

Evaluation of Outcomes in Gamma Knife Stereotactic Radiosurgery Treatment of Essential and Parkinsonian Tremor—A Private Institution Update

D. Dunham^{1,2}, R. Sorum^{1,2}, H. Wang^{1,2}, M. McDonough^{1,2}, A. Harris, K. Bergman^{1,2}, M. Reda^{1,2}, K. Nkiwane^{1,2}, A. Zemanek², D. Mastras², N. Bittner², A. Pittier², W. Gao²

¹South Sound Gamma Knife, Tacoma, WA, United States of America

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

Purpose: To update previously presented 2011 study examining inclusively the outcomes of 68 patients (69 cases) presenting with essential or Parkinsonian tremor. All patients were treated with Gamma Knife stereotactic radiosurgery (GKSRS) via ventralis intermedius (Vim) thalamotomy.

Methods: Between January 2005 and December 2016, a total of 69 cases of tremors were treated at our facility (South Sound Gamma Knife at St. Joseph's Hospital, Tacoma, WA). Sixty with benign essential tremor, seven with Parkinsonian tremor, and two with both types of tremors were included. Using magnetic resonance imaging, the contralateral Vim thalamic nucleus of the chosen treatment side was located and treated, receiving a single 4 mm shot of 130 Gy. These patients were followed by their Radiation Oncologist or Neurosurgeon. A retrospective review of medical records including physical exams, writing samples and Archimedes spiral testing, in combination with patient phone interviews, were conducted to obtain data on treatment outcomes.

Results: In total 68 patients with a median age of 77 years received GKSRS for essential tremor or Parkinson's tremor diagnosis. They had median pre-treatment tremor duration of 11.5 years (range, 1.5-70). With a median follow-up period of 16 months (range, 1-64), a total of 79.4% (54/68) responded to the treatment, as evidenced by lessening in their tremor severity. Of these patients, 35.2% had a complete response, with no residual tremor. The median time to response was 3 months (range, 0.1-18). 5.88% (4/68) of patients experienced symptomatic, MRI proven radiation induced perilesional edema requiring the need for steroid treatments and physical therapy.

Conclusion: When combined with prior research data, GKSRS Vim thalamotomy at our private institution has shown consistency in providing relief from tremor at rates similar to other studies on this topic. This continues to be a viable, safe and effective treatment option for this disabling condition.