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Comparative Study of Various Treatment Positioning Technique: A Site Specific Study-CA. Breast

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Abstract : Introduction: Radiation therapy has come a long way over a period of decades, from 2-dimensional radiotherapy to intensity-modulated radiation therapy (IMRT) or VMAT. For advanced radiation therapy, we need better patient position reproducibility to deliver precise and quality treatment, which raises the need for better image guidance technologies for precise patient positioning. This study presents a two tattoo simulation with roll correction technique which is comparable to other advanced patient positioning techniques. Objective: This is a site-specific study is aimed to perform a comparison between various treatment positioning techniques used for the treatment of patients of Ca- Breast undergoing radiotherapy. In this study, we are comparing 5 different positioning methods used for the treatment of ca-breast, namely i) Vacloc with 3 tattoos, ii) Breast board with three tattoos, iii) Thermoplastic cast with three fiducials, iv) Breast board with a thermoplastic mask with 3 tattoo, v) Breast board with 2 tattoos – A roll correction method. Methods and material: All in one (AIO) solution immobilization was used in all patient positioning techniques for immobilization. The process of two tattoo simulations includes positioning of the patient with the help of a thoracic-abdomen wedge, armrest & knee rest. After proper patient positioning, we mark two tattoos on the treatment side of the patient. After positioning, place fiducials as per the clinical borders markers (1) sternum notch (lower border of clavicle head) (2) 2 cm below from contralateral breast (3) midline between 1 & 2 markers (4) mid axillary on the same axis of 3 markers (Marker 3 & 4 should be on the same axis). During plan implementation, a roll depth correction is applied as per the anterior and lateral positioning tattoos, followed by the shifts required for the Isocentre position. The shifts are then verified by SSD on the patient surface followed by radiographic verification using Cone Beam Computed Tomography (CBCT). Results: When all the five positioning techniques were compared all together, the produced shifts in Vertical, Longitudinal and lateral directions are as follows. The observations clearly suggest that the Longitudinal average shifts in two tattoo roll correction techniques are less than every other patient positioning technique. Vertical and lateral Shifts are also comparable to other modern positioning techniques. Concluded: The two tattoo simulation with roll correction technique provides us better patient setup with a technique that can be implemented easily in most of the radiotherapy centers across the developing nations where 3D verification techniques are not available along with delivery units as the shifts observed are quite minimal and are comparable to those with Vacloc and modern amenities.

Keywords : Ca. breast, breast board, roll correction technique, CBCT
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