An accurate follow-up > 24 months was obtained in 209 patients (mean 46.5 months, range 24–93); 25 patients died, 12 for uncorrelated or unknown causes. 20 patients had distant metastases only and 2 patients had axillary and distant metastases syncronally. 27 patients had clinically axillary metastases as only and first site of metastatic disease: 21 patients underwent full axillary dissection showing pathological metastases in 17 cases. The mean number of metastatic nodes was 6 (1–32) and the mean diameter of the primary tumour in these metastatic cases was 16.8 mm. Only one case had a tumour diameter < 1 cm. The mean time of disease free interval was 29.1 months. 3 patients out of 26 were treated with radiotherapy to the axilla without surgery, and 3 patients were treated with hormonotherapy. All operated patients are disease free. Even if this study is not a prospective randomized trial, we can conclude that avoiding axillary dissection in small breast tumors and in elderly patients does not impair local control of disease and does not have a negative impact on long term outcome in selected patients.

1025 ORAL

RECENT REFINEMENTS IN FREE FLAP BREAST RECONSTRUCTION: THE DEEP INFERIOR EPIGASTRIC PERFORATOR (DIEP) FREE FLAP ANASTOMOSED TO THE INTERNAL MAMMARY ARTERY

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By dissecting the perforating vessels of the deep inferior epigastric pedicle out of the rectus abdominis muscle, no muscle tissue has to be resected, as is done with the conventional Transverse Rectus Abdominis Myocutaneous (TRAM) Flap. Hereby, we avoid abdominal wall dysfunction and complications and still keep the advantages of the TRAM flap. The same skin paddle as with the TRAM flap can be safely prelevated on two or more perforating branches of the deep inferior epigastric vessels, which is then anastomosed to the internal mammary vessels. One total flap loss out of 15 free DIEP flaps occurred due to cephalic vein thrombosis. Abdominal wall function was evaluated in DIEP and TRAM flap patients.

1026 ORAL

ROLE OF BOOSTER DOSE TO THE TUMOR BED IN BREAST CONSERVATIVE TREATMENT—PHASE III STUDY

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Tumorecomy with axillary dissection followed by locoregional irradiation is the standard treatment of T1 T2 ≤ 3 cm breast cancer. The optimum dose to the breast and the tumor bed remains controversial. To answer this question a phase III study was conducted in Lyon since 1986. Main criterias of inclusion were T1 T2 ≤ 3 cm with free margins on the pathological specimen, age no more than 70 years.

Randomization was between two dose levels: Arm 1: whole breast irradiation 50 Gy/20 F/5 weeks (dose specified on the 95% ICRU isodose); Arm 2: same dose plus a boost of 10 Gy with electrons 9 or 12 Mev (isodose 90%).

First end point will be local recurrence. For this criterium, on the assumption of a 1.2 annual rate of local recurrence, in patients with boost, and a 2.4 rate in those not receiving boost, with an annual censured rate of 1%, at one side sent, a type 1 error equal to 5% and a power of 85%, a number of 1014 patients must be included in the trial.

Between 01/86 until 07/92, 1024 patients were enrolled in this trial. Randomization was performed with stratification on pTNM classification. The groups were comparable for know prognostic factors.

Results: The local relapse free survival after 5 years was 96.4% in the 60 Gy group (tested group) and 95.5% in the 50 Gy group (controlled group). The hazard ratio, adjusted for other prognostic factors was 0.31 (0.11 to 0.88—$P = 0.028$).

The disease free survival after 5 years was 86% in the 60 Gy and 82.2% in the 50 Gy group. The adjusted hazard ratio was 0.6 (0.38 to 0.96—$P = 0.037$)

There was no significant difference for overall survival between the two groups.

Telangiectasis grade 1 were present in 6% in the 50 Gy group and 12% in the 60 Gy group.

This result suggests a trend in favor of the boost (60 Gy) in term of local control with a small and acceptable detrimental effect on cosmetic results.

1027 ORAL

AN ASSESSMENT OF THE PHYSICAL AND FUNCTIONAL MORBIDITY FOLLOWING DIFFERENT RADIOTHERAPY SCHEDULES FOR BREAST CANCER

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The aim of this study was to determine the physical and functional morbidity after treatment with a range of radiotherapy schedules for breast cancer. Case notes from all patients treated with radiotherapy at the Mount Vernon Centre for Cancer Treatment between 1984 and 1988 were examined (total number 1661). All patients who were well at the time of their last follow-up were asked to complete a questionnaire to assess the incidence and severity of symptoms. Analysis of data for patients treated in 1988 is as follows: a total of 181/208 (87%) questionnaires were returned with 177/208 (85%) suitable for analysis, 47% of patients reported pain in the breast or chest wall, 28% reported pain in the arm, 19% reported tingling in the arm, 27/177 (15%) swelling of the arm and 34% reported restriction of arm movement. These symptoms were mainly reported as occasional or slight with no severe symptoms. Analysis of the remaining data is in progress. Patients may find this type of information useful prior to giving informed consent to treatment.

1028 ORAL

A PROSPECTIVE TRIAL OF CONSERVATIVE SURGERY (CS) WITHOUT RADIATION THERAPY (RT) FOR EARLY-STAGE BREAST CANCER

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We performed a one-arm prospective trial, 1986–92, to test the hypothesis that RT can be safely omitted after CS in selected pts with early-stage breast cancer. Pts were selected to include unicentric, clinical T1 carcinomas with neither an extensive intraductal component nor lymphatic vessel invasion. We required histologically negative margins of ≥ 1 cm and pathologically negative axillary nodes. The trial was closed after the accrual of 87 pts when early stopping rules were met. Median pt age was 67 yrs (27–84). The cancer was detected by mammography alone in 76%. Median pathologic tumor size was 0.9 cm. All pts underwent re-excision with only 2 having evidence of residual cancer. The median total volume of resected breast tissue was 114 cm^3. Median f/u is 56 mos for the 84 surviving pts. 14 pts (16%) developed a LR as their first site of failure. The average annual LR rate is 3.6% and the crude 3-yr LR rate is 8%. 4 pts developed distant failures for a crude 3-yr rate of 1%. In comparison, 45 pts fulfilling the trial's strict eligibility criteria but treated with CS + RT between 1983–86 had a crude 3-yr LR rate of 0% and a crude 3-yr DF rate of 4%. This data suggests that even with careful selection and surgical treatment, this group of pts is at substantial risk of LR following treatment with CS alone. More accurate predictors of LR following CS alone are needed.

1029 POSTER

BREAST-CONSERVING SURGERY (BCS) FOLLOWED BY DEFINITIVE RADIOTHERAPY (DR) FOR DUCTAL CARCINOMA *IN SITU* (DCIS): A RETROSPECTIVE MULTICENTRIC STUDY OF 110 PATIENTS

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Purpose: To evaluate the outcome of pts treated with Breast-Conserving Surgery (BCS) and definitive irradiation (DR) for Ductal Carcinoma *in situ* of the breast (DCIS).

Patients and methods: 110 cases (104 evaluable) treated between 1980 and 1990 have been collected in 9 Italian Institutions. All the cases were treated with BCS (quadrantectomy 78, wide excision 8, tumorectomy 18) and DR (median breast total dose 50 Gy, median boost dose 10 Gy).

Results: Median follow up time was 62 months (range 21–151). There were 6 (5.7%) failures in the breast. Neither nodal recurrences or distant metastases were observed. All the 6 patients were salvaged with mastectomy. Five metachronous controlateral breast tumors (2 invasive)

and 4 second tumors developed during follow-up. Five-year actuarial overall, cause specific and breast-recurrence free survival is 94.6%, 100% and 90% respectively.

Conclusion: This study confirm that BCS and DR is an effective alternative to mastectomy in the treatment of DCIS of the breast.

1030 POSTER

LYMPHEDEMA FOLLOWING CONSERVATIVE MANAGEMENT OF EARLY STAGE BREAST CANCER

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The risk of developing lymphedema after axillary dissection and radiation is lifelong. The reported incidence varies, but underrepresents mild or asymptomatic arm edema. We retrospectively analyzed 237 patient records for arm lymphedema (LE). 185 patients had available morbidity data and were free from axillary recurrence. Median f/u was 43 months. Patient complaints and examination with arm measurements were used to assess the LE, which was graded as mild, moderate, or severe.

The 5-yr actuarial incidence of LE is 28%. The incidence of developing mild LE was 23%, of moderate or severe LE, 7%. Of 38 events, 28 were mild, 9 moderate, and 1 severe. The 5-year actuarial incidence increased as the level of axillary dissection increased, and as the number of nodes sampled increased: no dissection performed (n = 46) 13%, Level 1 (n = 47) 27%, Level 2 (n = 56) 41%, Level 3 (n = 23) 30%. As it can be difficult to determine high axillary dissection levels retrospectively, arm morbidity was also assessed using the number of lymph nodes dissected. The 5-yr actuarial incidence of LE is: None (n = 46) 12%, 1–10 (n = 54) 29%, 11–20 (n = 65) 40%, > 20 (n = 20) 39% ($P = 0.05$). These differences were more marked in those patients receiving radiation to the axilla or supraclavicular fossa (n = 132): 61% and 53% for a level 2 and 3 dissection vs. 10% and 25% for no dissection or a level one dissection ($P = 0.001$).

Morbidity is reduced with a less extensive dissection of the axilla, especially if the patient receives adjuvant radiation to the axilla. The extent of the axillary dissection should be sufficient only to establish the risk of systemic disease.

1031 POSTER

COLLIMATORS IN ASYMMETRIC MODE AND 3D PLANNING. APPLICATIONS IN BREAST CANCER

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Introduction: The possibility of use linear accelerators with two pairs of opposing collimators operating independently (asymmetric mode), allows beam modifications in habitual treatment planning. These modifications can be verified in 3D planning. We reported a variation in breast cancer treatment planning to avoid inhomogeneities at toracoclavicular fields' junction.

Technique: 1.—Patient positioned in an adjustable inclined plane to maintain the chest wall in line with the treatment couch. This position avoids collimator rotation in the tangential fields.

2.—Treatment planning in a conventional simulator or CT. The 3D dosimetry with multi-image CT display allows us to know dose distribution in the whole target volume.

3.—Treatment delivered using a LILAC with two pairs of asymmetric collimators and three isocentrics beams. The isocenter was at the junction beams.

(a) Superior longitudinal half beam in asymmetric mode, (with secondary field blocks to avoid humeral articulation) to treat the axilo-supraclavicular fosse.

(b) Inferiors longitudinals half beams in asymmetric mode, to cover the breast or the chest wail with two tangential fields. (i) They can be also in asymmetric mode in transversal collimator (a quarter of field) to avoid lung radiation.

Conclusion: Our dosymetric 3D study verifies the perfect dose homogeneity in treatment fields junction using collimators in asymmetric mode. This radiation technique allows to do diary treatment without moving the patient or the treatment couch. The progressive introduction of informatic control systems in treatment radiotherapy (performing collimators size, gantry angulation and other radiation parameters) makes easy to reproduce this technique diary.

1032 POSTER

INTRAARTERIAL CHEMOTHERAPY (IAC) (MITOMYCIN-CISPLATIN) IN PATIENTS WITH LOCORREGIONAL (LRP) OF BREAST CANCER RESISTANT TO CONVENTIONAL THERAPIES

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Breast tumors with LRP present a great difficulty even for palliative control, when they are resistant to conventional treatments. IAC has been used in few occasions and bibliography reports do not clearly refer application timing and the real usefulness of the procedure. Since May 1991 to March 1995, 20 patients with breast cancer in LRP underwent 44 chemotherapy courses (range 1–6, average 2). All the patients were pretreated; 20/20 systemic chemotherapy, 1 to 3 lines, none CDDP; 20/20 hormonotherapy and 18/20 radiotherapy. IAC was performed by femoral route according to Seldinger's method, selective catheterism of internal mammary artery. Of these patients 3/20 had metastatic disease at the start of the chemotherapy. Treatment plan was cisplatin 100 mg/m^2 and mitomycin 10 mg/m^2, every 21–28 days with hydration and antiemetics. 3/20 patients had complete response, including 1 patological complete response; 5/20 partial response greater than 50%; 7/20 with response minor than 50%; 2/20 stable disease and 3/20 progressive disease. Response duration ranged between 4 and 18 months. Two of the patients with complete remission are still alive (16–18 months) and free of disease. Complications related to the technique observed in the 44 courses performed were: wound hematoma and wound infection in 1 case each. No cases of severe neutropenia have recorded. *Conclusions:* IAC is a procedure with low morbidity; objective response was 40% in patients resistants to standard treatments. These results suggest that IAC may be used in earlier stages (SIII).

1033 POSTER

THE EFFECTS OF PRIMARY CHEMOTHERAPY ON THE COMPLEXITY OF BREAST CANCER SURGICAL TREATMENT

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The goal of this trial is to analyse the effect of primary chemotherapy on the complexity of the surgical treatment of breast cancer. From Feb 1990 through Oct 1994, 233 patients with palpable early stage breast cancer (stages I, II and III UICC/AJC) diagnosed through needle biopsy, received pre-operative chemotherapy with Epirrubicin (50 mg/m^2), Cyclophosphamide (500 mg/m^2) and 5-Fluouracil (500 mg/m^2) administered by IV infusion for 3 courses on 21 days cycles. The mean age of the group was 50.6 years (26–69). The response regarding clinical stage is summarized below.

Clinical Stage	Number of Patients (%)	Clinical response CR (%)	PR (%)	SD or PD (%)
I	27 (12)	12 (44)	11 (41)	4 (15)
II	98 (42)	13 (13)	56 (58)	29 (29)
III	108 (46)	7 (7)	81 (75)	20 (18)

With these results, 57 of the patients underwent less extent surgical treatment (41% QUART instead of radical mastectomy and 16% TART instead of QUART). No life-threatening complications were seen due to chemotherapy. The data demonstrate the feasibility of primary chemotherapy is early stage breast cancer, providing significant reduction in the extent of surgical treatment.

1034 POSTER

INCIDENCE OF LYMPHOEDEMA AND IMPAIRED SHOULDER FUNCTION AFTER AXILLARY DISSECTION

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Aim: To assess the occurrence of lymphoedema and impaired shoulder function after axillary dissection, and to identify factors predicting these conditions. *Material:* 124 consecutive breast cancer patients, who had an axillary dissection a.m. Cady were invited for an examination median 17 months after the operation (range 14–20). They filled in a questionnaire about function and symptoms of the ipsilateral arm. At the day of examination circumference and function of the ipsilateral arm was compared with the contralateral arm. *Results:* Participation rate was 77% (95/124). Objective measurements disclosed lymfoedema in 6%, reduced flexion in 25%, reduced abduction in 21%, and reduced