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New biologic parameters for tailoring adjuvant radiotherapy in breast cancer: is it just an illusion?

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In breast cancer management significant advances have been obtained in the last decades from diagnosis to palliative care. In surgery, systematic total mastectomy and axillary dissection are replaced by minimal invasive surgery including lumpectomy and sentinel node biopsy. In the adjuvant setting, whole breast radiation therapy (RT) delivering 50 Gy in 5 weeks +/- boost to the tumor bed, remains the standard of care and partial breast irradiation is under investigations in selected patients. The main problem is to define the patients profiles for which it is possible to reduce the breast volume and modify the fractionation.

RT indications and volume definition are generally dependant on existing prognostic factors. Apart from particular cases, RT technique does not vary according to the patient or tumor biology profiles in terms of total dose, dose per fraction, fractionation, and RT duration. The future challenge is to define new parameters or tumor biology profiles that will allow patients' selection for more tailored RT than the 5 to 7 weeks-standard schedules. The future issue is to define biological markers able to screen patients and tumors according to their high metastatic potential (in which the primary therapeutic challenge may not locoregional control) and those patients that have a particular radiosensitivity to ionizing radiation. The benefit / risk ratio based on particular patients profiles and/or tumor biology markers could be the future rationale for tailoring RT delivery in daily practice.