systemic chemotherapy	
No	46 patients
Preoperative	8
Postoperative	13
Hormone therapy	
No	47 patients
Yes	20

Results: The median follow-up after radiotherapy was 85 months (range, 3−92 months). 3 patients without protocol treatment were excluded the analysis.

Baseline characteristics including age, tumor size, estrogen receptor status, tumor grade etc were presented in table.

Three patients experienced a local breast cancer recurrence as a first event.

At 7 years, local recurrence-free survival was 94.4%. Any recurrence was noted as a first event − 11 events were identified. (3 local recurrences, 2 regional recurrences, and 6 distant recurrences). At 7 years, disease-free survival rate was 82.3%. At 7 years, overall survival rate was 98.3%.

In late radiation toxicity of the subcutaneous tissue, no grade 2, 3 was observed. Incidence of grade 0 was 70% and grade 1 was 30%. No skin telangiectasia was observed. One patient developed rib fracture at 23 months.

Conclusion: Hypofractionated whole breast irradiation for breast conserving therapy is a highly effective and safe treatment for Japanese women.

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Prognostic factors in patients treated with radiotherapy for bone metastasis from breast carcinoma

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Background: The aim of this study was to evaluate prognostic factors and to analyze the overall survival of patients with bone metastasis due to breast carcinoma.

Materials/Methods: We performed a retrospective review of 137 patients with bone metastasis (BM) from breast cancer who were treated with radiotherapy (RT) between 1999–2008. All patients had histologically confirmed breast cancer. Median age was 49 (range 26−83). At the time of BC diagnosis: 72 (53%) patients were premenopausal, 64 (47%) were postmenopausal. ER+, PR+ and HER2 phenotypes were represented by 67%, 64%, 69% of this group, respectively. Fourty patients (29%) had one bone metastasis, 25 (18%) had two, 14 (10%) had three and 58 (42%) had more than four bone metastases. Due to first bone metastases, RT was mostly applied to thoracal vertebra region (26%). Most patients (80%) had received a total dose of 30 Gy in fractions of 3 Gy.

Results: Median follow-up was 57 (3–279) months. At the time of analysis, 65 patients had died with disease, 72 were alive. The median time from BC to BM was 35 (1–192) months. The median overall survival after diagnosis of bone metastasis was 43 months. Overall survival rate at 2 and 5 years was 87% and 63%, respectively. Age, menopausal status, clinical stage, Karnofsky performance status, grade, ER, PR and HER-2/neu status, alkaline phosphatase (ALP) and calcium levels, RT fields, number of bone metastases, the presence of distant metastasis before BM and interval from BC diagnosis to BM were investigated as a prognostic factors. Univariate and multivariate analysis demonstrated that ER, PR, HER-2/neu and ALP level in serum were statistically significant predictors of survival.

Conclusions: This study demostrated that ER, PR positivity and HER-2/neu negativity and low level of ALP were significantly associated with better survival in bone metastasis due to breast carcinoma.

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Four times weekly adjuvant breast radiotherapy with a moderately intensified boost to the tumour bed − feasibility and acute toxicity

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Background: Standard safe schedules for adjuvant breast radiotherapy (RT) after breast conserving surgery use a dose of 45−54 Gy with fraction doses of 1.8−2.5 Gy in an overall treatment time of 35−38 days to the whole breast [1]. A boost of 16 Gy to the tumor bed improves local control but leads to increased fibrosis in the boost area [2]. The optimal dose and technique for the boost remain unclear. Biological considerations such as the low α/β ratio in breast cancer [3−5] and accelerated proliferation as well as the possibility of selecting resistant residual tumor cells are in favour of a dose intensification of the boost after whole breast RT (WBI). We chose a moderate intensification to avoid fibrosis and hypothesize that four times weekly adjuvant breast RT with a moderately intensified boost to the tumour bed is feasible and yields acceptable acute toxicity in patients $\leqslant$70 years.

Material and Methods: 50 consecutive patients $\leqslant$70 years with ductal carcinoma in situ or pT1−2 (ypT0included) pN0−1 invasive breast cancer after breast conserving surgery with or without chemotherapy and/or hormonotherapy were studied. Treatment consisted of 21×2.25 Gy WBI followed by a boost of 6×2.5 Gy to the tumor bed during $6\frac{1}{2}$ weeks by two tangential photon beams (6−18 MV) for WBI and photon or electron beams for the boost depending on tumour location. Acute RTOG-EORTC skin toxicity in the breast and the boost region was assessed weekly during treatment and six weeks after the end of RT.

Results: The median age of the patients was 57 (33−69) years. Seven patients had ductal carcinoma in situ, 43 patients invasive carcinoma. Median overall treatment time was 44 (42−46) days. Acute G1, G2 and G3 skin toxicity occurred in 13 (26%), 30 (60%) and seven patients (14%) in the boost region and in 18 (36%), 30 (60%) and two patients (4%) outside the boost. At a median follow-up of six weeks after the end of RT, remission of skin toxicity ($\leqslant$G1) was seen in all but two patients with G2 toxicity.

Conclusions: On the basis of biological considerations and promising results of hypofractionated schedules [6−9], an intensified boost to the tumour bed after WBI may improve local control. Our schedule using four times weekly WBI followed by a moderately intensified boost to the tumour bed is feasible and well tolerated at short term in patients $\leqslant$70 years