

AbstractID: 8294 Title: Video-coaching as biofeedback-tool to improve gated treatments: 2 years clinical experience

Purpose: Gated treatments using the Varian RPM-gating™ System include in a standard configuration a coaching tool based on voice commands (“breathe-in”/”breathe-out”) called audio-coaching. As this configuration does not include feedback information like amplitude and breathing period, there are limitations concerning respiration depth and breathing pattern. The aim of this study was to evaluate the impact of video-coaching as biofeedback to achieve more regular breathing and – as a consequence – quality improvements of the 4D-CT scans as well as duty cycle enhancements.

Method and Materials: Varian RPM-gating system is used for acquisition of the CT-Scan (4D-CT) as well as the treatments; for the latter it manages the controlled switching of the radiation beam during a pre-selected specific phase of the respiratory cycle. 80 patients with gated treatments have been analyzed, whereas 40 were only audio-coached and 40 audio-coached with video-feedback. We evaluated periodicity and amplitude changes as well as compliance with regard to the theoretically calculated duty cycle and determined the dependency of the parameters on the coaching type.

Results: For the CT acquisitions several changes has been observed, i.e. fluctuations of the inspiration maxima are significantly smaller ($p=0.005$) and the breathing curves are smoother. The compliance during the treatment course was significantly increased: almost all video-coached patients reached in average their theoretical duty cycle, whereas 60% of the patients with audio-coaching only had more than 25% longer treatment times due to inappropriate amplitudes ($p=0.001$).

Conclusion: Video-coaching is suitable to significantly improve the quality of 4D scans and allows optimizing the treatment time due to better compliance. We also implemented this feedback technology combined with voluntary end-inspiration breath hold technique thus allowing the patient to control the treatment themselves in a direct way. These results indicate that this approach could suit the individual patient need in a better way.