AbstractID: 14045 Title: Can We Predict the Severity of Artifacts on 4DCT from the Respiratory Irregularity during 4DCT Image Acquisition?

Purpose: To evaluate the correlation between the severity of artifacts on 4DCT and patient's respiratory irregularity.

Method and Materials: The 4DCT from 10 different patients were studied. These patients went through two consecutive procedures in a single session: 4DCT with free breathing (FB) followed by another 4DCT with audio and visual (AV) instructions. Phillips big bore Multislice CT scanner with 4D CT capabilities were used to acquire the 4DCT scans. Real Time Position Management system by Varian was used to capture patient's breathing trace during 4DCT acquisition. Describe your methods to quantify 4DCT artifact and respiratory irregularity.

Results: Our results of all ten patients indicate that there is an obvious correlation between severity of artifact and breathing irregularity. For each individual patient, the severity of the artifact increases with the breathing irregularity for 4D CT with free breathing. However, it is difficult to use a universal function to describe the correlation among all patients. The most possible cause can lay on the unique dependence of internal organ motion on external motion of each patient. Our results also indicate that the AV coaching helps to reduce the breathing irregularity during the CT acquisition and therefore results in mitigated artifact in 4DCT.

Conclusion: We conclude that it is feasible to predict the severity of the artifacts on 4DCT by quantification of breathing irregularity. We also found coaching is helpful to reduce the breathing irregularity.

Conflict of Interest: Research sponsored by Philips.