Conclusion: The hook-wire localization of nonpalpable breast lesions is simple, accurate and safe method for detection of early breast cancers. Frozen section is feasible and accurate in the majority of these lesions, and therefore, diagnostic and therapeutic one step surgical procedure could be performed.

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Clinical implications of tumour-positive internal mammary lymph nodes in breast cancer

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Background: Since the introduction of the sentinel lymph node biopsy in breast cancer patients there has been a renewed interest in the lymphatic drainage pattern to the internal mammary chain nodes. In this study we evaluated the frequency of lymphatic drainage to the internal mammary chain, the rate of positive nodes and the clinical implications of its presence.
Material and methods: Between May 1999 and December 2004 494 consecutive patients underwent a sentinel lymph node procedure for primary breast cancer, clinically stage T1–2N0. In all patients preoperative lymphoscintigraphy was combined with intraoperative gammaprobe use. In patients with internal mammary sentinel lymph nodes on lymphoscintigraphy, lymph node extirpation was attempted through an intercostal parasternal incision.
Results: The sentinel lymph node identification rate was 99.2%% (490/494). In 87 patients (17.6%) ipsilateral internal mammary lymph nodes were visualised, in 76 of them (87.5%) the lymph node(s) could be removed. In all 88 patients with sentinel nodes in the internal mammary chain we found concomitant axillary sentinel lymph nodes. In sixteen of the 76 patients in whom internal mammary sentinel nodes could be retrieved, metastasis were found (21.1%). In 12 of these patients this resulted in expansion of the radiotherapy field, while in only six patients internal mammary lymph node metastasis was the indication for adjuvant systemic therapy. In the remaining 10 patients systemic therapy was indicated based on primary tumour features and/or axillary lymph node positivity. More extensive radiotherapy and adjuvant systemic treatment was indicated solely on internal mammary lymph node positivity in 12/88 13.6% and 6/88 6.8% respectively of the patients in whom internal mammary sentinel nodes were visualised. This means 2.4% and 1.2% for all patients.
Conclusions: Sentinel lymph nodes in the internal mammary chain are a common feature and can be excised successfully in the majority of patients. The implications of sentinel node positivity are limited. The proportion of patients in whom adjuvant systemic therapy is indicated is negligible and the proportion of patients in whom the radiotherapy field is expanded is comparable to or even lower than the false negativity rate of the (axillary) sentinel lymph node procedure.

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Intraoperative radiotherapy with electrons (ELIOT) for breast carcinoma: the preliminary study on treatment tolerance at the European Institute of Oncology

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Background: At present, radiation therapy after breast-conserving surgery is generally delivered to the whole breast over a period of 5 to 6 weeks. Such a prolonged postoperative radiotherapy is a burden to patients and hospitals and forces many women with difficult access to Radiotherapy Centers to chose mastectomy instead. Furthermore, for patients receiving chemotherapy, the start of conventional radiotherapy may be delayed so long as to increase the risk of local relapse. These problems might be eliminated if effective radiotherapy could be given as a single treatment intraoperatively, immediately after surgery. Since the majority of local recurrences in selected patients occur close to the former tumor bed, even when radiotherapy is omitted, the question arises whether a sole tumor bed irradiation might be a therapeutic alternative to total breast irradiation.
Material and methods: One hundred and one consecutive patients with invasive breast cancer of tumor size up to 2.5 cm were prospectively treated at European Institute of Oncology with ELIOT directed only at the region of the tumor bed as part of their breast-conserving therapy from 1999 to 2000. The trial was based on a dose-escalation starting from 10 Gy: we tested the dose levels of 10, 15, 17, 19 and 21 Gy. The dose-levels of 10 and 15 Gy were followed by a reduced course of external fractionated radiotherapy. Most patients received 21 Gy intraoperatively. The focus of this study was the early and intermediate results of treatment in terms of toxicity, complications, cosmetics, local control.
Results: After a mean follow-up of 42 months, only 23 patients of the 84 patients who received a dose of 17 to 21 Gy had experienced mild or moderate side effects, including breast fibrosis 16 patients, mild in 15, severe in 1, which resolved within 24 months. Postoperative infection 2 patients, hematoma 3 patients and lyponecrosis in the treated area 3 patients.
Conclusions: Early results on treatment tolerance suggest, that ELIOT could be offered to the patients a potential advantage of reduced treatment-related toxicities and improvements in the quality of life. Less exposure of normal breast tissue, greater accessibility for elderly or frail patients, a more convenient schedule for working patients, the ability to deliver radiation before chemotherapy without a potential delay in local therapy, and possibly less cost, should lead to greater appropriate use of ELIOT in patients with breast carcinoma.

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Reduction of ipsilateral breast tumor recurrence rate by Intraoperative Radiotherapy (IORT) boost technique

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Introduction: Ipsilateral breast tumor recurrence (IBTR) after breast conserving surgery is rare (1–2% per year), but can be further reduced by proper surgery and modern radiotherapy techniques. The Salzburg Concept of intraoperative radiotherapy (IORT) applies the combination of IORT in boost modality and postoperative whole breast irradiation.
Patients and Methods: 378 women with stage I or II breast cancer were included in this study. All patients had breast conserving surgery and received 51 Gy to 56.1 Gy of postoperative radiation to the whole breast in 1.7 Gy fractions, but patients received different boost strategies. Group 1 (n = 188) received electron boost radiation of 12 Gy subsequent to the irradiation to the whole breast, group 2 (n = 190) received electron boost radiation of 9 Gy directly to the tumor bed intraoperatively, followed by whole breast irradiation. The groups were treated sequentially, group 1 from January 1996 to October 1998 and group 2 from November 1998 to March 2001. The groups are comparable looking at age, menopausal status, tumor size, grading and nodal status. All statistical tests are two-sided.
Results: After a median follow up period of 81.0 months in group 1 and a median follow up period of 51.1 months in group 2, 12 IBTRs (6.4%) could be observed in group 1 and no IBTR could be observed in group 2 (0.0%). The five year actuarial rates of IBTR were 4.3% (95%CI: 1.9% to 8.3%) and 0.0% (95%CI: 0.0% to 1.9%) respectively (P = 0.0018). Distant recurrences occurred in 24 patients (12.8%) in group 1 and in 8 patients (4.2%) in group 2. The five year actuarial rates of distant recurrence were 8.6% (95%CI: 4.9% to 13.5%) and 4.2% (95%CI: 1.8% to 8.2%) respectively (P = 0.08). The five year disease-free survival rates were 90.9% (95%CI: 85.8% to 94.7%) in group 1 and 95.8% (95%CI: 91.8% to 98.2%) in group 2 (P = 0.064).
Conclusions: Immediate IORT-boost yields excellent local control and results in statistically significant lower IBTR rates compared to the treatment with conventional postoperative electron boost after five years of follow-up.

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Population analysis of the randomised EORTC trial 22922/10925 investigating internal mammary and medial supraclavicular (IM-MS) lymph node Irradiation

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Purpose: To describe the patient population that has been included in the large prospective multicentre EORTC "IM-MS" trial 22922/10925.

Methods and Materials: Between 1996 and 2004, 4004 patients were accrued into the trial. Most important inclusion criteria were: informed consent, age $\leqslant 75$ years, unilateral and operable breast cancer, tumour site at the medial or central quadrants irrespective of the axillary status or any location with axillary node invasion. Patients were randomised between no radiotherapy (RT) and 50 Gy RT of the IM-MS nodes.
Results: Ineligibility rate was <0.75%. The median age at randomisation was 55 years (range 19–75), with 59% post-menopausal women. Of the 4004 patients, 15% presented with a primary tumour <10 mm, 44% between 11–20 mm, 37% between 21–50 mm and 4% *51 mm. Axillary nodal invasion was absent in 44% and present in 56% (43% one to three nodes; 10% four to nine nodes and 3% had $\geqslant 10$ positive nodes). Using the current TNM classification UICC 6th Ed., 33.5% of the patients had st I, 32% st IIA, 19% st IIB and only 12% st IIIA beast cancer and 1.5% unknown. 73% of the patients had positive oestrogen receptors and 58% had positive progesterone receptors. The surgery consisted of breast conserving technique (BCT) in 76% and mastectomy in 24%. RT has been given in all but 7% of the patients. A boost has been added in 66.7% of the overall patients respectively 85% after BCT. The median total dose to the breast after the BCT was 64 Gy (20–76) including the boost and to the chest wall after mastectomy was 50 Gy(16–84 Gy). The adjuvant systemic treatment consisted of chemotherapy in 25%, hormonal therapy in 29% and both in 29% of the patients respectively. Overall, we found a major deviation from the protocol guidelines in 2.5% of the cases, including 1.1% refusal of the assigned treatment and 1.1% not treated according to the randomisation. In the IM-MS treatment arm an under-treatment (IM-MS dose <45 Gy) occurred in 0.7%. Minor treatment deviations were found in 44.4% of the patients, consisting of a slight under-treatment (IM-MS dose 45–47.5 Gy) in 3.3%, an extended delay between RT and surgery in 3.8%, modifications in technique (ratio and energy of photons and electrons) in 37.3% of patients.
Conclusions: In this study, the actual patient population has a lower risk and better overall survival than anticipated more than 10 years ago, when the protocol was written. This was timely recognised and led to a modification of the statistics of the trial, resulting in a recalculation of the necessary number of patients based on the corrected assumptions. This will result in a more accurate and representative final analysis of the primary endpoint.

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Letrozole is cost-effective versus tamoxifen as adjuvant therapy in postmenopausal women with early breast cancer: BIG-1–98

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Background: The BIG 1–98 study is an ongoing, independent, phase 3, double-blind, randomised clinical trial comparing tamoxifen with letrozole – both as monotherapy and in sequence – in 8,010 postmenopausal women with endocrine responsive breast cancers following complete tumour resection. Results from the primary core analysis comparing tamoxifen and letrozole monotherapies were reported at ASCO 2005. Median age at enrolment was 61 yrs and median follow-up at time of primary core analysis was 26 months. Compared to tamoxifen, letrozole significantly improved disease-free survival (hazard ratio [HR] = 0.81, p = 0.003), especially reducing time to distant recurrence (HR = 0.73, p = 0.001). This analysis incorporates the effects of letrozole on breast cancer events and adverse events as observed in BIG 1–98, and extrapolates the cost, quality of life, and mortality effects of these events to estimate the cost-effectiveness of letrozole versus tamoxifen in this setting.
Methods: A published economic model (Karnon 2002) is adapted to calculate the cost per life year (LY) and cost of quality-adjusted life year (QALY) saved of 5 years of initial adjuvant therapy with letrozole versus tomoxifen in postmenopausal women with early breast cancer. The model describes life time incidence of breast cancer events (contralateral tumours, locoregional, and distant recurrences) and treatment-related adverse events (endometrial cancer, bone fractures, coronary heart disease, stroke, venous thromboembolism, and hypercholesteremia). HRs (lerozole versus tamoxifen) for each event were estimated form the BIG-1–98 trial. Mortality rates for each specified adverse event, for other causes, and extrapolated breast cancer event rates are estimated from other published sources, as are health-care costs and utility values, which are both discounted at 3.5% annually. Probabilistic sensitivity analyses are undertaken to calculate 95% confidence interval for cost-effectiveness.
Results: The baseline results show that the additional costs associated with adverse events are similar to the cost savings as a result of fewer breast cancer events. The additional lifetime cost of letrozole per patient is £4,546 (£9,568 letrozole vs. £5,022 tamoxifen). Letrozole leads to a gain of 0.29 LYs (13.34 vs. 13.05) and 0.33 QALYs (12.67a vs. 12.34). The incremental cost per LY gained is £15,549 and per QALY is £14,001. In probabilistic sensitivity analyses, the 95% confidence interval for cost-effectiveness is £11,341 to £29,406 per LY saved, and £10,067 to £26,068 per QALY saved.
Discussion: Letrozole is a cost-effective use of healthcare resources and should be considered as a new option for the adjuvant treatment of patients with early breast cancer, based on preliminary analysis of published results of the primary core analysis of the BIG-1–98 study.

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No differences in quality of life for letrozole relative to placebo in post-menopausal women with early breast cancer regardless of age: results from the MA-17 study

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Introduction: MA-17 was a randomized placebo-controlled trial that compared the efficacy and safety of 5 years of letrozole (Femara®) 2.5 mg/d versus placebo and related QoL impact on postmenopausal women with early breast cancer, after 5 years of tamoxifen. Due to significant lowering in risk of disease recurrence and distant metasteses observed with letrozole, the trial was unblinded early after 2.4 years mean follow-up. Earlier studies have reported that letrozole did not worsen patient's QoL relative to placebo in this population. However, evaluation of QoL impact may vary by age, thus the objectives were to describe QoL scores by treatment group and age (<65; $\geqslant 65$ years) in MA-17.
Methods: The generic validated QoL scale (SF-36 Health Survey) and the validated patient bother scale (MENQOL) were administered. The SF-36 yielded 2 summary scores providing a global indicator of patients' physical and mental QoL and 8 specific domains providing insight on specific QoL aspects. Symptom impact associated with estrogen suppression was assessed using 4 domains of the MENQOL. Due to the early unblinding of MA17, differences in SF-36 and MENQOL scores between treatment groups are reported only for the first 3 years of the study (6, 12, 24, 36 months), using non-parametric testing.
Results: Across all timepoints for both age groups, no statistically significant differences between letrozole and placebo were observed for MENQOL psychosocial and physical domains and SF-36 mental QoL summary score and physical functioning, role-physical, general health, social functioning, role-emotional, and mental health sub-domains. In both age groups, statistically significant differences in favour of placebo were observed for SF-36 Bodily Pain (months 6, 12, 24 for <65 and month 6 for $\geqslant 65$) and MenQoL vasomotor symptoms (months 6, 12 for <65 and months 12 and 24 for $\geqslant 65$). In the younger age group, differences in MENQOL sexual functioning were observed at month 24 in favour of letrozole, For the older group, physical summary score at month 24 and vitality at month 6 were impacted in favour of placebo. No further differences were observed. Although statistically significant these differences were not considered clinically relevant based on current methodology.
Conclusions: Extended adjuvant treatment with letrozole after standard adjuvant tamoxifen in postmenopausal women provides improved efficacy while not worsening QoL relative to placebo, regardless of women's age.

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Comparison of cardiovascular (CV) safety profiles of aromatase inhibitors (AIs)

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Background: The recent ASCO Technology Assessment recommended that adjuvant endocrine treatment should include an AI to lower the risk of recurrence in postmenopausal women with hormone-receptor positive early breast cancer. It is uncertain, however, if the AIs are interchangeable in clinical practice. Emerging data suggest that the distinct molecular structures of the AIs may result in different safety profiles. We report here an indirect comparison of available data on the CV events of letrozole, exemestane and anastrozole.
Methods: Safety data from the BIG 1–98 trial, evaluating letrozole versus tamoxifen (n = 8028), and the IES study, evaluating exemestane versus tamoxifen (n = 4742), were compared with safety data from the monotherapy arms of the ATAC trial, which evaluated anastrozole versus tamoxifen (n = 6186).
Results: Data from BIG 1–98 at 26 months' median follow-up demonstrated a significantly greater incidence of moderate to severe (grade 3–5) cardiac events with letrozole versus tamoxifen (2.1% vs 1.1%, respectively; p = 0.0003). There were 7 cerebrovascular deaths on letrozole compared with 1 on tamoxifen, and double the number of cardiac