

Density Gamma Analysis for the Brain, Chest, and Abdomen in the MobiusCB as a new Cone-beam CT QA Tool

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MobiusCB can evaluate the patient positioning error and anatomical changes through a density gamma analysis on the cone-beam CT (CBCT) image acquired during radiotherapy with the planning CT image. In this study, we evaluated the average gamma passing rates (%GP) of density gamma analysis and tried to find the characteristics of the CBCT images according to the tumor location.

The density gamma analysis was performed by using MobiusCB with gamma criteria of 0.2 g/cc and 3 mm for 81 patients treated radiotherapy to the brain (9), chest (30), and abdomen (42) in Kangwon National University Hospital.

As a result, the average %GP and their standard deviations for the brain, chest and abdomen were $98.5 \pm 1.3\%$, $96.1 \pm 2.9\%$ and $95.1 \pm 2.8\%$, respectively. In the cases of the brain, since a mask is used to immobilize, the %GP is higher than other sites ($p < 0.05$). For the results of chest cases, we would consider that the %GP of the chest cases includes the effect of the internal motion of the lung and heart. In the case of the abdomen, there were differences according to bladder filling, whether eating or not, and changes in weight, etc. Therefore, the changes of %GP as the treatment continues can be a quantitative index to determine an appropriate re CT simulation schedule.

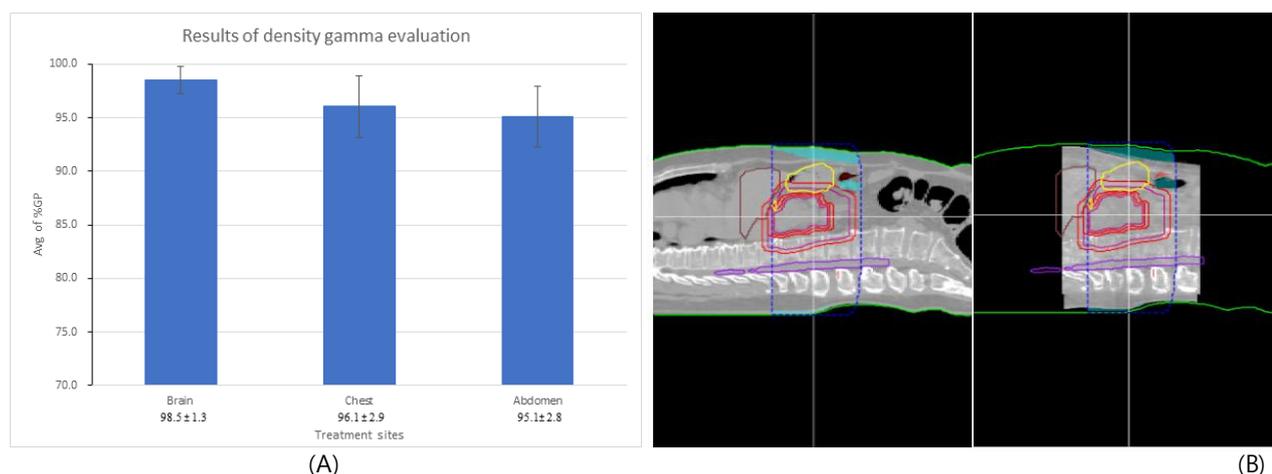


Figure 1. Results of density gamma evaluation are shown (A) and the difference by weight change is shown (B) Planning CT and (C) CBCT in sky blue color

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