

## Case Report

# Bilateral Trigeminal Neuralgia Refractory to Medical Therapy: Importance of A Multi-Therapeutic Approach

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## Abstract

Bilateral trigeminal neuralgia refractory to medical therapy is a rare occurrence and it is mandatory to choose therapeutic procedures minimizing possible bilateral sensitive deficit due to the employment of bilateral minimally invasive ablative techniques. A patient affected by bilateral trigeminal neuralgia refractory to medical therapy secondary to multiple sclerosis is presented. Multiple therapeutic tools were employed in this challenging pathology. The second and third left trigeminal divisions were involved by the neuralgia, while the third division was involved in the right facial side. Controlled radiofrequency thermocoagulation was employed for the isolated right third division, then radiosurgery was conducted for the left hemifacial side. After one month, because of the persistence of pain attacks of the left second trigeminal division, peripheral authorizations were performed.

Control of pain, with the withdrawal of medical therapy (BNI scale class I), was achieved in this patient with a multi-therapeutic approach. Radiofrequency thermorizotomy was performed for the right third division because neuralgia was very acute, and immediate pain relief was achieved. Pain in the left third trigeminal division regressed after radiosurgery, while pain in the left second division continued after radiosurgery, then peripheral alcoholization was performed with pain control.

Bilateral trigeminal neuralgia refractory to medical therapy should be treated by the dedicated neurosurgeon, avoiding bilateral ablative techniques for the same division and using neurosurgical techniques according to the trigeminal division interested by the neuralgia and according to the intensity of pain.

## Introduction

Bilateral trigeminal neuralgia is a rare occurrence [1] and, when it is refractory to medical therapy, its treatment represents a therapeutic challenge because of the necessity to avoid or limit, as well as possible, the employment of invasive techniques causing bilateral sensitivity and motor deficits or bilateral major surgical interventions. Then, this pathology should be treated by dedicated neurosurgeons experienced with all the therapeutic options for trigeminal neuralgia refractory to medical therapy, from percutaneous procedures [2-4] to microvascular decompression [5,6], to radiosurgery [7-11]. In this way the neurosurgeon can indicate the best therapeutic choice for each patient according to patient (age, general conditions, multiple sclerosis) and neuralgia

characteristics (intensity of dolorific attacks, interested trigeminal division, side with prevalent pain). We present the results achieved in one patient affected by bilateral trigeminal neuralgia refractory to medical therapy.

## Case presentation

The patient was 62 years old woman affected by multiple sclerosis, treated for several years with carbamazepine for bilateral trigeminal neuralgia (right third division, left second and third divisions). For six months, pain attacks were refractory to medical therapy.

Because the most severe pain was localized to the right third trigeminal division, radiofrequency thermorizotomy was performed as the first therapeutic approach, achieving

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immediate pain relief thanks to selective anesthesia localized only to the third division hemifacial district. Pain to the left third and second trigeminal divisions was more tolerable, so stereotactic radiosurgery was performed because this procedure takes about 4-6 weeks to achieve therapeutic effect. One month after radiosurgery, pain in the left third division was regressed, but it was acute in the left second trigeminal division: peripheral alcoholization was performed with immediate pain relief.

Pain outcome was assessed by the BNI Pain Intensity scale [12], and the patient was registered as BNI class I. After 2,4 years of follow-up pain relief was stable.

Stereotactic radiosurgery was performed by a dedicated linear accelerator, delivering 40 Gy on the retrogasserian cisternal portion of the trigeminal nerve, as previously described [7] (Figure 1). The target of 10 mm of diameter was contoured on 1 mm thickness T2 weighted 1,5 tesla MR images fused with 1 mm thickness CT images, as previously described. No side effects, such as sensitive deficit or facial numbness, were registered.

Percutaneous controlled radiofrequency thermocoagulation was performed, as previously described [3], only for the isolated third trigeminal division, by the introduction of the electrode needle into the foramen ovale (Figure 2), performing thermocoagulation for about 8 minutes, at 80 °C

- 90 °C, of foraminal, gasserian and retrogasserian rootlets of the isolated third trigeminal division. Selective anesthesia to the only third-division facial district was achieved with immediate pain relief.

Peripheral alcohol injection was performed for II trigeminal division, injecting 2 cc of absolute alcohol into the infraorbital foramen, achieving selective anesthesia to the only second trigeminal division facial district.

## Discussion

Bilateral TN represents a therapeutic challenge and dilemma, according to other Authors [13]; we retain that this rare pathology should be treated only by neurosurgeons experienced with all therapeutic methods so that patients can be submitted to the most appropriate therapy according to neuralgia characteristics.

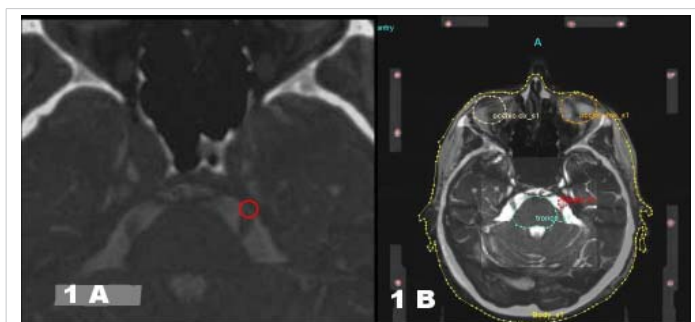
The presented patient represents a real trial about the advantages and disadvantages of some of these therapeutic tools because she was affected by bilateral TN involving multiple trigeminal divisions.

The very good result achieved needs a longer follow-up, but we can say that the approach to bilateral trigeminal neuralgia should be different from the approach to unilateral idiopathic trigeminal neuralgia, and the different therapeutic tools play a different role in the first or the second pathology.

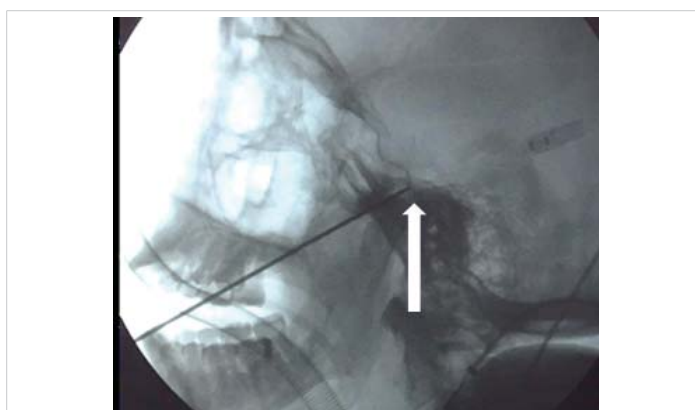
Regarding the therapeutic options used by us in our patient, we consider radiosurgery a valid therapeutic tool in patients affected by bilateral neuralgia, because it can be performed for both sides. After all, the sensitive deficit is very rare in our experience and it is a noninvasive therapy.

Thermocoagulation is indicated by us only for acute isolated III division TN and only for one side in case of bilateral neuralgia, because it is possible, in our experience [3], to provoke selective anesthesia limited to the only III division facial district that it is very well tolerated by all the patients, with immediate remission of the dolorific attacks. Peripheral authorization is a very helpful solution, even if temporary with an average period of 2,8 years of pain relief, but it is repeatable.

Other valid therapeutic options as microvascular decompression and gasserian ganglion compression with the balloon, were not employed in our patient. Microvascular decompression is indicated in healthy patients and we have to consider that our patients presented important comorbidities (advanced age, multiple sclerosis, and genetic syndrome with multiple pharmacological intolerances respectively) which didn't suggest this therapeutic option, at least as initial therapy. In particular, one of our patients was affected by multiple sclerosis and we retain, according to other Authors, that an eventual vascular conflict in this condition doesn't play a significant role in the genesis of the pathology, but it



**Figure 1:** Cisternal portion of trigeminal nerve. A) Target contoured at 1,5 tesla axial MRI. B) Target identified at CT - MRI imaging fusion (1 mm thickness).



**Figure 2:** Position of the electrode in the foramen ovale during percutaneous thermocoagulation. Procedure performed under fluoroscopic control (lateral cranial radiographic image): the white arrow indicates the retrosellar position of the electrode, used to achieve selective anesthesia localized to the only III trigeminal division



could be only a concurrent mechanism, because the most likely cause of MS-related TN could be a pontine plaque damaging the primary afferents [14]; moreover, other Authors reported that, because of the high recurrence rate of MVD in TN associated with multiple sclerosis, together with the morbidity associated with the procedure, MVD should not be offered to patients with Trigeminal neuralgia and multiple sclerosis [15], at least as first treatment in our opinion.

Finally, percutaneous balloon compression of the gasserian ganglion is a nonselective procedure because the inflated balloon compresses the entire ganglion (namely all the three trigeminal divisions are involved), provoking hypoesthesia or anesthesia to the entire hemifacial territory; in our opinion, this method should be reserved only to old patients affected by multiple divisions TN in whom all the other therapeutic possibilities have failed.

## Conclusion

Bilateral trigeminal neuralgia is a rare affection which requires personalized therapy according to neuralgia and patients' characteristics. In our patient, very good clinical result was achieved using the combination of radiosurgery, peripheral alcohol injection, and radiofrequency thermocoagulation, avoiding invasive therapy and avoiding bilateral ablative therapy for the same trigeminal division.

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