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Commentary

Hypofractionated Radiation for Early Breast Cancer

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DESCRIPTION

The recommended course of treatment for breast cancer is whole breast radiation following Breast Conserving Surgery (BCS). The radiation treatment plan of 50 Gy/25 fractions over the course of five weeks, which was employed in prior trials, showed that BCS and adjuvant whole breast radiotherapy were just as effective as mastectomy. The radiobiologic argument that radiation damage to normal tissue increases with increased fraction size without additional tumour control underlies the justification for Standard Fractionated Whole Breast Irradiation (SF-WBI) for breast cancer [1]. As a result, SF-WBI has been the accepted method for adjuvant therapy following lumpectomy for many years. However, significant difficulties with SF-WBI include the expense and inconvenience to the patient of daily treatment cycles lasting 5 to 7 weeks. Short fractionation has been proposed as a replacement for BCS for early stage breast cancer as a result of this. Based on prior research from the previous two decades, Hypofractionated Whole Breast Irradiation (HF-WBI) presents a chance for enhanced patient convenience, lower healthcare costs, and more access to care without compromising treatment outcomes [2].

In this review, we looked at significant randomised trials of HF-WBI, with a particular emphasis on appropriate patient selection in accordance with the American Society of Therapeutic Radiology and Oncology (ASTRO) guideline and the radiobiologic aspects of HF-WBI in relation to its adoption in clinical settings.

Beyond the guidelines indication

Age: Age is a risk factor for breast cancer local failure. Only 21% to 30% of patients in the important randomised trials of HF-WBI were under 50 years old, nevertheless [3]. The Canadian trial's subgroup analysis revealed that age had no bearing on the fraction schedule's impact on IBTR. Additionally, younger age patients favour HF-WBI in terms of local-regional relapse, according to 10-year follow-up findings of the START studies published after the ASTRO recommendation. This supports the use of hypofractionation for patients under the age of 50.

Ductal Carcinoma *In Situ* (DCIS): Major studies did not include DCIS patients. However, a randomised experiment is still being conducted to examine the effectiveness and security of HF-WBI for DCIS patients. Furthermore, several retrospective data and meta-analyses have revealed no distinction between the HF-WBI and SF-WBI in terms of local recurrence. When compared to SF-WBI, HF-WBI for DCIS is unlikely to result in worse tumour control or adverse effects [4]. As a result, patients may have the choice of HF-WBI.

Grade: Hypofractionation appeared to be less helpful for high-grade cancers than for lower-grade tumours in the Canadian sample, according to subgroup analysis. Recent START A and B 10-year follow-up studies, however, did not show that the treatment efficacy varied considerably depending on grade. This gap may be explained by the fact that tumour bed boost was not permitted in the Canadian study, whereas in the START A and B trials, 61% and 39% of the patients, respectively, got tumour bed boost with 10 Gy in 5 portions. Another rationale stems from the fact that the Scharff Bloom Richardson (SBR) grading system was initially used in the Canadian study [5]. The more quantitative and repeatable Nottingham grading system took its place as the standard. The tumour grade did not correlate with the type of radiation (RT) treated in terms of local recurrence following a central pathology evaluation and assessment of tumour grade using the Nottingham grading system. Additionally, a population-based cohort analysis demonstrates that hypofractionation does not result in a worse outcome for patients with grade 3 breast cancer [6].

Regional Node Irradiation (RNI): Regional nodal irradiation was administered to only 21%, 14%, 7%, and 0% of the patients in the RMH/GOC, START A, START B, and Canadian studies, respectively. The follow-up after HF-WBI in both START trials was not deemed sufficient to rule out such late toxicity, despite the fact that only one of 750 patients in the 41.6 Gy/13 fraction arm of the START A trial experienced brachial plexopathy and that there was no significant difference in shoulder stiffness or arm edoema between the HF-WBI and SF-WBI arms in START A and B trials. A number of retrospective data, however, supported the use of hypofractionation in RNI

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[7]. Considering the research review when adopting regimens with a total dosage between 34 Gy and 40 Gy and a dose per fraction between 2.2 Gy and 2.5 Gy, the risk of radiation-induced brachial plexopathy was less than 1%. Currently available published data indicate the necessity for a prospective randomised study to evaluate the clinical results and toxicity of hypofractionated RNI to those of regular fractionation RNI. They also support the practicality of hypofractionated RNI.

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