

Do We Need A Different E2e Test For Multifraction SRS/SBRT?

Berat Aral ¹, Hasan Uysal ², Sait Sirin ³, Kaan Oysul ⁴

1. Medical Physics, Medicana International Ankara Hospital 2. Medicana International Ankara Hospital
3. CyberKnife Radiosurgery Center, Medicana International Ankara Hospital 4. Cyberknife Radiosurgery
and Advanced Radiotherapy Technologies Center, Medicana International Hospital, Ankara, TUR

✉ **Corresponding author:** Berat Aral, berataral@gmail.com**Categories:** Medical Physics**Keywords:** cyberknife, medical physics, end to end test**How to cite this abstract**

Aral B, Uysal H, Sirin S, et al. (June 16, 2016) Do We Need A Different E2e Test For Multifraction SRS/SBRT?. Cureus 8(6): a57

Abstract

Objectives: One of the most important characteristics of CyberKnife radiosurgery system is the total accuracy in millimetric level. Such accuracy is routinely controlled for each tracking system by end to end (E2E) test. All E2E tests are advised and performed in a single fraction. We thought whether these E2E tests are also proper for multifraction treatments. In the present study, the E2E tests were performed on 1, 3, and 5 fractions by keeping the total dose identical for 6Dskull, Fiducial and X-Sight Spine tracking systems. The aim of the present study was to observe the variance in the error values of E2E tests by keeping the phantom position and all other parameters constant for these tracking systems and to search the relation between the error values and the fraction number.

Methods: All parameters shown in the manual were used in the planning stage of E2E test. Only the fraction numbers were changed. The treatment plans were done for 1, 3 and 5 fractions by keeping total dose the same. The phantom was irradiated without any movement of the phantom for 3 and 5 fractions. We took an image for every 30 seconds for all algorithms during the procedure. Thereafter, all the E2E films used in the phantom treatments were scanned with the same parameters. Each treatment for 1, 3 and 5 fractions were repeated three times for each algorithm and obtained scanner results were averaged. Spearman correlation test was used for statistical analysis. To eradicate the effect of film on the results, we irradiated the films in a fixed set-up in 1, 3 and 5 fractions with the same total dose and analyzed with imageJ program. Graphical and numeric results showed same blackening in the films in different fractions.

Results: The results and statistical analysis showed a correlation between the fraction number for different tracking system and the error value. An increase in the error value was observed with increased fraction number ($p=0.010$). The correlation coefficient was 0.796 indicating a strong and positive relation on the same direction.

Conclusions: This study showed that there is an increase in error values with increasing fraction number in E2E tests performed in different fractions. A large-scaled dosimetric and mechanic study is warranted to confirm this consideration.

Open Access**Abstract****Published 06/16/2016****Copyright**

© Copyright 2016

Aral et al. This is an open access article distributed under the terms of the Creative Commons Attribution License CC-BY 3.0., which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Distributed under

Creative Commons CC-BY 3.0