IMPROVEMENT OF SETUP ACCURACY BY NECK-SHOULDER BAG DURING RADIOTHERAPY IN HEAD AND NECK CANCER PATIENTS

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Purpose **:** To study how neck-shoulder bag (NSB) improve the setup accuracy among head and neck cancer patients during radiation therapy (RT) by analyzing the cervical spine curvature difference.

Materials and Methods **:** Between March 2008 and March 2009, sixty-six consecutive head and neck cancer patients received RT with immobilization by thermoplastic mask and hollow-pillow. These 66 patients were divided into two groups. Group A (n = 37) were those with a neck to couch perpendicular distance (NCD) < 3 cm, measuring at the point just caudal to the hollow-pillow, and they did not use the NSB for neck support. Group B (n = 29) were those with NCD equal to or larger than 3 cm, and all of them used NSB during RT. Another cohort of 31 cases treated in the year 2007, not using the NSB was used as the retrospective control group. Among these 31 cases, fifteen have NCD < 3 cm (Group A') and sixteen cases were ≥ 3 cm (Group B'). Patient's cervical spine curvature was quantified by his/her second and fifth cervical vertebrae intersecting angle (cervical spine angle, CSA). It was measured weekly from patient's portal images and simulation films. A small difference between the weekly CSA indicated good setup accuracy. Body weight change, surgery prior to RT, NCD, and whether using a NSB or not were investigated correlating to CSA. Analyses were performed using the Pearson correlation coefficient and SPSS17 for independent univariate t test.

Results **:** A total of 582 portal images were obtained. Patients with NCD < 3 cm and not using the NSB have a CSA weekly difference of 0.67 ± 2.58° for Group A, and 1.03 ± 3.48° for Group A' ($p = 0.484$). Those with NCD ≥ 3 cm, CSA weekly variation for Group B was 0.41 ± 0.66°, and was 1.52 ± 3.63° for Group B', ($p = 0.046$). Surgery prior to RT significantly increased the CSA range of difference ($p = 0.0436$). Body weight change had little to no correlation with CSA variation (r range: 0.01 to -0.21).

Conclusions **:** Our results indicated using NSB in patients with NCD ≥ 3 cm significantly reduced CSA variation among RT fractionations, thus improved setup accuracy. Patients with NCD < 3 cm had acceptable setup accuracy in the absence of NSB.

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Key words: Head and neck cancer, Setup accuracy, Neck-shoulder bag, Cervical spine angle