

AbstractID: 8791 Title: New weighted maximum intensity projection (MIP) images for assessing tumor motion in the thorax without a respiratory surrogate

Purpose: MIP image is effective for encompassing the tumor motion except in the area where the tumor is near the diaphragm. This is due to the fact that the tumor and the diaphragm may occupy the same space at two different times in respiration. We developed a new weighted MIP image to eliminate this constraint and advanced the application of cine CT imaging for assessing the tumor motion without a respiratory surrogate.

Method and Materials: We selected three patient studies from the conventional cine-CT based 4D-CT imaging on a GE 8-slice CT. These three patients each had a lung tumor near the diaphragm, and their MIP images were compromised by the diaphragm obscuring the tumor. We first identified the obscured region of 2 to 6 cm for weighted MIP processing. In each cine acquisition of 2 cm coverage, we identified one image of 2.5 mm thickness corresponding to the end-inspiration (EI) phase, associated with the least diaphragm or the largest lung region in the image. Selection of one image automatically groups in the other 7 images acquired at the same time from the 8-slice CT, reducing the selection time. We then submitted the selected images of EI phase along with the cine CT images outside the obscured region for MIP processing, resulting in a new weighted MIP image that shows good contrast for encompassing tumor motion.

Results: The contrast of tumor in MIP was improved with weighted MIP for all three patients when the tumor is near the diaphragm.

Conclusion: A new weighted MIP has been designed to further advance the application of cine CT imaging for assessing tumor motion without a respiratory surrogate when the tumor is near the diaphragm.