

## **Evaluation of Outcomes in Gamma Knife Stereotactic Radiosurgery Treatment of Essential and Parkinsonian Tremor**

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**Objective:** The purpose of this study was to examine the outcomes of 39 patients (40 cases) with essential or Parkinsonian tremor who were treated with Gamma Knife stereotactic radiosurgery (GKSRS) via ventralis inter-medius (Vim) thalamotomy.

**Methods:** A total of 40 cases of tremor were treated at our facility (South Sound Gamma Knife, Tacoma, WA). Thirty-five with benign essential tremor, three with Parkinsonian tremor, and two with both types of tremor were included. Using magnetic resonance imaging, the contra lateral 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, was conducted to obtain data on treatment outcomes.

**Results:** In total, 39 patients with a median age of 77.5 years, received GKSRS for tremor. They had a median pre-treatment tremor duration of 13 years (range, 1.5-70). With a median follow-up period of 15.5 months (range, 3-64), a total of 33 patients (82.5%) responded to the treatment, as evidenced by lessening in their tremor severity. Of these patients, 24% had a complete response, with no residual tremor. The median time to response was 3.5 months (range, 0.1-12). One patient developed unilateral weakness in his lower extremity with evidence of significantly more thalamic edema on MRI than what is considered normal. He had corticosteroids prescribed and physical therapy that resolved this weakness over a short period of time.

**Conclusion:** GKSRS Vim thalamotomy at our institution was shown to provide relief from tremor at rates similar to other studies on this topic. This is a viable, safe and effect treatment option that is an alternative to deep brain stimulation in patients refractory to medication.