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Assessment of Medically Refractory Ophthalmic Nerve (V1) Trigeminal Neuralgia Treated with Gamma Knife Radiosurgery

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Abstract

Objectives:

Medically refractory trigeminal neuralgia is a debilitating disorder necessitating neurosurgical intervention. The vast majority of trigeminal neuralgia presents as intractable pain involving the maxillary (V2) and mandibular (V3) divisions of the trigeminal nerve with ophthalmic division (V1) manifestation being relatively rare; the ophthalmic division has important distinct clinical importance as it contains the nasociliary nerve mediating the corneal blink reflex.1 We present one of the largest experiences examining ophthalmic division trigeminal neuralgia treated with stereotactic radiosurgery.

Methods:

A retrospective review of patients receiving Gamma Knife radiosurgery for medically refractory trigeminal neuralgia from 2015-2024 at a single center (University of Oklahoma) was conducted; patients with V1 trigeminal neuralgia were assessed for efficacy of treatment according to the Barrow Neurologic Institute Pain Intensity Score.2

Results:

A total of 13 patients (8 women, 5 men) with adequate follow-up were evaluated. Mean patient age was 62 years (median=59 years; range 33-94). Of these patients, 62% (8/13) had right-sided pain, 31% (4/13) had left-sided pain, and 15% (2/13) had bilateral pain. Fifteen percent (2/13) of patients experienced pain in only the V1 distribution, 38% (5/13) had pain in both the V1 and V2 distribution, and 46% (6/13) had pain in the distribution of V1, V2, and V3. Prior to undergoing Gamma Knife, 5 patients (38%) had undergone a previous surgical procedure for trigeminal neuralgia. Mean follow-up was 29 months (median follow-up = 27 months); the majority of patients were treated to a maximum dose of 85 Gy to the offending trigeminal nerve. At last follow-up, 8 patients (62%) were Barrow Class III (Some pain, adequately controlled with medications), 4 (31%) were Barrow Class IV (Some pain not adequately controlled with medications), and 1 (8%) was Barrow Class V (Severe pain, no relief). For the two patients who had only V1 involvement, the Barrow scores were Class IV and Class V. No patient exhibited documented impairment in corneal blink reflex following stereotactic radiosurgery.

Conclusion(s):

In one of the largest evaluations of ophthalmic nerve (V1) trigeminal neuralgia, Gamma Knife stereotactic radiosurgery provided pain relief in a majority of patients, yet was unable to reduce medication requirements. More importantly, no patient exhibited neurologic complications as a result of stereotactic radiosurgery. These findings may indicate that the radiosurgery dose given is safe but may not be sufficient to achieve pain freedom while reducing medication requirements. These results are worthy of further investigation.