Intraoperative radiotherapy (IORT) in breast cancer: analysis of 6,816 cases from ISIORT database


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Purpose/Objective: A joint analysis of clinical and technical data from 34 centres within the International Society of Intraoperative Radiation Therapy (ISIORT) was undertaken in order to identify the range of intraoperative radiotherapy (IORT) indications and techniques for various tumour sites. In this survey we analysed breast treatments.

Materials and Methods: Since 2007, we collected demographic, clinical and technical data related to IORT procedures in a common database. Prospective and retrospective data entry was possible. The current study analysed 6,816 breast tumours.

Results: Breast tumours represent 80.3% of all data of the ISIORT survey that encompassed 8,493 IORT procedures performed from 1992 to 2014. The median age of breast patients was 61.1 years (range 16-90). Gender was female in 99.7% and male in 0.3% of cases. In 6,702 cases (98.3%), IORT was a component of radical treatment for primary, newly diagnosed disease and in 114 cases (1.7%), it was an attempt to rescue localized recurrent breast cancer.

IORT was performed as a boost before or after EBRT in 3,258 cases (47.8%) with doses of 8-12 Gy. In 3,558 cases (52.6%), IORT was used as single radiation treatment modality with doses of 18 Gy, 20 Gy or 21 Gy. The patients enrolled in study protocols represented 33% of those treated by a single dose and 6.3% of those treated by a boost dose.

IORT was delivered after and before tumour removal in 39% and 61% of cases, respectively. In 6,406 cases (94%), IORT was performed using electrons of 4-12 MeV energy. The most used applicators (77% of cases) were 5 or 6 cm in diameter and bevel angle was 0° in the majority of cases (88%). Four hundred and ten cases (6% of patients) were treated with a 50-kV x-ray source in a single centre. X-rays treatments were delivered by a spherical applicator inserted into the surgical cavity after tumour removal.

Conclusions: At present, the ISIORT database represents the largest clinical and technical IORT data collection. Breast cancer is the most frequent IORT treatment performed in the 34 participating centres. From this analysis, it emerged that in most cases IORT was used as single boost of 18-21 Gy, the most employed treatment modality was electron beam and the procedure was most frequently performed after tumour removal. Only a minority of patients was included in clinical trials.

Further data analyses could enhance multi-institutional performance and serve as a basis for designing clinical trials in an effort to define the role of IORT in tailored multimodality therapeutic approaches.
Hypofractionated WBI plus IOERT-boost in early stage breast cancer (HIoB): Updated results of a prospective trial

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Purpose/Objective: To assess the role of an intraoperative electron boost (IOERT) in combination with hypofractionated whole breast irradiation (WBI) in terms of in-breast tumor control and cosmetic outcome.

Materials and Methods: Starting in Jan 2011, a prospective multi-center single arm trial is conducted by the ISORT. Patients receive an IOERT boost of 10 Gy (Dmax 11.1 Gy) followed by a WBI of 40.5 Gy in 15 fractions (2.7 Gy single dose). 5-year in-breast-recurrence rates will be analyzed in 3 different age groups (35-40 y, 41-50 y, > 50y) and tested against the respective best published results from randomized prospective trials by the use of a sequential probability ratio test (SPRT). Acute reactions are assessed by CTC-scoring, late reactions according to LENT-SOMA criteria. Cosmesis is evaluated by a 5-point-Scoring System (van Limbergen, double evaluation) starting prior to WBI on the basis of repeated photodocumentation in standardized positions.

Results: As of August 2014, within ten active institutions 645 patients have been recruited, 481 of them already in follow-up. Patient and tumor characteristics are summarized in Table 1. For IOERT, the median energy chosen was 7 MeV (range 4-12) with median tube diameters of 6 cm (4-8) and mean prescription depths of 19 mm (6.2 SD), resulting in mean D90 volumes of 19 ml. Perioperatively, no major complications were observed. Four weeks after the end of WBI and 479 evaluated patients, 177 (37%) showed no reactions (CTC 0), 277 (58%) presented with faint (CTC 1) and 24 (5%) with moderate to brisk erythema (CTC 2), respectively. Go-I late reactions (LENT-SOMA) occurred in a probability ratio test (SPRT). Acute reactions are assessed by CTC-scoring, late reactions according to LENT-SOMA criteria. Cosmesis is evaluated by a 5-point-Scoring System (van Limbergen, double evaluation) starting prior to WBI on the basis of repeated photodocumentation in standardized positions.

Conclusions: Tolerance of combined IOERT/hypofractionated WBI regimen is excellent, acute reactions moderate and late reactions insignificant in short-term assessment. With regard to postoperative appearance, early cosmetic results are not impaired. Both tumor control and cosmetic outcome have to be evaluated on long-term follow-up.

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Differences in Quality of Life after external beam APBI and IORT for elderly breast cancer patients

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Purpose/Objective: The hypothesis is that partial breast irradiation after lumpectomy will have less impact on QoL, when compared to whole breast irradiation. We don’t know the impact of the different partial breast irradiation techniques. We therefore compared the QoL parameters ‘pain and fatigue’ for external beam APBI and IORT in our phase 2 (feasibility) study.

Materials and Methods: Eligible patients were women aged 60 years or older with unilateral breast cancer with tumor stage Tis, T1 or T2 less than 3 cm treated within the context of a phase II study. For practical reasons using external beam APBI in one hospital, 10 daily fractions of 3.85 Gy, and IORT in the other hospital, 23.3 Gy in one fraction with electrons