whole breast (WB) irradiation at the Institut Curie for early BC, a titanium clip was placed (during the surgery) at the zone where the first SLN was found. All pts were irradiated using previously published techniques: in dorsal decubitus (DD) position using 2 tangential fields and isocentric lateral decubitus (ILD). Prophylactic dose to SLN (PD) was defined as 95% of total dose prescribed to the breast (boost to tumor bed was not considered). The dose was evaluated to this "clip point". Prospective registration and dosimetric study was conducted in all cases. Statistical analysis used Student and chi 2 tests to find any correlation between anatomical, clinical and radiological pts' and tumors' characteristics and dose received to SLN bed.

Results: All 152 pts were enrolled in the study. The median age was 57 years (yrs) (34−81). The median weight was 60 kg (43−80). The median body mass index (BMI) was 23 kg/cm^2 (17−40). T1 98%, T2 2%, N0 93% and N1 7% of cases. All tumors were pN0. Sixty-eight percent were treated in DD and 32% in ILD position. The median total dose delivered to the WB was 50 Gy (32−54). For the population of all pts, PD was seen in 25% of cases, of them 17% of pts, treated in DD and 41% in ILD groups ($p = 0.018$). PD was found more often in young pts ($p = 0.04$), heavy pts ($p = 0.03$), pts with a higher BMI (0.03), and N2 ($p = 0.004$).

Conclusions: In our series we found that the dose received by the SLN clip is related to treatment position and pts morphology. These parameters could be systematically considered especially if an axillary node irradiation is proposed.

330 Poster

The role of IMRT in the irradiation of breast cancer

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Background: Breast cancer is one of the most frequent indications in radiation therapy. With common techniques the recommended range of the prescribed dose between 95% and 107% can not be realized in either case. Complex target volumes e.g. including axillary, supraclavicular or internal mammary lymphnodes are in most cases not covered in accordance to international recommendations (ICRU 50 and 62). Therefore further irradiation techniques are eligible. Three different techniques are described and the dosimetric results are compared. Especially the option of the Intensity Modulated Radio Therapy (IMRT) is investigated.

Material and Methods: Three different techniques are compared in three different clinical situations. The irradiation of bilateral breast cancer, the irradiation of a thoracic wall including axillary and supraclavicular lymphnodes and the irradiation of the breast including an integrated boost. The techniques to be compared are the common tangential irradiation, the tangential irradiation with an additional field (forward planned field-in-field technique), and the IMRT. All treatment plans have been calculated with the Eclipse planning software (VARIAN), based on the AAA photon calculation algorithm. The definitions of target volumes and the evaluation of all plans were carried out in accordance with the German S3-Guidelines and the recommendations ICRU 50 and 62.

Results: Only in rare cases the common tangential irradiation can fulfill the ICRU criteria strictly. With the use of an additional field in the treatment of the breast and the thoracic wall, respectively, the ICRU criteria are more frequently applicable. A dose coverage of the supraclavicular lymphnodes can be realized by a radiation technique with opposing fields, however, comprising considerable normal tissue volumes outside the target volume. An appropriate dose conformity to the target volume can be realized with IMRT, preventing high doses outside the target volume.

Conclusions: In simple cases the traditional approach of tangential fields with or without an compensation field provides good results within the ICRU limits. For complex cases the use of IMRT techniques provides an improved conformal dose distribution to the target volumes. However, with IMRT the amount of normal tissue outside the target volume, that receives low doses, increases. With IMRT the delivery of an integrated conformal boost to the tumorbed and thereby a shortened overall treatment time can be realized.

331 Poster

Anatomical, clinical and radiological delineation of target volumes in the radiotherapy planning of breast cancer: individual variability, questions and answers

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Purpose: To evaluate the variability of anatomical and radiological delineation for breast cancer radiotherapy, as part of preparing of new techniques as tomotherapie and simplified IMRT and propose the solutions to improve the delineation procedure.

Material and Methods: First phase: a patient with complete response after neoadjuvant chemotherapy, stage T3N3M0 breast cancer underwent CT scan in treatment position before radiation treatment was studied. Eleven radiation oncologists (5 breast cancer specialists and 6 residents in training program) independently delineated the breast and lymph node regions before the definition of target volumes. All regions [breast, axilla, supraclavicular lymph nodes (LN), infraclavicular LN, internal mammary chain (IMC)] were delineated and compared with regard to volume. The results were evaluated and the second phase consisted of training in contouring of treatment volumes for all physicians, then contouring of new patient: bilateral T1N0M0 breast cancer after conserving surgery and chemotherapy before radiation therapy.

Results: The clinical and radiological variations were observed between different radiation oncologists. After training in the volume delineation, the same physicians improved the contouring of different volumes. After the second phase there were still found differences some volumes. Simplified rules of volume delineation were established and atlas developed.

Conclusions: Major differences in anatomical and radiological delineation for breast cancer radiotherapy were observed between different physicians. This study conducted to development of written protocols of delineation. After training program, better results were observed. The study is still running with evaluation of dosimetric impact and definition of different target volumes.

332 Poster

Results of a novel weekly fractionation regimen for brain metastasis in patients with carcinoma breast

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Background: Breast cancer commonly metastasizes to bone, liver, lung and brain. The usual treatment of brain metastasis is whole brain radiotherapy to a dose of 20 Gray in 5 fractions or 30 Gray in 10 fractions. We attempted to study a novel weekly fractionation regimen for brain metastasis in patients with carcinoma breast.

Material and Methods: 40 consecutive patients of breast cancer with brain metastasis were taken in this prospective study. In all patients baseline characteristic were recorded before radiotherapy. A dose of 12 Gray in 2 fractions (1 week apart, on Saturdays) was delivered to whole brain by German helmet technique using Cobalt 60 machine or a 6 MV linear accelerator. A parallel pair technique was used for this purpose. A clinical evaluation was done before radiotherapy and at RT conclusion. Patients who did not report for follow up were contacted on phone or by letters to accurately assess the status and overall survival.

Results: The mean age was 49 years (range 31−72). 23 (57.5%) cases underwent CT while the rest underwent MRI examinations for detection of brain metastasis. 9 (22.5%) patients had a single lesion and 30 (75%) had multiple lesions. One patient had diffuse leptomeningeal involvement. Only 2 patients (5%) were taken for surgery for the metastatic brain lesion while the rest underwent upfront radiotherapy. 28 patients (70%) felt better, 10 (25%) felt same as before while 2 (5%) felt worse at radiotherapy conclusion. At one month 32 patients (80%) had improved or stable KPS while 8 patients (20%) had decreased KPS. The median survival of the patients was 6.5 months.

Conclusion: Our novel fractionation regimen has shown equivalent survival rate compared to more fractionated regiments. This treatment is a useful resource sparing strategy for busy oncology centers and reduces patient visits to the hospital.

333 Poster

Breast cancer patients treated with intra-operative radiotherapy alone when conventional external beam radiation therapy was not possible

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Background: Intra-operative radiotherapy (IORT) with Intrabeam system has been piloted since 1998 and used in the randomised TARGIT International trial since 2000. Some patients are suitable for off-trial therapy,

particularly where external beam radiotherapy (EBRT) cannot be offered due to various reasons.

Methods: Patients with invasive breast cancer underwent wide local excision followed by IORT (n = 75) using the Intrabeam system containing a miniature electron gun and accelerator. Low energy x-rays (50 kV) are emitted from the point source, delivering 20 Gy to the breast tissue at the surface of the tumour bed using a spherical applicator. Patients who were deemed unfit for surgery (n = 3) received interstitial radiotherapy alone using Intrabeam, with only the point source placed at the tumour centre under stereo-guidance under local anaesthetic, and were followed up with serial MRI scans.

Results: Over the past 7 years 78 patients have been treated in this way in centres in 3 countries (UK, Germany and Australia). To date there have been no local recurrences. One patient developed a second primary and subsequently died of brain metastases.

Conclusions: This cohort adds to the evidence that targeted radiotherapy using Intrabeam (either IORT or interstitial) could offer a safe and effective method of delivering radiotherapy to breast cancer patients in whom EBRT is not an option.

Table

Reason for IORT	No. of patients	Age (years)*	Follow-up (months)*	Outcome
Previous EBRT	22	64 (54−74)	35 (15−50)	All free of LR; 2 died
Collagen vascular disease	5	63 (57−64)	24 (22−35)	All free of LR
Co-morbidities	24	79 (66−83)	22 (16−35)	All free of LR; 7 died
Other	27	62 (52−73)	29 (22−48)	All free of LR; 1 died

* median (IQR). LR = local recurrence.

Thursday, 17 April 2008 12:30–14:30

POSTER SESSION

Sentinel node – technique, diagnosis and management

334 Poster

Axillary and extra-axillary lymph node recurrences after a tumor-negative sentinel node biopsy for breast cancer using intra-lesional tracer administration

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Background: A recent literature review of sentinel node-negative breast cancer studies with a median follow-up of 46 months revealed an axillary recurrence rate of 0.4%. At our institution, the tracer fluids are administered in the primary breast cancer. Sentinel nodes both in and outside the axilla are pursued. The objective of the present study of sentinel node-negative breast cancer patients was to determine the lymph node recurrence rates in the axilla and elsewhere, the false-negative rates, and survival.

Methods: Between January 1999 and November 2005, 1,019 patients underwent a sentinel node biopsy for breast cancer with intra-lesional tracer administration of technetium-99m-nanocolloid (GE-Healthcare). Lymph node recurrence rates were calculated as a percentage of the tumor-negative sentinel node biopsies. The false-negative rate reflects the percentage of missed involved sentinel nodes and was calculated by dividing the number of lymph node recurrences by this same number plus all tumor-positive sentinel node biopsies. Survival was calculated by Kaplan–Meier analyses.

Results: In 748 patients, 755 sentinel node biopsies revealed a tumor-negative sentinel node and axillary dissection was omitted. The median follow-up time was 46 months. Two of the 748 patients developed an axillary lymph node recurrence after 10 and 44 months, and are both alive without tumor-activity 46 and 15 months later, respectively. Two other patients developed a supraclavicular lymph node recurrence after 8 and 52 months and both died of distant metastases after 2 years and 9 months, respectively. The lymph node recurrence rate was 0.5%; 0.25% for the axillary and 0.25% for the extra-axillary nodes.

In 271 patients, 284 sentinel node biopsies revealed metastases: in 247 of them in the axilla, in 20 outside the axilla, and in 17 patients both in the axilla and elsewhere. The false-negative rates were 1.4% overall, 0.8% for the axilla and 5.1% for the extra-axillary nodes.

After five years, 95.9% of all patients were alive and 89.7% were alive without disease.

Conclusion: The low recurrence and false-negative rates and promising survival figures show that our lymphatic mapping method with intra-lesional tracer administration is accurate for the axilla. Outside the axilla, 5.1% of involved sentinel nodes were missed.

335 Poster

Current status of the EORTC 10981–22023 AMAROS trial – After mapping of the axilla radiotherapy or surgery

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Background: The AMAROS trial is a phase III study comparing axillary lymph node dissection (ALND) with axillary radiation therapy (ART) in patients with proven axillary metastasis by sentinel node biopsy (SNB). The main objective of the trial is to prove equivalent locoregional control and reduced morbidity for ART. The aim of this report is to discuss the progress of the trial.

Material and Methods: Patients with operable unifocal invasive breast cancer (5−30 mm) and clinically negative lymph nodes are randomized between ALND and ART. SNB is performed using preoperative lymphoscintigraphy, blue dye and a gamma-ray detection probe. Quality of Life, arm- and shoulder function is evaluated after 1, 3, 5 and 10 years. The primary endpoint is axillary recurrence rate. The calculated sample size was 3485 patients to be registered, assuming a SNB positive rate of 40%.

Results: In Europe 30 institutes are participating. Between 2000 and 2007, 3494 patients have been enrolled. Accrual rate is 60 patients per month. Of the first 3100 patients, 1000/3100 (32%) patients were SNB positive and 2006/3100 (65%) were SNB negative. The identification rate was 97%: in 3% (89/3100) the sentinel node was not identified. Three percent (32/759) of patients with a positive SNB were ineligible, mainly due to absence of invasive breast cancer or clinically positive axillary lymph nodes. Fifteen percent (112/759) of patients had tumors >30 mm or multifocal tumors on final pathological assessment, while at baseline, they complied with the inclusion criteria. Protocol treatment compliance was 90%. Main reasons for non-compliance were cross over, no further treatment because of isolated tumor cells (<0.2 mm) and patient refusal. Thus far, in 7/3100 enrolled patients, axillary lymph node metastases became apparent.

Conclusion: The SNB identification rate is above the mandatory 90% and is similar to the results of other multicenter trials. The SNB positive rate is lower than expected, 32% instead of 40%. To randomize the required 1394 SNB positive patients and to compensate for 10% treatment non-compliance, the trial will remain open for another 2 years, until 4766 patients are registered. The allowed maximum tumor size will be increased from 30 mm to 50 mm since it is nowadays considered to be safe to perform a SNB in these patients and it will be allowed to omit further axillary treatment if only isolated tumor cells are found.