



Contents lists available at ScienceDirect

The Breast

journal homepage: www.elsevier.com/brst

Editorial

Radiation therapy after breast conserving surgery increases long-term breast conservation for DCIS patients

Keywords:

DCIS
Breast-conserving therapy
Radiation therapy
Breast cancer

1. Editorial

Two studies published in this issue of *The Breast* are complementary to the understanding of the role of radiation therapy (RT) after breast conserving surgery (BCS) for the management of pure ductal carcinoma in-situ (DCIS). Both studies included a large cohort of patients (2098 and 3303 patients, respectively). Barbour et al. evaluated the patterns of care in Queensland, Australia, as well as the incidence and predictive factors for invasive local recurrence [1]. In another population-based study, in Ontario, Canada, Rakovitch et al. examined long-term breast preservation after BCS with or without RT in relation to the use of mastectomy for local recurrences [2].

The role of postoperative RT after BCS for DCIS in reducing local recurrence is well-established and supported by level I evidence derived from long-term follow-up data from several randomized controlled trials including over 4000 patients. The Cochrane meta-analysis showed a statistically significant benefit from the addition of RT after BCS on all ipsilateral breast events (HR 0.49; 95% CI 0.41 to 0.58, $p < 0.00001$), ipsilateral invasive recurrence (HR 0.50; 95% CI 0.32 to 0.76, $p = 0.001$) and ipsilateral DCIS recurrence (HR 0.61; 95% CI 0.39 to 0.95, $p = 0.03$). Overall, the addition of RT to BCS reduced the risk of any local recurrence by 51%, with a similar benefit in all subgroups of DCIS (according to complete excision, size, age, and comedonecrosis) [3].

However, we should keep in mind that DCIS is a premalignant lesion with an excellent long-term survival, irrespective of treatment. Therefore, we should reduce unnecessary treatments with related potential harms. In this view, omission of RT was tested in a randomized prospective trial in patients with good-risk DCIS patients (non-palpable, unicentric, low or intermediate nuclear grade, less than 2.5 cm, and margins ≥ 3 mm) [4]. At 7-year median follow up, the local failure rate was 6.7% in the BCS arm versus 0.9% in the RT arm (HR 0.11; 95% CI 0.03 to 0.47; $p < 0.001$). These results gave further support to the routine use of RT post-BCS.

Currently, we are evaluating the use of molecular and genetic

predictive tools and further de-escalation by omission of surgery with or without endocrine therapy in low-risk DCIS patients in prospective studies, such as the COMET, LORD and LORIS trials [5–8]. In the future, this will allow us to better individualize treatment approaches for DCIS patients.

The study published in this issue by Barbour et al., nicely illustrates how practice changed over the years following emerging data from randomized trials [1]. The authors reported that the year of diagnosis was significantly related to the use of RT, with rates significantly lower in the early part of the decade (25%) and more than doubling to 62% over time ($p < 0.001$). These rates might also be associated with the increasing availability of RT facilities. Additionally, the authors reported a 5-year rate of ipsilateral invasive recurrence of 1.7% (95% CI 1.0–3.0) in the RT group versus 2.8% (95% CI 2.1–3.8) in the BCS alone group ($p = 0.11$). The non-significant difference is most probably a result of short follow-up and that patients with high-risk features (larger tumour size, higher nuclear grade and smaller surgical margins) were more likely to be referred for RT.

The second study by Rakovitch et al. was based on the argument that omitting RT after BCS in DCIS patients could help preserving the breast by enabling further breast conserving therapy in case of recurrence [2]. Since there is a paucity of data on the management of local recurrences, this study adds significant insight by providing us a reliable view of current practice, recurrence rates and patient/provider's treatment preference. The authors should also be congratulated for managing that more than 77% of the pathology was centrally reviewed for such a large cohort and for selecting a well-balanced group of patients treated with BCS (with/without RT). The long follow up time (patients were treated between 1994 and 2003) allows getting a very useful long-term perspective. Overall, the authors report that in both groups together, 599 (18%) women developed local recurrence of which 370 (62%) were treated by salvage mastectomy. Salvage mastectomy was used in 57.4% (197/343) of local recurrences after BCS alone and in 67.6% (174/257) of local recurrences after BCS with RT. There were no significant differences for salvage mastectomy in cases of invasive or DCIS local recurrence in either group, or if the local recurrence occurred within 5 years from initial diagnosis compared to a late recurrence. Treatment of the primary DCIS with BCS and RT was not associated with a greater probability for salvage mastectomy in case of local recurrence (HR 1.33; 95% CI 0.93 to 1.89, $p = 0.12$). Combined with a lower recurrence risk after RT, the investigators showed that women treated with BCS and RT

<https://doi.org/10.1016/j.breast.2017.10.013>

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had a greater likelihood of bilateral breast preservation at 10 years compared to women treated by BCS alone.

The combination of both studies published in this issue shows us that the use of RT for DCIS is increasing and that, despite common belief, omitting RT after BCS does not result in a greater chance of breast preservation in case of local recurrences. These trends will continue to change as we gain experience with genetic testing and maturation of data from current and recent trials, without forgetting the influence of patients' preferences. In the meanwhile, we should continue to explore options to further reduce the treatment burden (e.g., hypofractionation and partial breast irradiation). RT-related toxicity should be avoided whenever possible using techniques such as cardiac sparing to reduce the exposure of organs at risk.

In summary, the quest for the right balance between over- and under-treatment of ductal carcinoma in situ [9] has been brought a step further by these large population-based studies, confirming a strong recommendation in favour of routine postoperative radiation after BCS for most DCIS patients.

2. Conflict of interests

None declared. No funding source.

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27 September 2017
Available online xxx

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