CHESTWALL AND BREAST IMMOBILIZATION FOR 3DCRT AND IMRT

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Purpose/Objectif: Purpose of the study is the investigation of the feasibility of using individual thermoplastic mask fixation of the thoracal region for adjuvant 3D conformal and intensity modulated radiotherapy of breast cancer patient.
Materials/Methods: 18 patients after surgery (7 postmastectomy, 11 breast conserving surgery) underwent postoperative 3DCRT 25x2 Gy /5 weeks in supine position on AIO Solution™ (ORFIT) in three groups: group A without mask; group B with diagonal mask (contralateral breast-abdomen); group C transversal mask fixation. Portal images were obtained weekly using Electronic Portal Imaging Device. The set up accuracy was defined comparing the portal image to the DRR derived from the planning system (XIO-CMS). The breathing movement was evaluated by measurement of the central lung distance (CLD) and the area of the Margin(field)-Costo-Phrenical Triangle (MCPT) durind the delivery of radiation in expiration and in inspiration. Adverse reactions were assessed and graded weekly over the baseline using CTCAE v. 3.0.
Results: In the group A 10-20 mm correction of the position was neccessary in 3/6 cases in the group B in 1/6 cases and no correction was requested greater than 5 mm in the group C. The average difference in inspiration and expiration of the CLD and MCPT were in group A 1.66 mm and 209.22 mm^2; in group B 0.94 mm and 80.36 mm^2; in group C 0.67 mm and 74.2 mm^2 respectively. We have not observed acute skin reaction in 3 cases and there were no grade 4 skin toxicity. Grade 3 radiodermatitis occured in 2/6, grade 2 in 1/6, grade 1 in 2/6 cases if the radiated area was covered by mask material and 1/12 grade 3, 2/12 grade 2 and 7/12 grade 1 if not. (group A+B).
Conclusions: The transversal thermoplastic mask fixation reduces the breathing motion remarkably during the treatment delivery and assures high repositioning accuracy, but in the same time slight increase of the acute skin reaction was detected. Therefore the two or better four points transversal mask fixation can be recommended for irradiation of the chestwall, where the bolus effect is advantageous, for 3D partial breast RT and IMRT. For standard CRT the diagonal mask could be a solution to avoid the skin toxicity, but it needs further optimisation to achive the same degree of breathing motion reduction and repositioning accuracy.