

The importance of radiation optimization using CT-planning for supraclavicular irradiation in breast cancer patients

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Abstract

Introduction: For breast cancer patients, routine prescription of the dose to supraclavicular (SC) region at depth of 2.5-3 cm may underdose these regions due to differences in the depth of SC and axillary lymph nodes (AXLI-III).

Aim: to determine whether radiation optimization using CT-planning should be used for SC irradiation for breast cancer or routine prescription of the dose to 2.5-3 cm achieves adequate coverage for SC and AXLI-III lymph nodes for all patients.

Methods: Ten breast cancer patients with post mastectomy radiation that included a SC field were selected. The planning target volume (PTV) of the chest wall, SC region, AXLI-III, contra-lateral breast (CB), heart and both lungs were contoured. Three plans were generated for each patient by prescribing the dose at 2.5cm, 3cm and 5cm depth for anterior SC field. The three plans were compared and analyzed statistically. A correlation was tested between the depth of the SC and of AXLI-III lymph nodes, their minimum dose, D95%, dose inhomogeneity & body maximum dose.

Results: Significant improvement in different target volumes coverage when the dose is prescribed to 3 or 5cm compared with 2.5cm. There is a significant positive relationship between the depth of SC and AXLI-III lymph nodes. A correlation was found between depth of different target volumes and its min dose, D95% and dose inhomogeneity.

Conclusion: CT simulation and generation of optimized treatment plan for each patient should be the standard way for radiation treatments of SC and AXLI-III lymph nodes in breast cancer patients. I declare that there is no conflict of interest with any financial organization regarding the material in this manuscript