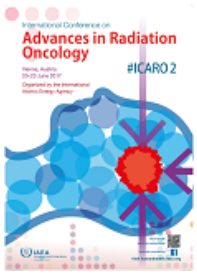

Contribution ID: **228** Type: **Poster**

Planning implementation of a hybrid VMAT (H-VMAT) in radiation therapy treatments of head and neck cancer cases; a dosimetric comparison with IMRT and VMAT; should we move on?

Wednesday, June 21, 2017 3:45 PM (5 minutes)

INTRODUCTION:
For head and neck cancer (H&N) It was compared three treatment techniques as volumetric modulated arc therapy (VMAT), Intensity Modulated Radiotherapy modality sliding Windows (IMRTsw), and Hybrid treatment thechnique (H-VMAT), the latter consists in blend both techniques VMAT and IMRTsw and give different weights for each during planning. The research is to compare the dosimetric distributions, and observed gains with regard to dose distribution, treatment time and scattered radiation imparted to the patient.
MATERIALS AND METHODS:
For a patient with a Head and Neck Cancer diagnose we decided to compare treatments described above, patient was simulated in supine position, inmobilized by using thermoplastic mask, in all cases positioning was verified by using cone beam (XVI), patients were planned with the three treatment techniques to the case of VMAT (1 arc) and for IMRTsw (5 fields). Patients were simulated in Computed tomography (CT) simulation General Electric (GE) Optima model, slides acquisition 1.25 mm; Magnetic Resonance was also done in a Siemens de 1.5T with 1 mm slices in contrast enhanced T1 MPR, T2 Flair, T2 Ciss, Diffusion, Perfusion; image fusion for PTV and OAR contouring; calculation were done in Monaco® planning system version 5.10.02 with Monte Carlo algorithms; treatment delivery were make in a LINAC Elekta Infinity™ with Agility™ head with 160 interdigitating leaves with 0.5 cm width at isocenter; positioning verification XVI versión 4.5.1 b141, Calculations were verified with PTW OCTAVIUS System.

H-VMAT treatment modality consist in use IMRT fields and VMAT Archs blended with with the new bias dose option (B) This allows us to account for doses previously planned for a patient in a new plan during the optimization proccess, and different weights deliver treatments to achieve lower dispersion and higher tumor dose conformality.
When compare dose distribution shown in figure 1, it is observed that 5% (Blue) dose is less in H-VMAT; what reflects less scattered radiation, with regard to 5% scattered dose is less with H-VMAT as is with the hot points as well.
Dosimetric analysis were made in regard to conformity Index RTOG (CIRTOG), homogeneity index (HIRTOG), Paddick inverse conformity Index (PCI), Dmean. OARs were analyzed in terms of Dmax and Dmean.

Ptv: volume tratement planification
Conformidad index: (ICRTOG)

Homogeneity index (HIRTOG)
Dmax: Maximun Dose
Dmin: Minimun Dose
Dmean: Mean Dose

Paddick inverse conformity Index (PCI):
Table N°1 It is observed for H-VMAT that CI, HI, Paddick Index, are better than those for IMRT or VMAT alone, nor for MU that are in between of the mean values.
Table N° 2 it is observed the values distribution in Gy, between PTV volume in H-VMAT compared to IMRT 5 Field and VMAT 1 Arc, showing 2%, 50% and 95% volume isodose distribution; and it is seen that cGy given to PTV are less in H-VMAT leading to a better isodose distribution and homogeneity, having in count that the

prescribed dose is 6600cGy.
Table 3 Shows patient dose distribution, 5% Isodose (330cGy) for H-Vmat the % is fewer compared in volume cc, to IMRT and VMAT alone, that allow us to control more efficiently the possible colateral effects that its could lead to. Also it is observed a gain in the 50% isodose being less for H-VMAT.
It is observed that the maximum dose distributed in IMRT is bigger, and mean dose is closer to the prescribed dose in H-VMAT.

In Table N°4. Dose max is less for HMAT in comparison with VMAT and IMRT.

In conclusion the hybrid H-VMAT technique shows improvments from the treatment time compared to IMRT, dose distribution and less scattering to VMAT, making it a good option in the Radiation therapy planning for head and neck cancers.

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