European Society for Radiotherapy and Oncology (ESTRO) workshop

E3. What is Hot in breast cancer radiation oncology in 2012?

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Partial Breast Irradiation

Most patients with early breast cancer can be treated with breast-conserving therapy (BCT) consisting of a lumpectomy and axillary staging followed by whole-breast irradiation [1,2]. The addition of a boost to the primary tumour bed further reduces the local relapse rate, with a relevant benefit in patients with risk factors [3].

Because of the inconvenience linked to protracted radiation therapy (RT) fractionation schedules, many women living in remote areas cannot benefit from BCT [4]. Two approaches have been used to diminish this drawback, the first being hypofractionation, and the second accelerated partial-breast irradiation (APBI) [5,6]. The latter is built on the finding that the recurrence pattern after BCT is generally confined to the vicinity of the primary tumour and on the expectation of a lower rate of adverse effects when large doses of RT are delivered in a short time to a part of the breast only. Over recent years, several techniques of APBI have been developed and tested [7,8]. From the recent and ongoing prospective randomised clinical trials, the only results published are those of a small trial with multicatheter brachytherapy also including a conventionally fractionated external electron beam technique with a median follow-up of 66 months, and the results of a trial using a dedicated 50 kV applicator to deliver a single intraoperative dose to the lumpectomy cavity after a median follow-up of only slightly more than 2 years [9,10]. In the presence of the available (mostly non-randomised) evidence showing that APBI can be both safe and effective, both the American Society for Radiation Oncology (ASTRO) and Groupe Européen de Curiethérapie – European Society for Radiotherapy and Oncology (GEC-ESTRO) published consensus guidelines describing patient categories that might be suitable for APBI [11,12]. However, as historically required levels of evidence are still unavailable, we should continue to support participation in clinical trials comparing APBI with conventional BCT.

Modern Radiotherapy Techniques

Preparation and delivery of RT has changed considerably over the years. Nowadays, fully virtual simulation based on a complete set of imaging data is used to prepare sophisticated image-guided individualised treatments to adequately cover the target volumes while simultaneously limiting the dose to the normal structures. Quality assurance tools and guidelines are progressively being applied in daily clinical practice.

Among the first to evaluate the influence of dose homogenisation on cosmetic outcome after BCT were Donovan and colleagues who randomised patients between standard RT and RT using three-dimensional dose optimisation techniques based on either physical compensators or step-and-shoot multileaf collimator (MLC) segmented fields. The improved dose homogeneity with a decrease in the breast volume receiving >105% of the prescribed dose was associated with a decreased change in breast appearance during follow-up as scored by photographic and clinical assessment [13]. Several technical solutions depending on the target volumes to be irradiated (breast; boost; lymph-node areas) are proposed, also demonstrating that an optimal compromise between dose coverage, homogeneity, and sparing normal tissues does not always require the use of the most advanced techniques [14,15,16]. Depending on the individual patient's anatomy, position and treatment technique should be individualised to obtain optimal dose coverage and organ sparing [17,18]. A significant reduction in the volume of irradiated lung and heart tissue can be obtained with the use of breath-hold and gating techniques [19,20].

All these improvements have led to a decrease in the dose to normal structures, which is expected to further increase the net benefit for the patients [21]. A prerequisite for modern RT planning starts with adequate volume delineation, for which there still remains a large source of variation and uncertainty [22]. Although it remains difficult to prove that optimised RT techniques have a direct effect in themselves, we should accept that they have contributed to the substantial improvement in the outcome of breast cancer patients in terms of disease control, survival, and quality of life [23].

Conflict of interest statement

The authors declare that they do not have any conflict of interest related to the work presented in this abstract.

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