Next steps: Increased frequency of pathology MDMs is under consideration, to shorten the time to discussion about adjuvant therapy.

Appointment of MDM coordinator to implement systematic tracking of patient's progress, and assist the specialist radiographer to avoid unscheduled delays in treatment.

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Expression of inducible heat shock protein 70 in breast cancer cells correlates with their radioresistance

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It is of importance to elucidate molecular determinants of enhanced radioresistance that many human tumors exhibit in vivo; such an approach would enable to artificially strengthen the anti-tumor action of clinical radiotherapy. The aim of the present study was to investigate how different patterns of the stress-inducible 70 kD heat shock protein (Hsp70) expression in human breast cancer cells correlate with their radioresistance.

A breast cancer-derived cell line MCF-7 and cancer breast biopsies were here studied. The cell and biopsy samples were analyzed in Western blotting and immunofluorescence staining with an antibody specific to an inducible form of Hsp70. Up- or down-regulations of inducible Hsp70 in the cultured cells were achieved by infection with virus-based vectors expressing either inducible Hsp70 or its RNAi, respectively. After gamma-radiation exposure, the death and survival of the irradiated cells were evaluated in TUNEL and clonogenic assays.

It was found that MCF-7 cells constitutively expressed the inducible form of Hsp70. The additional (Hsp70-vector-induced) increase in the intracellular Hsp70 content rendered these cells considerably more radioresistant. Conversely, the RNAi-vector-induced down-regulation of the basal level of inducible Hsp70 in MCF-7 cells significantly decreased their radioresistance. These in vitro data correlated well with results of studying of the breast cancer biopsies: the same tumors exhibited both the enhanced resistance to radiotherapy (clinical data) and the high levels of expression of inducible Hsp70 (data of in situ analyses of the biopsies).

Taken together these findings allow to conclude that the inducible form of Hsp70, when accumulated in human breast cancer cells, contributes to their enhanced radioresistance. Consequently, artificial suppression of the expression of inducible Hsp70 in the tumors could render them more sensitive to radiotherapy; the latter conclusion gives additional motivation for development of clinically applicable ways to manipulate the in vivo expression of Hsp70.

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194 Poster

The importance of patient's position in CT-scan based localization of the Internal Mammary Chain (IMC) and Supra Clavicular Nodes (SCN) for breast cancer (BC) radiation therapy planning

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Purpose: To evaluate the importance of treatment position in the evaluation of the exact localization of SCN and IMC and their variability among patients in order to improve treatment planning in BC patients.

Material and Methods: A total of 46 CT scans of the chest were examined. All patients were female with breast conserving treatments. The study was divided into two phases. The first consisted in the measurements on the diagnostic CT scan. This scan was performed in the supine position with both arms over the head for diagnostic reasons. All diagnostic CT scans – patients were injected for the procedure. When the injection was done on the left side, measurements were performed on the right side and vice versa, to diminish artifacts. This first phase was performed as a training program for radiologist and radiation oncologists to prepare the second phase of the study where the CT scan in treatment position was used without injection. For this second group of patients with one arm raised above head (treated side) and the other was kept by the side (contralateral side). Measurements were performed on both sides to evaluate the influence of the arm position. The depths of IMC and SC vessels were measured at 5 points: 1) the origin of the internal mammary artery, 2) the sterno-clavicular articulation, 3–5) the first, second and third rib interspaces (RI). Measurements of the depth and of the distance between the internal mammary vessels and the middle plan of the sternum were obtained using electronic calipers on a PACS workstation.

Results: Twenty diagnostic Ct scans and 26 CT scans in treatment position have been studied. The results of all measurements showed differences in the depth between diagnostic CT scan and CT in treatment position. Definitive results compared by the method of Fischer will be presented at the Meeting. Table 1 shows the lateral limits of IMC-the distance between the IM vessels and the middle axis of the sternum (I, II, III rib interspaces): diagnostic CT and CT scan in treatment position (treated side).

Lateral limits [mm]	Diagnostic CT scan (n = 20)	Treatment CT scan* (n = 26)
I RI		
Median value [range]	30 mm [17–40]	31.5 mm [22–35]
Mean±SD	29.8±5.3	30.9±3.2
II RI		
Median value [range]	26 mm [21–39]	28.5 mm [25–37]
Mean±SD	28.2±4.7	29.8±3.5
III RI		
Median value [range]	27 mm [19–39]	29 mm [24–39]
Mean±SD	27.6±4.9	29.9±3.9

Conclusions: This study shows the importance of the patients' position between diagnostic and therapeutic CT scan, the large variability in the depth of SCN and IMLN. It is important to visualize these regions to permit an individual dosimetric optimization.

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Breast radiotherapy in women with pectus excavatum (funnel chest): is the lateral decubitus technique an answer? – a dosimetric study

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Purpose: Breast radiotherapy is a technical challenge in women with pectus excavatum. This study aimed to assess isocentric lateral decubitus (ILD) technique as a means to irradiate breasts for patients with pectus excavatum.

Methods and Material: Four women presenting with left-sided breast cancers and found to have pectus excavatum were offered breast-conserving treatments. Postoperative breast radiotherapy was indicated (50 Gy at ICRU point in 25 fractions over 5 weeks) with, in two patients, an additional boost to the tumour bed (16 Gy in 8 fractions over 1.5 weeks). Both ILD and standard decubitus (SD) techniques were simulated. We report the dosimetric comparison of these techniques and the acute skin toxicity (RTOG toxicity scale) of ILD radiotherapy.

Results: ILD permitted the same breast dose-homogeneity as SD while decreasing breast thickness by 41 to 62%. The width of lung and/or heart receiving > 20 Gy ranged between 2.1 and 4.3 cm with SD and between 0.5 and 1.1 cm with ILD. The estimated percentage of ipsilateral lung receiving > 20 Gy ranged from 21% to 34% with SD and from 0% to 5% with ILD. Acute skin toxicity was scored 1 for all patients at completion of ILD radiotherapy, with no interruption of treatment.

Conclusion: ILD is an effective breast radiotherapy technique for patients with pectus excavatum that preserves the underlying heart and lung from unnecessary irradiation.

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Evaluation of irradiated breast tissue volume and cosmetic outcome in conserving treatment using intraoperative Ir 192 HDR brachytherapy boost

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Introduction: Radiotherapy boost is a standard procedure during breast conserving treatment in patients with breast cancer, resulting in lower incidence of local recurrencies. One of the methods may be the intraoperative Ir 192 HDR brachytherapy. Our study evaluates the irradiated breast tissue volume and cosmetic outcome in such a modality.

Material and Method: Between January 1998 and May 2003, 40 breast cancer patients received intraoperative Ir 192 HDR brachytherapy in the course of their breast conserving treatment (group A). Control group of 75 women received brachytherapy boost after finishing the full teleradiotherapy regimen (group B). The characteristics of both groups were similar. Patients in both groups received the boost in 1 fraction of 10 Gy, the dose specification was also identical (the dose was specified 5 mm from the source). The volume was measured for isodose of 10 Gy. All patients in