AbstractID: 14068 Title: A comparative study between RapidArc and IMRT techniques applied to H&N cancers

Purpose/Objectives
RapidArc (RA) is a new technique in which the linear accelerator rotates around the patient while the radiadion is shaped in small beams that are aimed at the tumor from multiple angles. The purpose of this study is to evaluate RA relative to the conventional Intensity-Modulated Radiotherapy (IMRT) for head and neck (H&N) cancers.

Materials/Methods
Twelve patients with H&N cancers were selected for the study. All RA and IMRT plans were created on Eclipse 8.6. Photon beams of 6 or 15 MV from a Trilogy machine outfitted with imaging capabilities were used for all the IMRT plans and only 6 MV photon beams for RA plans. The organs at risk (OAR) included parotid glands, brainsteam, cord, mucosa and mandibula. RA plans consisted of one or two full or partial arcs while IMRT plans consisted of 5 or more fields. Evaluation of the plans was performed by means of parameters such as conformity index $CI_{90\%}$ and homogeneity index. For OAR evaluation included maximum dose expressed as $D_{1\%}$ and mean dose.

Results
Both RA and IMRT techniques reached planning objective for the PTV with $CI_{90\%}$ slightly superior for the IMRT. The hot spots were inside the PTV for RA plans. RA mean and maximum doses for parotids were equal or smaller than the IMRT ones, with relative reductions of up to 20%. IMRT plans failed to achieve the planning objective for parotid glands in case of five of the patients. RA technique proved to be much faster than IMRT, calculated treatment time for RA being below four min.

Conclusions
RapidArc technique is superior or at least equal to IMRT for H&N cancers. Benefits of RapidArc over IMRT consist of similar PTV coverage, better OAR sparing with hot spots placed inside target, fewer monitor units, shorter treatment times and less patient motion.