AbstractID: 1414 Title: Time and Error Evaluation of Real-time Virtual Simulation for Breast Cancer Treatment

Aim of the virtual simulation is to create a set of distinguishable patient points or markers for setting up the daily treatment reference. However, the holding time between scanning patients and setting up the fiducial tattoos can be an important source of positioning error. Especially when performing gated study, lengthy wait time for patient on the CT couch is a viable error source for patient marking. We have established a test protocol to perform patient marking on the fly, and to evaluate the error minimization of patient marking. The embedded localization software package (CT Loc™) inside the CT console software performed this task with high patient marking accuracy and reduces simulation time. With the images sending to another contour station for localization, the marking error can be up to 4 to 8.5 mm due to the lengthy wait time, breathing and motion. To test the benefit of this new package, second CT scan was performed to double check the first set of contours and markings, as expected, the error could be as large as 8.5 mm depending on patient holding position. Therefore, real time marking system seems to be necessary to resolve the following virtual simulation issues:1) Reduce the patient hold time by about 45 % compared to the regular simulation technique; 2) Accurate fiducial marking and verification during the image acquisition; 3) Enhance gating capability and improve patient marking accuracy. This procedure acts as the first step toward IGRT delivery.