

EVALUATION OF THE EFFECT IN IMPACT OF POSITIONING ERRORS ON ORGAN DOSES USING VOLUMETRIC ARC RADIOTHERAPY IN CASES WITH LEFT BREAST CANCER AFTER MASTECTOMY

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- ✓ breast cancer
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THESIS ABSTRACT

This study retrospectively evaluated the effects of translational and rotational set-up errors in Volumetric Arc Therapy (VMAT) plans on target volumes and at-risk organ doses in patients with left breast cancer after mastectomy. The effects of shifts of varying directions and magnitudes on reference treatment plans were analyzed. The findings showed that large translational shifts, in particular, could reduce target volume coverage and increase doses to some critical organs. In conclusion, accurate patient positioning, daily image-guided radiotherapy practices, and effective quality assurance processes were determined to be critical for treatment accuracy and the preservation of normal tissue.

APPLICATION AREAS OF THE THESIS RESULTS

The results of the study contribute to the evaluation of the effects of field center (set-up) shifts in radiotherapy applied with the VMAT technique on target volumes and organ doses at risk in patients with left breast cancer after mastectomy. The findings provide scientific support for clinical planning and quality assurance processes by revealing that translational and rotational deviations, especially in certain directions and magnitudes, can change the dose distribution.

ACADEMIC ACTIVITIES

1. Demir Akkuş, İ., Çetintaş, S., & Kahraman, A. (2026). Effect of set-up errors on heart dose in left breast cancer VMAT treatment: Analysis in post-mastectomy cases. 10th Uludağ Breast Cancer Symposium, 25–28 June 2026, Bursa, Türkiye. Poster Presentation (No: 335441680).
2. Işıklar, S., Demir, İ., Turan Özdemir, S., & Özpar, R. (2023). Examination of the development and asymmetry of the cerebellum and its lobules in individuals aged 1–18 years: A retrospective MRI study. Brain Topography, 36(6), 901–925. <https://doi.org/10.1007/s10548-023-00997-2>

