The art to irradiate the Internal Mammary Nodes (IMN) in breast cancer patients

Radiation therapy (RT) has demonstrated strong clinical benefit in patients with breast conservative surgery or with radical mastectomy and who are at high risk for relapse.

Unfortunately, this benefit was counterbalanced by an increased risk for death from cardiac events. Similarly, several systemic agents are associated with a cardiac toxicity or might also increase the toxicity of RT, including endocrine therapy, chemotherapy (CT) agents, or molecular targeted therapies.

This paper is a report on the current available techniques to irradiate the IMN, including promising new technology that may help limiting the risk of cardiac toxicity.

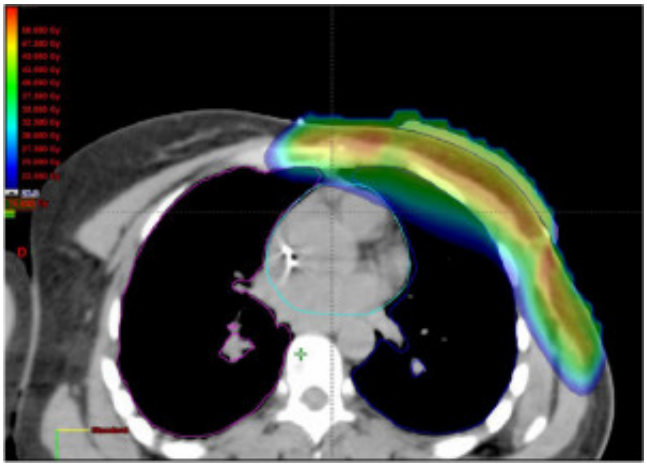

Fig. 1. Irradiation by electrons to the chest wall after mastectomy and the IMN, left side. It is shown how nicely we can spare the heart using this kind of irradiation

For years now the preferred method to decrease the doses to the heart was the use of electrons: superficial beams which slide along the irradiated volumes (Fig. 1) . Consequently, treatment planning is adapted to each patient’s morphology and practical guidelines have been implemented to improve delineation of target volumes.

Currently, new techniques as the “intensity modulated radiotherapy (IMRT)”, Tomotherapy can sculpture the isodoses and contribute to spare the heart from high dose irradiation, particularly in left-sided breast cancer patients with unfavourable cardiac anatomy. The respiratory control is also proposed in this population of patients.

Altogether, these technological improvements led to significant decrease in heart dose, suggesting but not demonstrating that cardiac toxicity could be decreased. Next step would be to explore the use of new type of beams as protons to try to deliver the dose directly to the region of IMN. The particularity of these beams is that we can stop them at the depth we want.

The future with the highly performing irradiation techniques seems better and less toxic techniques can change the long term results of the breast cancer treatment with high cancer control rates, less toxic effects and obviously better quality of life.

Publication

Irradiation of internal mammary nodes: State of the art.
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