

First Report On Frameless Mask Optimization Using the Elekta Leksell Gamma Knife Icon

Michael Schulder ¹, Kevin Kwan ², Troy Dawley ³, Orseola Arapi ⁴, Anuj Goenka ⁵

1. Neurosurgery, Hofstra Northwell School of Medicine, New York City, USA 2. Neurosurgery, Zucker School of Medicine at Hofstra / Northwell, Hempstead, USA 3. Neurosurgery, St. John Providence Hospital, Southfield, USA 4. Neurosurgery, Northwell, Manhasset, USA 5. Radiation Medicine, Northwell Health, New York, USA

✉ **Corresponding author:** Michael Schulder, mschulder@northwell.edu

Categories: Radiation Oncology, Neurosurgery, Medical Physics

Keywords: gamma knife, elekta, stereotactic radiosurgery, srs, sbrt, radiosurgery

How to cite this abstract

Schulder M, Kwan K, Dawley T, et al. (October 24, 2019) First Report On Frameless Mask Optimization Using the Elekta Leksell Gamma Knife Icon. Cureus 11(10): a430

Abstract

Objective(s): Frameless, mask-based stereotactic radiosurgery (SRS) systems have a different workflow from frame-based methods. This study is the first to analyze treatment time delays due to interruptions from patient movement using the Elekta Gamma Knife (GK) Icon when using a mask-based setup.

Methods: This is a retrospective analysis of twenty consecutive patients with brain tumors who received mask-based intracranial SRS using the GK between May through September of 2018.

Results: Twenty patients receiving 26 total treatments were included in the analysis. Patients were age 66 years \pm 8.8 with 45% (9/20) male. The average number of lesions treated per session were 2.14 \pm 1.65, with 1.35 \pm 0.75 fractions utilized per patient. Planned treatment times versus actual treatment times were 36 \pm 20 minutes and 43.8 \pm 24 minutes, respectively. Treatment delays averaged 6.64 \pm 9.9 minutes. Two patients in particular had substantial delays of 33.9 and 33.9 minutes. 70% (14/20 patients) completed treatment within five minutes of their intended plan. 50% (10/20) of patients required repeat cone beam computed tomography (CBCT) imaging. High-definition motion management system alarms were triggered 1.08 \pm 0.41 times per patient resulting in treatment disruptions.

Conclusion(s): This study is the first to reveal increased treatment time delays using the mask-based Elekta GK Icon, mainly due to patient motion during the procedure. Although the majority of patients did not encounter delayed treatment workflows, optimization with pre-medication and mask fit is necessary to ensure that patients can complete SRS successfully. Patients unable to remain immobile should be evaluated for potential frame-based treatment.

Open Access

Abstract

Published 10/24/2019

Copyright

© Copyright 2019

Schulder 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