

AbstractID: 10431 Title: Evaluation of CT-based high dose rate brachytherapy treatment planning in nasopharynx using dose volume indices

Purpose: Treatment of the nasopharyngeal tumour can be particularly challenging. Because it is surrounded by multiple critical organ. Conventional Radiograph based treatment planning is lack of quantitative information about target volume (TV) and other critical organs. But on CT based dosimetry provides the dose distribution on the patient images and enable to quantify the dosimetric outcome using Dose Volume Histogram(DVH).The aim of this study is to evaluate the different dose points(DP) normalization with optimization techniques and compare the dose volume indices(DVI).

Method and Materials: Four patients were underwent image guided Rotterdam nasopharyngeal catheter with dummies followed by 3mm slice thickness of CT images were transferred to virtual simulation Dosimetrist for contouring target and other structures. PLATO BPS V14.3.5 used to catheter reconstruction and DP generation and dose distribution. Here three techniques were used. Plan1 (P1) is DP were generated at 5mm around the target. Plan 2(P2) is DP were generated at 5mm around the target combined with dose point optimization. Plan 3(P3) is DP is generated on catheters (+U) 7mm distance from two catheters. In all plans prescription dose is normalize to DP .Dosimetry outcome from these 3 different plans were compared quantitatively using DVI. Which includes Dose homogeneity index(DHI),External Volume Index(EI) and Conformal Index(COIN).COIN is taken in to consideration of coverage of target volume (TV) and also unwanted irradiation of normal tissue (soft palate) outside the TV

Results: In all four patients the volume of target is ranging from 9.11 to 31.23 cc. DHI for P3 is better optimal 0.5506 ± 0.0334 (0.5938-0.5407) and EI also optimal 0.1060 ± 0.1172 (0.0240-0.06).But COIN is Suboptimal for P3.But in P2 COIN is optimal 0.4784 ± 0.070 (0.3947-0.5455), DHI and EI also optimal 0.394 ± 0.0907 , 0.2763 ± 0.0468 respectively.

Conclusion: If TV is less than 10cc, P3 show all indices are optimal. But TV is more than 15cc. P2 shows all indices are optimal