

Purpose: The aim of this study is to find out whether it is still necessary to use a beam spoiler for breast treatment especially with IMRT technique.

Materials and methods: Full Monte Carlo simulations were performed with and without a beam spoiler for 11 breast patients treated using 10MV photon beams and another 10 patients using 18MV photon beams with IMRT technique employed. CTV was defined as the breast volume which started from 5mm away of the skin and the build-up-region was defined from 2mm to 5mm depth from skin. Doses to CTV, build-up-region, skin and contralateral breast were compared with and without a beam spoiler.

Results: Comparison of dose distributions show that the beam spoiler increases dose at the build-up-region where the patient surface is perpendicular to the beam and thus improves the dose homogeneity inside the breast. After the dose distributions were normalized to ensure 95% volume of CTV receives at least 95% of the prescription dose, the difference on the minimum and maximum dose of CTV is <2% for 10MV and <4% for 18MV, and the difference on the mean dose in the build-up-region is <3% for 10MV and <7% for 18MV. However, the mean dose of skin is increased by 5% for 10MV and 14% for 18MV on average and the maximum dose to the contralateral breast is increased by >100% by using a beam spoiler.

Conclusions: The Monte Carlo simulation results show that the beam spoiler can improve dose homogeneity in the breast. But it is not clinical significant especially when the IMRT technique is used to limit the dose heterogeneity. And thus it is suggested that a beam spoiler may not be necessary when breast patient is treated using two opposite tangential 10MV or 18MV beams if the build-up-region is not a big concern.