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Influence of surgical clip and oncoplasty on breast, heart, and lung volumes irradiated during boost radiotherapy in breast cancer

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Objective: The objective of this study was to evaluate the irradiated volumes of the breast, heart, and lung, considering the presence of the surgical clip and the oncoplasty techniques **Methodology:** This is a retrospective study of women submitted to boost radiotherapy tumor bed after breast conservative surgery between January 2011 and January 2021. Statistical analysis using Student's t-test (95%CI; $p < 0.05$). It was considered volumes of lung and heart relative to 40% of the prescribed dose in the boost radiation planning (V40 Lung) (V40 Heart) and 100% in the breast and boost volume (V100 Breast) (V100 Boost), which were compared by oncoplastic techniques and surgical clips using the dose-volume histogram in three-dimensional conformal radiotherapy. **Results:** This study evaluated 183 women. For the entire group, regardless of the oncoplasty, when the patient was clipped, there was a significant difference between the mean boost volumes. In the group of patients without oncoplasty, there was a significant difference between the mean boost volumes: V100 Boost=95.66 cm³ (PD±42) in the presence of 1–2 clips and V100 Boost=90.99 cm³ (PD±34) in the presence of 3 or more clips, when compared with non-clipped: V100 Boost=255.23 cm³ (PD±162) ($p < 0.001$), and the difference in mean breast volumes was also significant, in the presence of 1–2 clips, V100 Breast=233.31 cm³ (PD±122), when compared with non-clipped breast: V100 Breast=368.71 cm³ (PD±232) ($p = 0.032$). There was no statistically significant difference in the mean heart and lung volumes analyzed. **Conclusion:** The presence of the clip significantly reduced the mean boost volume for the entire group. For those who did not undergo oncoplasty, the presence of the clip made it possible to reduce the mean volume of the breast, when one to two clips were inserted. In those undergoing oncoplasty, the presence of the clip increased the cardiac volume. There was no significant difference in the mean lung volumes.

Keywords: breast cancer; radiotherapy; surgical clip.