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Original Research

Accelerated partial breast irradiation using intensity modulated radiotherapy versus whole breast irradiation: Health-related quality of life final analysis from the Florence phase 3 trial

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Abstract ***Background:*** Accelerated partial breast irradiation (APBI) represents a valid option for selected early breast cancer (BC). We recently published the 5-year results of the APBI-IMRT-Florence phase 3 randomised trial (NCT02104895), showing a very low rate of disease failure, with acute and early–late toxicity in favour of APBI. We present the early and 2-year follow-up health-related quality of life (HRQoL) results.
Methods: Eligible patients were women aged more than 40 years with early BC suitable for breast-conserving surgery. APBI consisted of 30 Gy in five fractions delivered with IMRT technique. Standard whole breast irradiation (WBI) consisted of 50 Gy in 25 fractions plus a 10 Gy in five fractions boost on tumour bed. A total of 520 patients were enrolled in the phase 3 trial. Overall, 205 patients (105 APBI and 100 WBI) fully completed all the given questionnaires and

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were therefore included in the present analysis. As HRQoL assessment, patients were asked to complete the European Organisation for Research and Treatment of Cancer QLQ-C30, and the BR23 questionnaires at the beginning (T0), at the end (T1) and after 2 years from radiation (T2).
Findings: No significant difference between the two arms at QLQ-C30 and BR23 scores emerged at T0. Global health status ($p = 0.0001$), and most scores of the functional and symptom scales of QLQ-C30 at T1 showed significant differences in favour of the APBI arm. Concerning the BR23 functional and symptom scales, the body image perception, future perspective and breast and arm symptoms were significantly better in the APBI group. Similar significant results emerged at T2: significant differences in favour of APBI emerged for GHS ($p = 0.0001$), and most functional and symptom QLQ-C30 scales. According to QLQ-BR23 module, among the functional scales, the body image perception and the future perspective were significantly better in the APBI group ($p = 0.0001$), whereas among the symptom scales significant difference emerged by breast and arm symptoms with better outcomes in APBI arm ($p < 0.01$).
Interpretation: Early BC treated with APBI showed an improved short-term, and 2-year follow-up HRQoL outcome as compared with WBI. Early BC treated with APBI showed an improved short-term, and 2-year follow-up HRQoL outcome as compared with WBI. APBI should be strongly considered in the treatment choice for selected low-risk patients. Mature local control results from ongoing adequately powered randomised trials are awaited.

1. Introduction

Accelerated partial breast irradiation (APBI) represents a solid option for selected early breast cancer (BC); advantages of APBI include shorter treatment time, improved safety profile and a cost reduction compared with standard fractionation [1].

Several studies investigated APBI efficacy in disease control in selected low-risk early BC patients, as compared with whole breast irradiation (WBI) [2–4].

APBI selection recommendations have been published by both the American Society for Radiation Oncology and the Groupe Européen de Curiethérapie-European Society for Radiotherapy Oncology [5,6].

We recently published the 5-year outcome results of a phase 3 randomised trial (NCT02104895), showing a very low rate of disease failure. An improved outcome in favour of APBI in terms of acute and early–late toxicity was shown [7].

The purpose of the present analysis is to compare the health-related quality of life (HRQoL) of women with BC treated with either APBI or WBI.

2. Materials and methods

2.1. Trial design and methods

This single-institution study was conceived and performed at the Radiation Oncology Unit of the University of Florence (Florence, Italy). Between 11th March 2005 and 18th June 2013, a randomised phase 3 clinical trial was conducted to compare conventional tangential field WBI (50 Gy in 25 fractions, plus a 10 Gy in 5 fractions tumour bed boost), with APBI using the IMRT technique (30 Gy in five daily fractions). Inclusion/exclusion criteria, trial procedures, randomisation and masking, outcome results and whole series features were previously extensively described [7]. Eligible patients were women aged more than 40 years with early BC (maximum diameter 2.5 cm) undergoing breast-conserving surgery. The local Ethics Committee (Azienda Ospedaliero-Universitaria Careggi, Florence, Italy) gave permission to perform the present study, which was conducted according to the Declaration of Helsinki and the Guidelines for Good Clinical Practice. All patients provided full written informed consent. The trial is registered with ClinicalTrials.gov, number NCT02104895.

2.2. Procedures for HRQoL assessment

HRQoL assessment was not the primary endpoint of the whole trial. At the beginning (baseline, T0), at the end of radiotherapy (time 1, T1) and at 2-year follow-up visit (time 2, T2), patients were asked to complete two specific questionnaires on HRQoL: the European Organisation for Research and Treatment of Cancer QLQ-C30, as a reliable and valid measure of the HRQoL of cancer patients in multicultural clinical research settings [8], and the BR23 module, as a supplementary questionnaire for assessing HRQoL issues relevant to patients with BC [9]. All participants, after signing an informed consent form, were instructed to complete the questionnaires themselves during the follow-up visit in the clinic; no phone call or post questionnaire was allowed. All the patients that accepted HRQoL protocol assessment (205/520 patients) fully completed all the questionnaires over time.

The QLQ-C30 includes nine multi-item scales: five functional scales (physical, role, emotional, cognitive and social); three symptom scales (fatigue, pain and nausea-vomiting); and a global health status (GHS) HRQoL