European Society for Therapeutic Radiology and Oncology (ESTRO) teaching course and workshop

E4. Current clinical issues in breast cancer

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Breast cancer constitutes a continuously moving field of interest in a multidisciplinary environment thanks to the contribution of basic and translational as well as clinical research to our knowledge of disease prevention, development and progression, local and systemic treatment and late side effects. During this third ESTRO workshop on breast cancer being held on the first day of the European Breast Cancer Conference, we would like to update the participants on two topics related to radiation therapy that have a direct practical consequence for the care of breast cancer patients. The first concerns the need and possibilities for guidelines for target volume delineation and the second concerns the still highly debated issue of post-mastectomy radiotherapy. The course will attempt to reach a consensus on these issues based on active interaction between the faculty and the audience.

Session one – Target volume and organ at risk definition and delineation

Radiotherapy forms part of the treatment for a majority of breast cancer patients. Over recent years, new radiotherapy techniques have been developed to obtain improved coverage and dose homogeneity for the target volumes whilst at the same time maximally sparing the neighbouring normal tissues. For this, however, our knowledge on target and organ at risk definition and delineation needs to be improved in the settings of both breast conserving therapy and post-mastectomy radiotherapy.[1] Substantial literature in this field has accumulated in recent years and some of the experts involved will update the audience on the current state of the ongoing initiatives in this field.[2–6] We hope that this, and also the discussion that is intended to be generated, will help us to further develop generally accepted guidelines for volume definition and delineation of the breast, the primary tumour bed, the thoracic wall, the regional lymph node areas as well as the organs at risk. This work will enable us to further improve our radiotherapy techniques in breast cancer in a concise and reproducible manner. This is especially required for a number of newer treatment solutions including the various forms of intensity-modulated radiation therapy such as helical tomotherapy.

Session two – Indications for post-mastectomy radiotherapy

The treatment of the thoracic wall and the regional lymph nodes has been a major focus of debate over the last decade and national guidelines differ.[1] The meta-analysis of the randomised clinical trials in the fourth cycle of the Early Breast Cancer Trialists' Collaborative Group (EBCTCG) found that radiotherapy produced a proportional reduction of about 70% in the rate of locoregional recurrences in all patients, irrespective of age, tumour characteristics or the administration of systemic therapy.[7] This meta-analysis also demonstrated that about one breast cancer death during the 15 years after randomisation will be avoided for every four local recurrences at 5 years that are prevented. Therefore, the absolute improvement in local control and in breast cancer mortality is expected to depend mainly on the baseline risk, with the highest gain for patients with a high risk for developing a local recurrence. Based on this, most consensus reports and guidelines recommend regional and post-mastectomy radiotherapy (PMRT) for patients at a high risk of locoregional recurrence. This concept is, however, questioned by studies showing that patients with a lower risk for locoregional relapses might benefit relatively more from eradicating locoregional disease in terms of long-term survival because of their anticipated lower probability of spread beyond the regional lymph nodes.[8] The extent to which the one-in-four relation will continue to hold for patients receiving modern treatments is as yet unclear. To provide insight

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into this, the fifth cycle of the EBCTCG meta-analysis has carried out a detailed investigation of the effect of radiotherapy in those patients whose therapy was closest to that given today in terms of the extent of axillary dissection, the radiotherapy technique, and the systemic treatment given. [9]

A further issue determining the extent to which patients will derive a net benefit from radiotherapy arises from the need to balance the benefits against the risk of long-term side-effects. In the older radiotherapy regimens, a significant excess incidence of contralateral breast cancer and a significant increase in non-breast cancer mortality in irradiated women was noted, particularly cardiac-related. [10,11] Therefore, the long-term net effect of radiotherapy will be strongly influenced by the patients' individual risk factors and by the extent to which radiotherapy is able to limit irradiation of the organs, particularly the heart, in the vicinity of the breast and of the regional lymphatic areas.

Further evidence of the value of PMRT in controlling breast cancer mortality in the era of widespread use of adjuvant systemic treatment will come from several well-designed large prospective randomised clinical trials, including SUPREMO (Selective Use of Postoperative Radiotherapy after Mastectomy) and its' biological sub-study TRANS-SUPREMO. [12] Recent work on novel molecular signatures of radiation response and resistance and biological prognostic markers opens new pathways to be explored that may also lead to new ways of determining the individual patients' prognosis and benefit from radiotherapy and thereby aid in the judgement of the balance between benefits and side effects of locoregional as well as systemic treatments. [13,14]

We extend a warm invitation not only to radiation oncologists but also to all oncologists active or interested in the field of breast cancer to participate in this meeting where there will be ample opportunities for interactive discussions and participation. Those who are still in training are of course welcomed as well.

Conflict of interest statement

None declared.

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