

## **Evaluation of Outcomes in Gamma Knife Stereotactic Radiosurgery in Treatment of Trigeminal Neuralgia**

P. Shin,<sup>1,3</sup> R. Sorum,<sup>1,2</sup> A. Zemanek,<sup>2</sup> M. McDonough,<sup>1,2</sup> K. Bergman,<sup>1,2</sup> D. Mastras,<sup>1,2</sup> K. Sanders,<sup>1,2</sup> N. Bittner,<sup>1,2</sup> A. Pittier,<sup>1,2</sup> H. Wang.<sup>1,2</sup>

<sup>1</sup>South Sound Gamma Knife, Tacoma, WA, United State of America

<sup>2</sup>Tacoma/Valley Radiation Oncology Centers, Tacoma, WA, United States of America

<sup>3</sup>South Sound Neurosurgery, Tacoma, WA, United Sates of America

**Objective:** It is well documented that stereotactic radiosurgical lesioning of the trigeminal nerve entry is an effective treatment of trigeminal neuralgia [TN], and an appealing alternative to invasive treatments. This study details the outcomes of 79 cases.

**Methods:** This study consisted of a retrospective chart review of 79 cases in 73 patients treated with Gamma Knife stereotactic radiosurgery (GKSRS) at our facility. A single 4 mm shot of 75-85 Gy for primary treatment and 50-70 Gy for secondary treatment was delivered with the Leksell Gamma Knife 4C to the trigeminal nerve 4 to 7 mm from its origin from the brainstem while limiting the radiation dose to the brainstem to the 20% isodose line. Of those 79 cases, seven were secondary GKSRS treatments. Two patients had been lost to follow-up, leaving 71 patients available for analysis.

**Results:** Median follow-up was 30 months. Mean dose administered for primary treatment was 79.4 Gy (range, 75-85Gy); for secondary treatment it was 57.1 Gy (range, 50-70Gy). A total of 91.2% of patients undergoing their first GKSRS experienced pain relief following treatment at a median of 30 days post -treatment. Of this population, 32.3% of patients experienced a recurrence of symptoms, at an average of 11 months after treatment. No significant differences were found between outcomes of subgroups including patients with multiple sclerosis, atypical TN, or those who had undergone previous surgical treatment for TN. There was no difference in outcome between the doses administered (75, 80, and 85Gy). For those patients receiving their second GKSRS for TN, there was an initial success rate of 71.4% with 40% of that population eventually having recurring symptoms.

Overall, 32.3% of patients developed some level of facial numbness. Of patients greater than 3 years post-treatment, (n=21), 52.4% experienced numbness, indicating a possible trend that this side effect may increase over time.

**Conclusion:** This study contributes to the growing body of research advocating that Gamma Knife stereotactic radiosurgery is an effective treatment of TN. Patient outcomes in terms of success of treatment are comparable to other studies. No significant predictor of recurrence or failure was found.