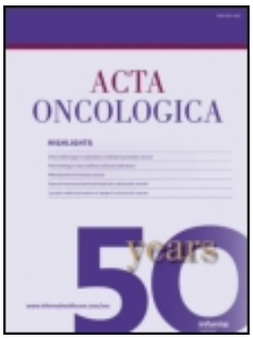

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EDITORIAL

Accelerated partial breast cancer irradiation (APBI)–the future breast cancer radiotherapy?

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Whole breast irradiation (WBI) after breast conserving surgery is the most common treatment in a majority of radiotherapy departments [1]. Several studies have confirmed that breast conserving surgery with postoperative WBI equals in efficacy to total mastectomy both regarding frequency of local recurrences and disease free survival [2–4]. WBI after breast conserving surgery is most often given over a 5 – 6 weeks period with a fractionation of 2 Gy per day. From a patient perspective, this is a relative long period and patients living far away from a radiotherapy clinic need to stay away from home. Some of these patients prefer to undergo a total mastectomy instead [5]. Further, a considerable number of patients operated with breast conserving surgery, for different reasons, never have their postoperative radiotherapy and thus have an increased risk for local recurrence [5,6].

The concept of a short series of accelerated partial breast irradiation (APBI) is very interesting from a patient perspective. The theory behind APBI is that a majority of the ipsilateral recurrences in patients operated with breast conserving surgery are localized in close vicinity to the initial operation cavity [7,8]. The proportion of the recurrences that develops close to the operation cavity varies in different reports from approximately 50 to 90% [9]. Many scientists claim that the risk for ipsilateral recurrence outside the operation cavity is in the same magnitude as the risk for a contralateral breast cancer [8].

Detailed histopathological analysis of the entire specimen after mastectomy for a clinical unifocal cancer reveals that multicentric cancer foci indeed are very common (>50%) [10]. The clinical recurrences however mainly develops inside or close to the operation cavity which suggests that the multicentric foci found in the detailed histopathology studies may not have clinical relevance [11].

APBI can be delivered in four principally different ways:

1. As interstitial brachytherapy with multiple catheters [12],
2. As intracavitary brachytherapy (Mammosite system, Cytyc, Marlborough, MA),
3. As intraoperative radiotherapy (IORT), either with electrons-ELIOT [8] or with conventional X-rays –TARGIT [13], or
4. with external 3D conformal radiotherapy [14].

Each one of these four techniques have advantages as well as limitations [15].

In this issue Bensaleh and co-workers highlights the Mammosite system [16]. The system consists of a catheter with an inflatable balloon which can be dilated inside the operation cavity. After the balloon is inflated in position the catheter is loaded with an Ir-192 high-doserate source. The treatment is given with 3.4 Gy fractions two times daily (minimum 6 hours between the fractions) for 5 days. Mammosite is easy to use and the patient has the advantage to get through the radiotherapy in a week. Bensaleh and coworkers describe advantages, disadvantages and uncertainties with the Mammosite method [16]. For instance, it is mentioned that the contrast medium inside the balloon may reduce the dose at the surface of the balloon, something that the brachytherapy dose planning system may not fully address. However, the

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authors claim this to be a minor problem if the concentration of the contrast medium is kept low.

There is substantial data from phase II trials, both on treatment efficacy and acute toxicity of the Mammosite technique. However, one concern is the sparse data on long-term follow-up. The US Food and Drug Administration (FDA) has approved the Mammosite system, but the approval was regarding use of Mammosite as a boost in addition to WBI. Internationally, especially in the US, many patients ask for this practical short series of radiotherapy with Mammosite alone. Therefore the American society of breast surgeons has an on-going cohort study, where all patients treated with Mammosite as the only radiotherapy, are prospectively registered (http://www.breastsurgeons.org/MammoSitePatientRegistry.htm).

In the view of the uncertainties regarding a possibly slightly higher risk for recurrence in combination with the lack of long-term follow-up data regarding toxicity, it is important to support on-going randomised studies between APBI and WBI. Such studies are on-going both in Europe (GEC-ESTRO APBI trial, the TARGIT trial, ELIOT trial) and in the US (NSABP B39/RTOG 0413).

Probably APBI will be the future radiotherapy for a large number of breast cancer patients operated with breast conserving surgery. However, in order to really identify which patients who will benefit from APBI in comparison to WBI, participation in the on-going randomised trials is essential.

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