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EORTC randomised phase III trial 22922/10925 investigating the role of internal mammary chain (IMC) irradiation in stage I–III breast cancer: A quality assurance report on the dummy run

Ph. Poortmans, W. van den Bogaert, J. Venselaar, G. van Tienhoven, H. Struikmans, C. Hurkmans, B. Davis, D. Huyskens, V. Vlaun, K. de Winter, B. Mijnheer, H. van Kleffens. *For the EORTC 22922/10925 Quality Assurance Committee; University Hospital, Radiotherapy, Heidelberglaan 100, The Netherlands*

Purpose: To evaluate and improve consistency between participating centres, irradiation techniques were reviewed and corrections were suggested when relevant.

Methods: Prior to participation, all centres were asked to perform treatment planning without (arm 1) and with (arm 2) irradiation of the IMC on 3 slices of a patient after mastectomy and of a patient after lumpectomy. Up to now, 19 dummy runs have been evaluated. Findings were discussed with the institutions on an individual basis. A letter with recommendations concerning the protocol prescriptions has been sent to all participants.

Results: In arm 1, the dose to the IMC region was > 25% in 30% of the treatment plans. In arm 2, the dose to the IMC region was < 75% in 12% of the plans, independent of the technique which has been used. Comments on the irradiation techniques were: dose prescription not in conformity with the protocol or with ICRU 50 (10 centres for the IMC and 12 centres for other target volumes), problems with the field set-up (positioning of the IMC field (3) and in general (3)), too low dose to the target volume (11), too large fields (3), absence of lung density correction (3), too few isodose lines (12).

Conclusion: By performing a dummy run in the early phase of a clinical trial, a number of potential systematic protocol deviations has been detected. A follow-up study is needed to check if the committee's recommendations have been incorporated correctly.

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Is hypofractionated breast radiotherapy a valid treatment option?

G. Ryan. *Peter MacCallum Cancer Institute, Radiation Oncology, Locked Bag No. 1, A'Beckett Street, AUS-3000 Melbourne, Victoria, Australia*

Hypofractionation is rarely used in the radical radiotherapy setting because of concerns about its efficacy and potential for increased long term toxicities. However, there may be patients for whom delivering a standard fraction course of radiotherapy is problematic because of age, debility etc. The experience of a group of 167 postmenopausal women treated with a hypofractionated radiotherapy schedule – 36 Gy in 8 fractions over 3 weeks – following breast cancer surgery is reviewed retrospectively. Survival, disease progression and treatment-related complications are compared with those of a group of 325 matched patients treated with a conventionally fractionated schedule – 45–66 Gy in 20–35 fractions over 4–7 weeks – over the same 10 year time period. A number of potential prognostic factors for outcome are studied – age, stage, extent of surgery, radiotherapy schedule – and additionally for complications extent of radiotherapy fields and years at risk.

For both disease-specific survival and time to disease progression, stage and prior surgery are significant ($P < 0.0001$), but age and radiotherapy schedule are not ($P = 0.23$ and 0.51). Competing risks analysis shows no difference between schedules in the sites of first progression, with patients in both groups 2–3 times more likely to have a systemic recurrence than a local recurrence. For a range of treatment-related complications (including oedema, fibrosis and telangiectasia), extent of radiotherapy fields ($P = 0.0003$) and years at risk ($P < 0.0001$) are significant, but radiotherapy schedule is not ($P = 0.80$).

Thus, in the particular group of patients studied, hypofractionation cannot be demonstrated to be associated with inferior treatment outcomes, and may be a valid treatment option. Dose comparisons using the linear quadratic equation support this conclusion, but a randomised trial is recommended to confirm these findings.

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Treatment of Paget's disease of the breast with radiotherapy only

M.R. Christiaens[1], J. Knol[1], W. Van den Bogaert[2], E. Van Limbergen[2]. *[1]Dept. of Surgery-Senology; [2]Dept. of Radiotherapy, University Hospital of Leuven, Belgium*

Paget's disease of the breast, without clinical or radiological signs of associated invasive or in situ cancer, remains a controversial treatment issue.

Between 1971 and 1997, 28 (27 female, 1 male) patients have been treated for Paget's disease with radiotherapy only. One patient was excluded because no follow-up data were available. Mammogram and ultrasound showed no underlying malignancy. In all patients a biopsy confirmed the presence of typical Paget's cells. None of those patients had an excision of the nipple-areola complex. Total breast irradiation varied between 45 and 65 Gy. An electron boost was delivered, resulting in a total dose between 60 and 70 Gy. With a follow-up varying between 12 and 213 months (median 79 m), 4 local recurrences (3 Paget's disease; 1 invasive carcinoma) were treated by mastectomy in one, and modified radical mastectomy in 3 cases. All are disease-free until now.

Although similar series are scarce, in our experience breast conservation with radiotherapy only, promises to be a safe procedure for pure Paget's disease, providing recurrences are detected and treated at an early stage. Further study is warranted.

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Radiosurgery of T1 breast cancer: A dosimetry study

C. Formenti[1], S. Jozsef[2], G. Parisky[3], V. Skinner[4], K. Luxton[2]. *[1]Southern California School of Medicine, University Los Angeles; Departments of [2]Radiation Oncology; [4]Surgery; [3]Radiology, USA*

Purpose: To develop a radiosurgery-like technique for T1 breast tumors.

Methods: Post-menopausal women with less than 1.5 cm. invasive breast cancer were elegible to pilot-test the role of radiosurgery in early breast cancer. At diagnostic core biopsy, a tantalum surgical clip was placed in the lesion. Transverse CT scans with the patient prone on a special table were aquired, covering the full superior-inferior extent of the breast with the clip used as reference points to define the isocenter. RS was delivered with the patient exactly in the same position on the same table that allows for beams to enter from a solid angle of about 220° × 90°. With a 4MV beam the clip is visible on port films to verify the isocenter. A 20 Gy/single fraction dose is given.

Results: By utilizing the arbitrary plane reconstruction and beams, eye view features of our treatment planning software, one can rule out beam directions which would deliver dose to normal structures. In the first test case the limits of the arc lengths were about 30° from the contralateral side, 15–20° from the ipsilateral side and less than 10° from the superior direction. The resulted dose distribution for one fraction of 20 GY is similar to that which would be produced by a single arc in the coronal plane through the isocenter. In the case of a deep seated tumor, seven, unequally weighted, horizontal, 32 mm diameter fixed beams results in virtually zero lung dose, with 90% of the maximum dose over the 30 mm diameter target, and 20–25% to the surface of the breast.

Conclusion: From dosimetric point of view the described technique is feasible.

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Variation in normal tissue complication probability with radiation technique in early breast cancer

P.A. Canney, R. Sanderson, C. Deehan, T. Wheldon. *Dept. of Radiation Oncology and Dept. of Clinical Physics, Beatson Oncology Centre, Glasgow, Scotland, UK*

Purpose: To investigate the effect of varying the treatment position to try and minimise the heart dose during post-operative radiotherapy fields for the treatment of breast cancer.

Methods: Using the same arrangement of glancing fields for each patient the effect of positioning was studied in 11 patients with left sided tumours. Cardiac doses were calculated from dose-volume histograms using a 'Helax' planning system. With the data available, using pericarditis as the end-point for radiation induced heart damage [Emami et al. 1991], the DVH reduction algorithm of Lyman and Wolbarst [1989] was applied to each DVH to produce a value for the normal tissue complication probability (NTCP).