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Weekly concomitant boost in adjuvant radiotherapy for patients with early breast cancer: preliminary results on feasibility

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ABSTRACT

Aims and background. Recent advances in the management of patients with breast cancer are focused toward the reduction of overall treatment time of radiotherapy by delivering a dose biologically equivalent to a standard schedule. The aim of the present study was to evaluate the feasibility and preliminary toxicity of a moderately hypofractionated whole breast irradiation schedule with the addition of a concomitant boost delivered to the tumor bed once-a-week in patients with early breast cancer submitted to conservative surgery.

Materials. We selected patients with pT1c and pT2 N0/N+ M0 carcinoma of the breast with negative surgical margins. The basic course consisted of 4600 cGy prescribed to the ICRU 50 reference point dose and delivered in 20 fractions, 4 times a week for 5 weeks. Once a week, immediately after whole breast irradiation, a concomitant photon boost of 120 cGy was delivered to the lumpectomy area. Overall, according to the linear-quadratic model, the schedule provides a biologically equivalent dose of 87 Gy for breast tumor (assuming α/β = 4 Gy), of 66 Gy for acute responding normal tissues (assuming α/β = 10 Gy), and 99 Gy for late responding normal tissues (assuming α/β = 3 Gy). Biologically, the schedule compares favorably with the 6-week conventional regimen consisting of 50 Gy, 2 Gy/fraction, followed by a 10 Gy boost (BED_{tumor},90 Gy; $BED_{acute\ effects}$, 72 Gy, and $BED_{late\ effects}$, 100 Gy).

Results. From November 2004 to April 2007, we tested this radiotherapy schedule in 176 patients. All enrolled patients had achieved a minimum follow-up of 6 months and were considered in detail for the evaluation of feasibility. Three clinical examinations were performed by a group of independent physicians at treatment end, after 1 month and after 6 months. According to the RTOG/EORTC Toxicity Criteria, of the 176 assessable patients at the end of radiotherapy, 58% showed grade 0-1 skin toxicity, 30% grade 2 and 12% grade 3. At one month of follow-up, grade 0 toxicity was observed in 47% of cases, grade 1 in 46% and grade 2 in 7%. At 6 months, late (skin and subcutaneous tissue) toxicity was assessed with the following scores: grade 0 in 68%, grade 1 in 26% and grade 2 in 6% of the patients. At 6 months, cosmesis was excellent, good and fair in 71%, 24% and 5% of patients, respectively.

Conclusions. The explored adjuvant schedule planned to intensify the radiotherapy course for patients with early breast cancer by adding a weekly concomitant boost appears to be feasible and provides low local toxicity and excellent to good short-term cosmetic results.

Key words: breast cancer, concomitant boost, fractionation, radiotherapy.

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