

# Trigeminal Neuralgia functional radiosurgery. Patients review

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## Introduction

Trigeminal neuralgia (TN) is a severe paroxysmal and devastating facial pain disease that can affect one or all three branches of the trigeminal nerve. TN is likely a heterogenous group of disorders that jointly manifests in facial pain, The first-line treatment for TN remains anticonvulsant medical therapy. Patients who fail this have a range of surgical options available LINAC-based Radiosurgery (SRS) is a therapeutic option for these patients and is not inferior to GK. (Risheng Xu - Johns Hopkins University).

## Materials and Methods

From 2013 to 2021, 15 patients with TN were treated. Etiology: 12 idiopathic NT, 1 post-herpetic NT, 1 NT secondary. Six patients (40%) underwent some previous surgical treatment. The mean age was 72 years, mean follow-up of 30 month [1,85] and the mean time from disease evolution to SRS was 9.8 years. Pain was assessed according to the scale used at the Barrow Neurological Institute (BNI) Figure 1, prior to SRS, defining early response before 3 months and late response after 3 months SRS. Before treatment, 10 patients (66%) presented a BNI V pain scale and 5 patients (34%) BNI IV. SRS was performed in a single fraction of 90Gy at Dmax. The retrogasserian portion of the nerve (where the isocenter was defined, Figure 2 ), and the OARS were contoured in anatomical mapping and basal ganglia (Brainlab), using imaging acquired from MRI 3 Tesla HR ( 0,5 mm slice thickness) in T1 gadolinium, T2 FIESTA and flair. Patients were immobilized using Frameless cranial stereotactic mask (Brainlab) and CT images 0.6mm slice thickness (Siemens dedicated). Treatment plan were done on iPlan v4.5 or Elements Cone (4mm) (Brainlab) , with 12 non-coplanar arcs of 110° with a couch separation between 10° and 20° and the beam energy used was 6MV SRS (Novalis Tx – 1000MU/min) or 6MV FFFF (TrueBeam STx – 1400MU/min). Some plans required modification of the start/top gantry angle to avoid table couch collision. The dose to the brainstem was less than 30Gy. Patient specific plan QA included independent MU calculation and in room free collision verification. Patients were positioned on treatment machine and image guided by ExacTrac (Brainlab) for each couch angle. A CBCT was done to check the patient treatment side. Patient position tolerances were 0.5mm and 0.5 degree.

BNI pain intensity score	Definition
I	No trigeminal pain, no medication required
II	Occasional pain not requiring medication
III	Some pain adequately controlled with medication
IV	Some pain not adequately controlled with medication
V	Severe pain, no pain relief

BNI : barrow neurological institute

Figure 1

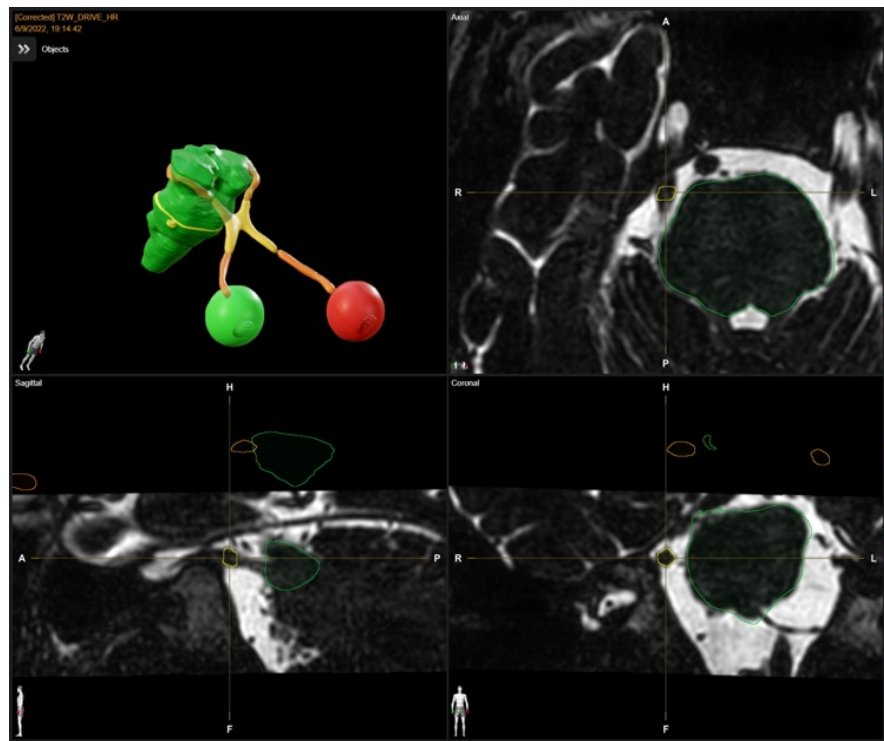


Figure 2

## Results

Treatment plan results withing the expected goals, Figure 3. SRS were well tolerated for all patients. Evaluated after treatment and before 3 months, they resulted in BNI I in 5 patients (33.4%), BNI II in 4 patients (26.7%), BNI III 4 patients (26.7%), BNI IV in 1 patient (6.6%) and BNI V in 1 patient (6.6%). In long-term follow-up, the final BNI was BNI I in 7 patients (50%), BNI II in 1 patient (7.2%), BNI III 5 patients (35.6%), BNI IV no patients, and BNI V in 1 patient (7.2%). Two patients presented ipsilateral facial hypoesthesia as early toxicity and 5 patients (35.7%) suffered from hypoesthesia and one patient (7.1%) ipsilateral corneal ulcer as late toxicity. One patient had a recurrence after 5 years of being pain free, Figure 4

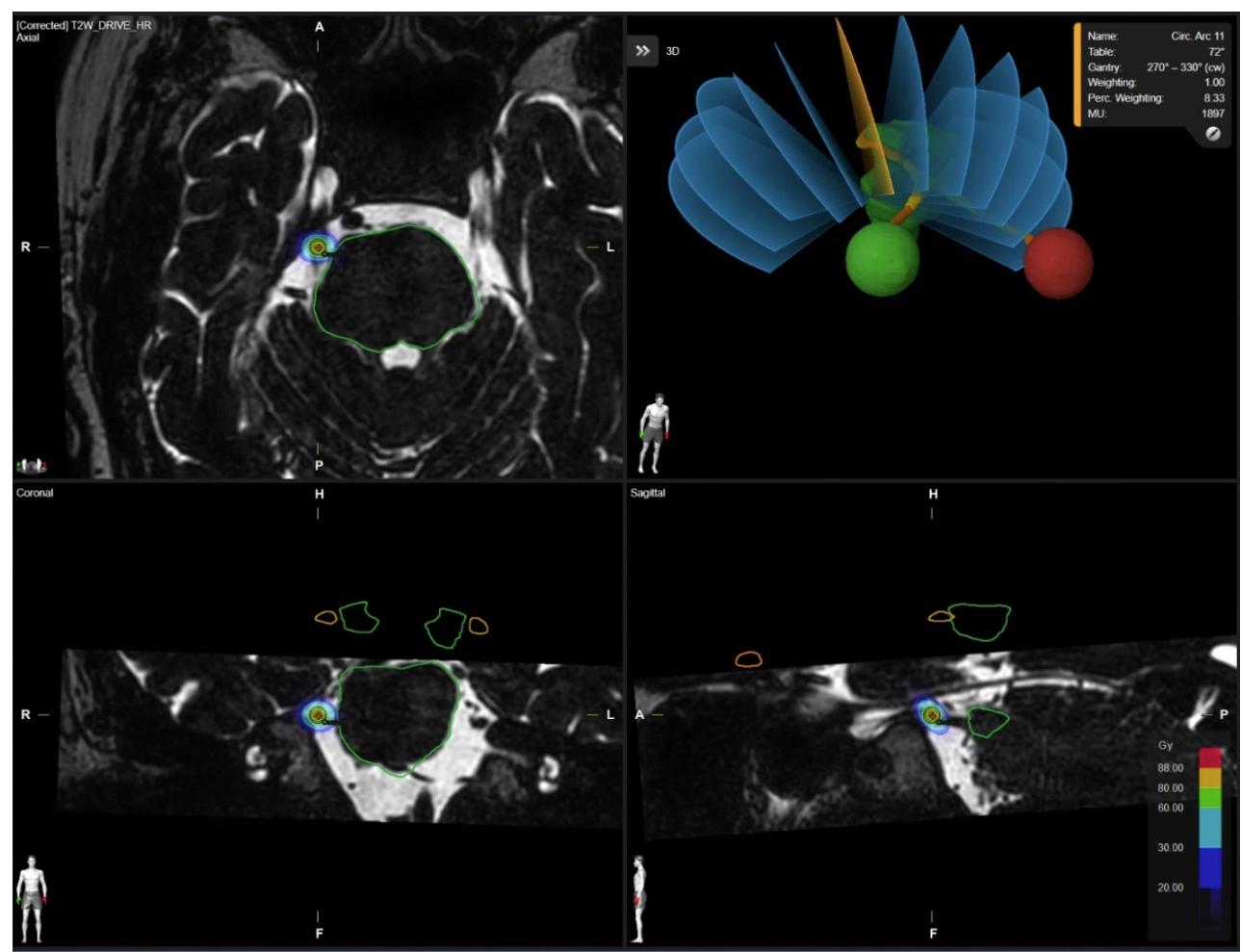


Figure 3

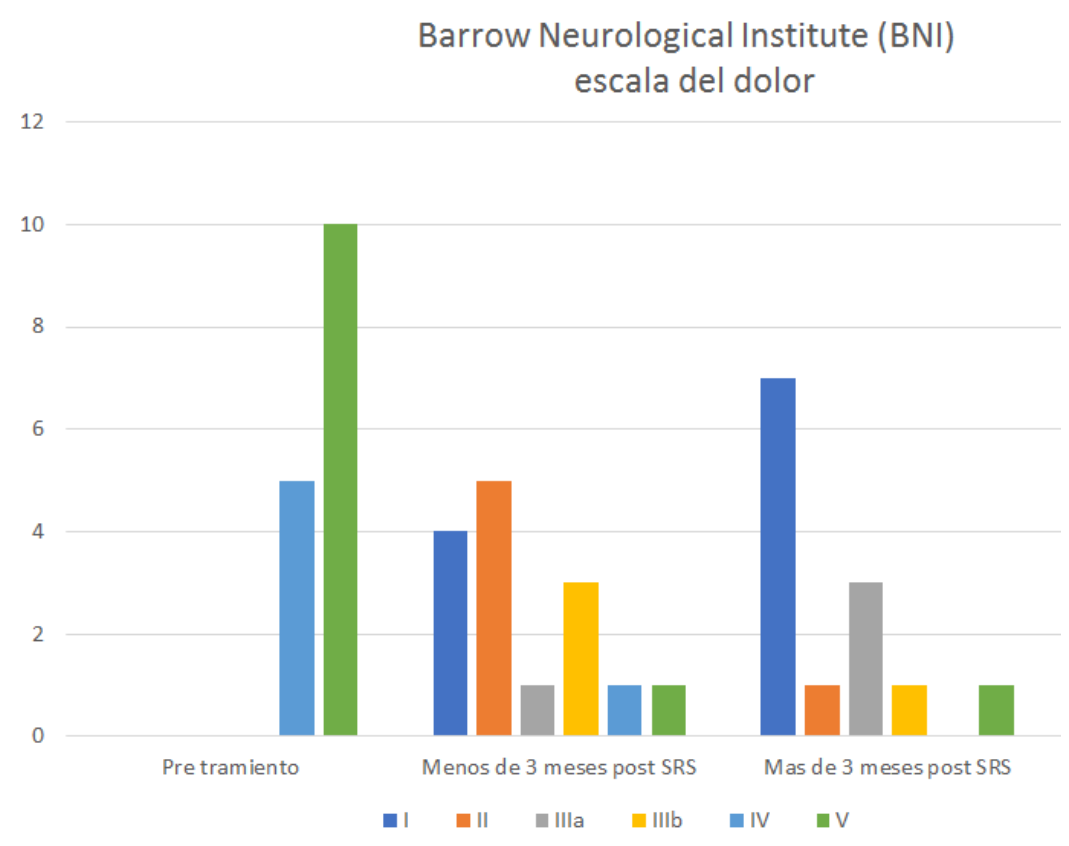


Figure 4

## Conclusion

LINAC-based SRS in treatment-refractory TN is an effective and safe treatment option with high rates of pain response and improved quality of life.