

Purpose:To investigate the application of Rapidarc as a technique to improve the dosimetric plan quality for the treatment of the chestwall and regional nodes when 3D conformal planning using the partially wide tangents (PWT) technique requires the irradiation of more than 3 cm of the ipsilateral lung and/or the heart in order to achieve coverage to the IMNs, and to compare it with IMRT.

Methods:The PWT plan was done using the field in field technique. IMRT planning consisted of 6 beams at five gantry angles, chosen to minimize the entrance or exit through the contralateral structures. The arc range for the Rapidarc plan was similar to IMRT. Dose calculation was performed with the AAA algorithm in Eclipse V 8.9. Dose prescribed was 5040 cGy.

Results:PTV D95 and V95 for both the Rapidarc and IMRT plans were 98% and 97% respectively. The same for 3D was lower by 4%-5% respectively. Rapidarc reduced the left lung mean dose compared to 3D and IMRT by as much as 19 Gy. The V20 Gy and V10 Gy were lower with Rapidarc by as much as 45% and 50%. The total lung mean dose was lower with Rapidarc by 8 Gy while the V20 Gy and V10 Gy reduced by 22% and 25%. Heart doses more than 25 Gy were identical with 3D and Rapidarc while IMRT gave a mean heart dose that was higher by 11 Gy. The mean dose to the contralateral organs was higher with Rapidarc by 3 Gy compared to 3D.

Conclusions:For the same coverage, Rapidarc was able to better spare critical organs compared to IMRT. Compared to 3D, Rapidarc had better coverage and lower ipsilateral and total lung dose and identical volumes of heart irradiated above 25 Gy.