

XXXIII CONGRESSO NAZIONALE AIRO

AIRO2023

BOLOGNA,
27-29 OTTOBRE 2023

PALAZZO DEI CONGRESSI

Radioterapia Oncologica: l'evoluzione al servizio dei pazienti



Associazione Italiana
Radioterapia e Oncologia clinica

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STEREOTACTIC RADIOSURGERY FOR THE TREATMENT OF TRIGEMINAL NEURALGIA: QUALITY OF LIFE ANALYSIS

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There is no financial interest to report.

BACKGROUND

Trigeminal neuralgia (TN) is a highly debilitating craniofacial pain syndrome that affects the trigeminal nerve and corresponding branches (V1, V2, V3). Epidemiological studies show increased anxiety and depression, with an increased risk of suicide.

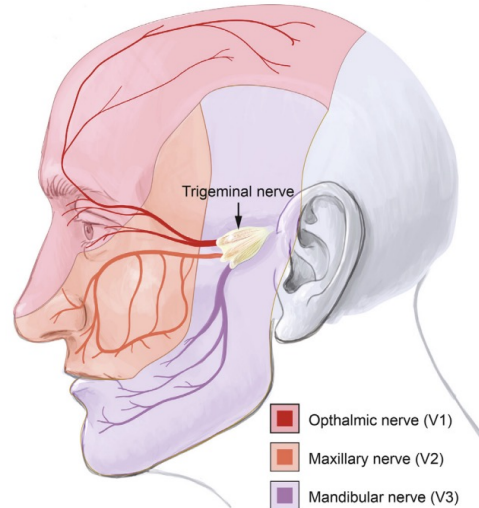


FIGURE 1. The Trigeminal nerve and its 3 branches.

Fermeini. *Trigeminal Neuralgia. J Oral Maxillofac Surg* 2021.

The International Classification of Headache Disorders third edition (ICHD-3) criteria for TN require recurrent paroxysms of unilateral facial pain restricted to the trigeminal distribution, lasting from a fraction of a second to 2 min, severe in intensity with an electric shock-like shooting, stabbing or sharp quality, and precipitated by innocuous stimuli (see [box 1](#)).⁹

BMJ

Lambru G, et al. *Pract Neurol* 2021;21:392–402. doi:10.1136/practneurol-2020-002782

BACKGROUND

The mainstay of management is pharmacological preventive treatments. In case of debilitating pain, refractory to pharmacological treatments, different types of surgical interventions are available:

1. Invasive, non-ablative: microvascular decompression;
2. Invasive, ablative: balloon compression, radiofrequency thermocoagulation, glycerol rhizolysis, internal neurolysis;
3. Non-invasive ablative: stereotactic radiosurgery (SRS).

Table 6 Surgical intervention for trigeminal neuralgia³⁴

Intervention	Microvascular decompression	Stereotactic radiosurgery	Radiofrequency thermocoagulation	Balloon compression	Glycerol rhizolysis	Internal neurolysis
Efficacy data						
Number of studies	21	8	7	5	3	1
Total number of patients	5149	1168	4533	755	289	26
Mean/median follow-up	3–10.9 years	3.1–5.6 years	3–9.3 years	4.2–10.7 years	4.5–8 years	3.6 years
Pain free at follow-up (5)	62%–89%	30%–66%	26%–82%	55%–80%	19%–58%	72%
Complications (%)						
Facial sensory changes	3	16	19	15	40	96
Corneal hypoaesthesia	0.3	0	6.6	0.7	6.6	0
Hearing loss	1.8	0	0.1	0	0.3	0
Motor weakness	0	0	6.2	4.5	1.7	0
Cranial nerve palsy	4.1	0.2	0.8	1.6	0	0
Meningitis	0.4	0	0.02	5.7	0	0
CSF leak	2	0	0.1	0	0	3.8
Anaesthesia dolorosa	0.02	0	0.6	0.1	0.7	3.9
Mortality	0.3	0	0	0	0	0

CSF, cerebrospinal fluid.

Lambru G, et al. *Pract Neurol* 2021;**21**:392–402. doi:10.1136/practneurol-2020-002782

Among non-invasive treatment options, SRS has proven to be a valuable method with satisfying rates of pain relief.

Quality-of-life outcomes after Gamma Knife surgery for trigeminal neuralgia

Clinical article

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CHUAN-FU HUANG, M.D., PH.D.,³ MEEI-LING SHEU, PH.D.,⁴ DAR-YU YANG, M.D., PH.D.,⁵
AND WEN-TA CHIU, M.D., PH.D.⁶

Conclusions. Gamma Knife surgery produced significant pain relief in severely ill patients who had TN without causing appreciable morbidity. The effect of reduced pain significantly paralleled an improvement in SF-36 quality-of-life indices. (DOI: 10.3171/2010.8.GKS10879)

Frameless stereotactic radiosurgery for the treatment of multiple sclerosis-related trigeminal neuralgia

Alfredo Conti, MD, PhD, Antonio Pontoriero, MD, Giuseppe Iati, MD, Felice Esposito, MD, PhD, Enrico Nastro Siniscalchi, MD, DO, Salvatore Crimi, MD, Sergio Vinci, MD, Anna Brogna, PhD, Francesco De Ponte, MD, Antonino Germanò, MD, Stefano Pergolizzi, MD, Francesco Tomasello, MD

Factors affecting outcome in frameless non-isocentric stereotactic radiosurgery for trigeminal neuralgia: a multicentric cohort study

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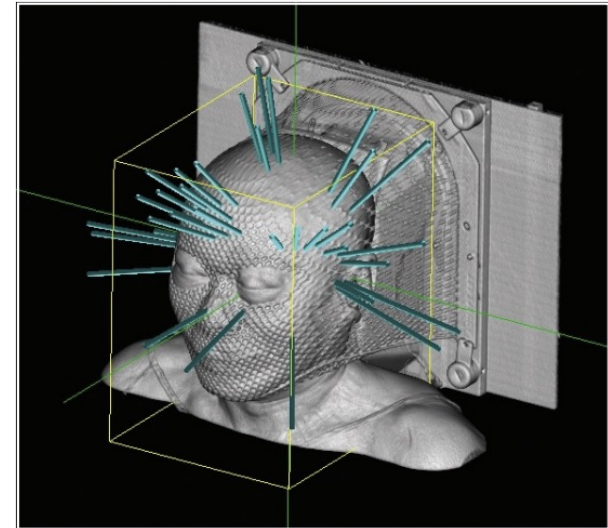
AIMS

In the aim to investigate efficacy of SRS, we performed a retrospective study on 103 patients treated at our institution from 2009 to 2022 with CyberKnife® Robotic Arm Stereotactic Radiosurgery.

- Primary endpoints: facial pain relief, pain recurrence and occurrence of sensory disturbance.
- Secondary endpoint: patients' reported quality of life.

Patients characteristics	Value
Age	64.5 years
Sex	M 43.6%, F 56.3%
Side	Dx 47.6%, Sin 52.4%
Multiple Sclerosis	9.7%

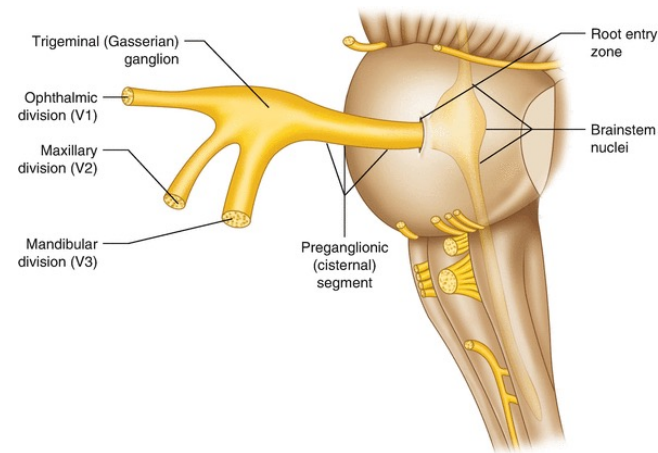
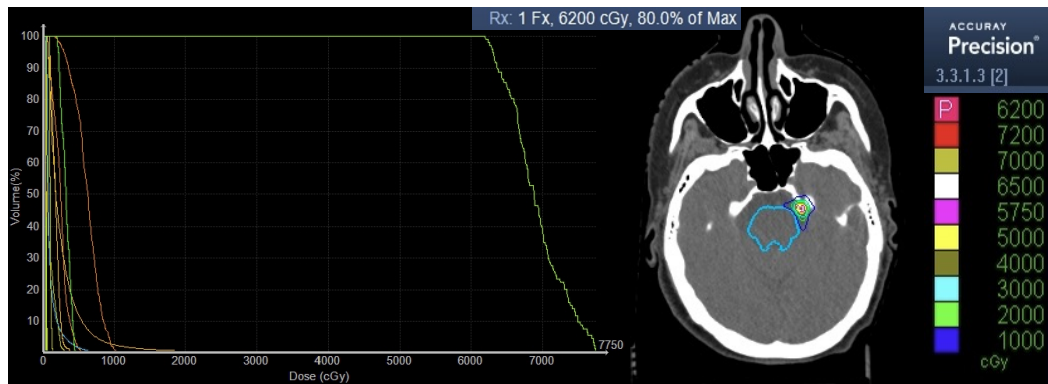
THE CYBERKNIFE® SYSTEM OFFERS ALTERNATIVE TREATMENT FOR TRIGEMINAL NEURALGIA



*Non coplanar beam arrangement
along the trigeminal path.*

METHODS

The delineation of trigeminal nerve and organs at risk was obtained by co-registered Computed Tomography and Magnetic Resonance Imaging. The target segment of the trigeminal nerve was delineated starting from 2-3 mm away from the root entry zone with a length of about 6 mm, while keeping a certain distance to the brainstem and temporal lobe. The average prescription dose was 58,82 Gy to the isodose of 80%. All patients were treated using CyberKnife® Robotic Arm Stereotactic Radiosurgery, an image-guided robotic system using non-isocentric irradiation delivery with 6D skull tracking.

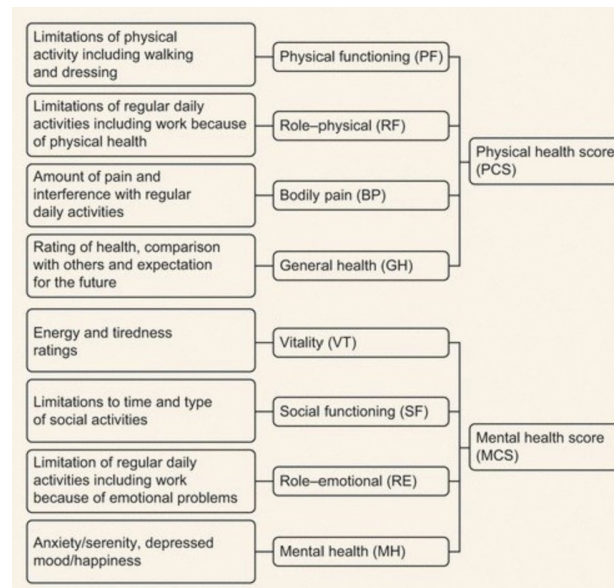


METHODS

After the end of the treatment, follow-up information was obtained by outpatient clinical evaluation or telephone interviews, 3-6 months after SRS and then once per year. Pain control and sensory disturbance were estimated using Barrow Neurological Institute Scale (BNI). Median follow-up is 93.2 months.

Score	Criteria
I	no facial numbness
II	mild facial numbness that is not bothersome
III	somewhat bothersome facial numbness
IV	very bothersome facial numbness

Score	Pain description
Class I	No pain, no medication required
Class II	Occasional pain, no medication required
Class III	Some pain, adequately controlled with medication
Class IV	Some pain, not adequately controlled with medication
Class V	Severe pain or no pain relief with medication



RESULTS

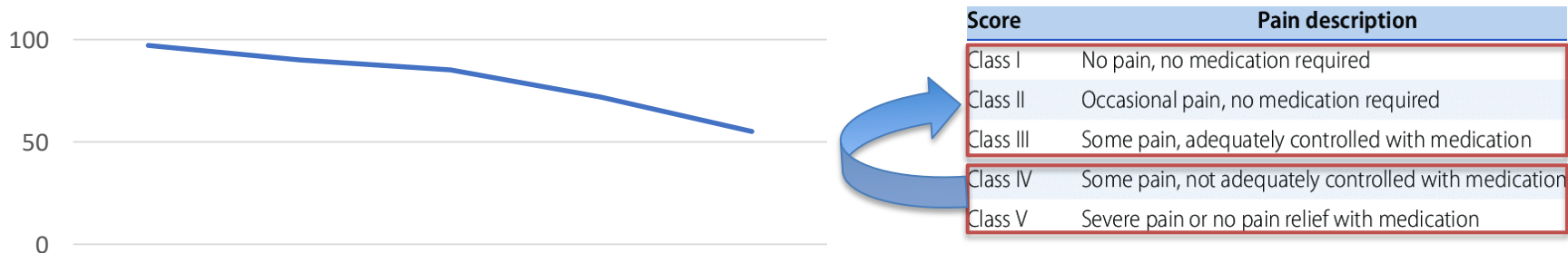
Primary endpoints

In terms of pain relief, the best result was obtained after 6 months (97 patients, 94.1%) with a slow decrease after 12 and 24 months (90 and 85 patients, 87.3% and 82.5% respectively).

After 24 months, only a small percentage reported adverse events (21%): facial numbness or other mild sensory disturbances, such as pins and needles, tingling, or pain. No further complications, such as temporal lobe radionecrosis, weakness of the mandible, diplopia or hearing loss, were reported.

Secondary endpoints

The majority of patients reported a significant increase of QoL (90%), along with a decrease of depression rates.



CONCLUSIONS

Based on our study's results, it can be concluded that CK SRS is a safe and effective minimally invasive therapeutic option to interrupt the trigeminal nociceptive pathways and improve pain relief and QoL in patients with TN.

Grazie!