

## Percutaneous Thermocoagulation for Sphenopalatine Ganglion Neuralgia

G. Salar, C. Ori, I. Iob<sup>1</sup>, and D. Fiore<sup>2</sup>

Institute of Neurosurgery, <sup>1</sup>Institute of Anesthesiology and Intensive Care, <sup>2</sup>Institute of Neuroradiology, University of Padova, Italy

### Summary

The authors describe percutaneous radiofrequency (rf) thermocoagulation of the sphenopalatine ganglion used to treat seven patients with sphenopalatine ganglion neuralgia.

The procedure was effective in relieving pain, without significant side-effects. All the patients have actually been free of pain during a follow-up of 6–28 months. The surgical technique and the rationale for its use are pointed out.

*Keywords:* Sphenopalatine ganglion; sphenopalatine ganglion neuralgia; pain treatment; radiofrequency thermocoagulation.

### Introduction

Up till now there is no commonly accepted and in all cases effective concept for the treatment of sphenopalatine neuralgia, also called Sluder neuralgia because Sluder was the first to describe this clinical entity at the beginning of this century<sup>18–19</sup>.

The purpose of this communication is to report our results of radiofrequency (rf) sphenopalatine ganglion thermocoagulation for treatment of this particular facial neuralgia as an alternative noninvasive treatment possibilities having failed or lost their effectiveness.

### Anatomy

The sphenopalatine ganglion lies in the pterygopalatine fossa; this is a small pyramidal space, upside down, 2 cm high and 1 cm wide, situated behind the posterior wall of the maxillary air sinus, anterior to the medial plate of the pterygoid process, and lateral to the perpendicular plate of the palatine bone; superiorly, the pterygopalatine fossa is limited by the sphenoid and laterally it communicates with the infratemporal fossa.

The posterior wall of the fossa has two important openings: superolaterally the foramen rotundum,

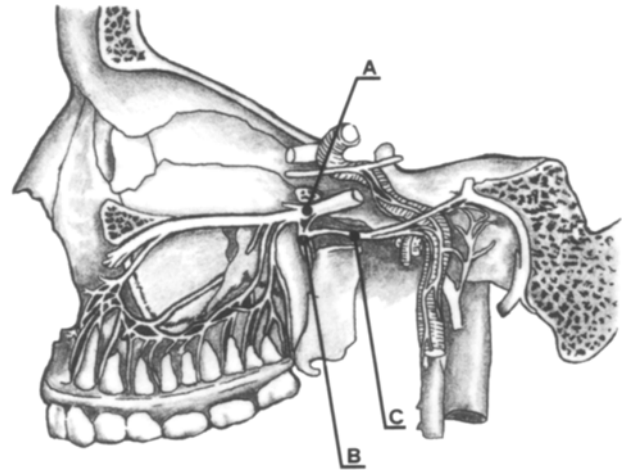
which transmits the second branch of the trigeminal nerve, and infero-medially the Vidian (pterygoid) canal, correlated to the maxillary nerve. (Deep and greater petrosal nerves.) Therefore, the pterygopalatine fossa contains vascular structures (the internal maxillary artery and its branches) and nerves (the maxillary nerve of the trigeminal second branch, the sphenopalatine ganglion with its afferent and efferent branches) Fig. 1.

Sympathetic and parasympathetic fibres join the sphenopalatine ganglion; the parasympathetic fibres originating from it are distributed to the nasal mucosa and the lacrimal glands (as the secretomotor supply).

### Clinical Picture of Sphenopalatine Ganglion Neuralgia

In 1908 Sluder<sup>18</sup> for the first time described the sphenopalatine ganglion neuralgia and outlined the characteristic clinical picture. It is an extremely rare condition, more common in males<sup>10</sup> and in middle age<sup>12</sup>. The pain is strictly unilateral and involves the region of the orbit, especially the inner canthus of the eye and the root of the nose, with extension to the maxillary sinus and the mastoid. The onset and the course of sphenopalatine neuralgia is characteristic: the attacks consist of continuous and aching, sometimes mild pain beginning with little or no warning, with paroxysms of throbbing pain starting at irregular intervals and reaching the maximum intensity within one to ten minutes. The paroxysms may persist for some hours, and are described as throbbing, sharp or knife-like painful sensations<sup>12</sup>, different from those of trigeminal neuralgia. On the involved side, clinical signs of parasympathetic discharges affect the lacrimal gland,

Fig. 1. Anatomical picture of pterygopalatine fossa and its nervous structures. *A* second branch of trigeminal nerve, *B* sphenopalatine ganglion, *C* vidian nerve



the nose and the face: miosis and ptosis, lacrimation, conjunctival injection, rhinorrhea, nasal congestion with obstruction to nasal breathing and a flushed face are observed. The attacks last from minutes to several days and usually stop abruptly<sup>20</sup>; the intervals between attacks, completely free from pain, vary from days to months<sup>12</sup>.

Wide disagreement exists as to the pathogenesis of this syndrome<sup>1</sup>; it seems reasonable, to include this neuralgia in the more comprehensive chapter of lower-half headaches<sup>14</sup> due to parasympathetic dysfunction, originating from the ganglion<sup>7</sup> or from a more central position<sup>24</sup>.

### Clinical Material

Our material consists of four males and three females, mean age 34 years, who presented the typical clinical picture of sphenopalatine neuralgia, involving only one side of the face.

Mean duration of symptoms was 7,5 years. All patients had been treated medically by analgesics, caffeine, ergotamine derivatives, carbamazepine, steroids, methysergide or lithium with only temporary improvement.

In addition also infiltrations of the sphenopalatine ganglion with local anaesthetics, alcohol or cocaine had been done with only temporary relief of pain. Follow-up period after thermocoagulation treatment was 6 to 34 months.

### Methods

The thermolesion of the sphenopalatine ganglion was performed by means of the same instrumentation used for trigeminal and glossopharyngeal nerve thermolesions, that is a rf generator connected to a needle-electrode (Radionics Inc. Burlington, Massachusetts) with an active surface of 5 mm<sup>2</sup>. The patient is seated on a pneumoencephalography chair, with the head in moderate extension to take anteroposterior, sagittal and laterolateral roentgenograms.

The whole intervention is carried out with monitoring of cardiac frequency and blood pressure under the careful surveillance of the anaesthetist. Slight sedation is used since the cooperation of the patient is essential in the phase preceding the thermal lesion, when the correct position of the needle must be confirmed.

The pterygopalatine fossa is reached through the lateral extra-oral route. Previously described by Levy and Boudoin<sup>11</sup> and reported by Bonica<sup>3</sup> for the anaesthetic block of the maxillary nerve at the level of the foramen rotundum. After local anaesthesia, the needle-electrode is inserted perpendicularly to the skin, beneath the mid-point of the zygoma, to reach the lateral plate of the pterygoid process; at this stage the needle is partially withdrawn for some millimeters and reinserted under fluoroscopic monitoring, slightly forward and higher for 1 cm more, so that the pterygopalatine fossa is reached. The proper placement of the needle is confirmed by a radiographic control: in the laterolateral view the tip of the electrode is placed before and under the anterior wall of the sphenoid sinus (Fig. 2) and, at an anteroposterior view, immediately under the foramen rotundum, where the sphenopalatine ganglion is located (Fig. 3).

Afterwards, a stimulation by low-voltage (0.2–0.3 V) is applied; if the placement of the needle is optimal, it should give rise to paresthesias in the area of distribution of the maxillary nerve.

Once the correct position of the needle has been determined by radiographic control and electrical stimulation, two rf lesions (at 60 and 65 °C respectively for 60 seconds) are performed.

The patients leaves the hospital two or three days after treatment, which is also the usual period of hospitalisation following the more common thermocoagulation of the Gasserian ganglion.

### Results

It was possible to treat all the patients in a tolerable degree of comfort. No alteration in blood pressure and electrocardiogram recordings was elicited during the surgical procedure.

After the thermolesion, the neurological examination showed a moderate involvement of the second branch of the trigeminal nerve, *i.e.* a slight hypoalgesia at the level of the nose and of the upper cheek.

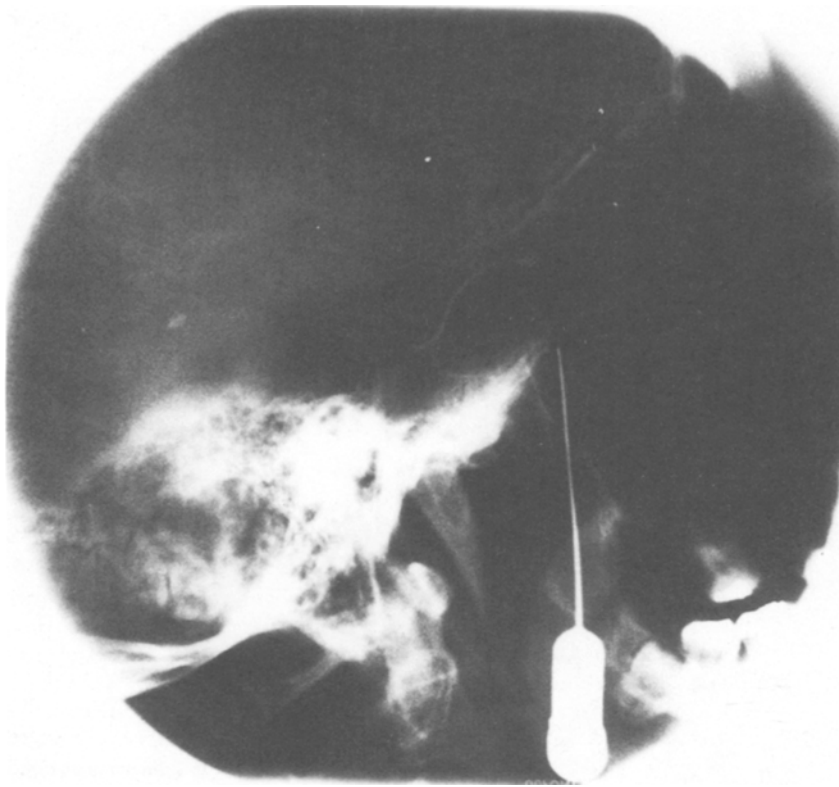


Fig. 2. Roentgenogram of the skull, latero-lateral projection. The proper placement of the needle is confirmed by the position of the tip lying before and under the anterior wall of the sphenoidal sinus

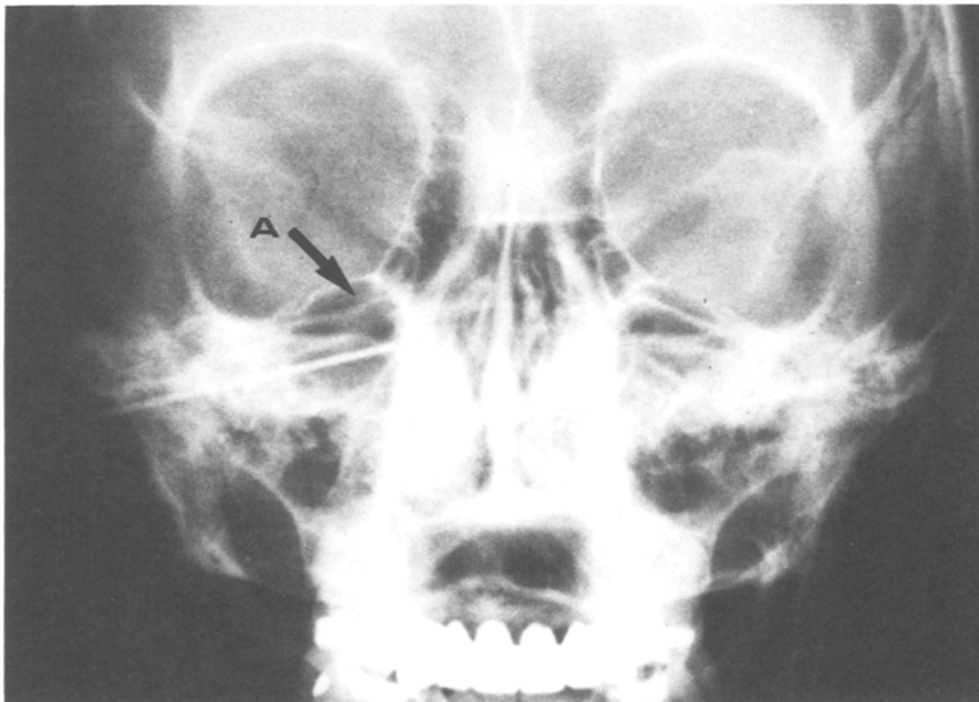


Fig. 3. Roentgenogram of the skull, anteroposterior projection. The tip of the needle-electrode lies immediately under the foramen rotundum (A)

Since good results were not obtained in three patients after the first thermolesion, it was decided to perform it again during the same period of hospitalization. Two and three procedures were necessary in one and two patients respectively to obtain a substantial relief of pain.

At the patients' discharge from hospital the more severe pain attacks had disappeared while a slight, deep-seated, continuous and troublesome sensation was present in the orbital region in all patients.

Fifteen days later the clinical examination confirmed these results, in particular the disappearance of the paroxysmal facial pain and of the parasympathetic discharges, as lacrimation and rhinorrhea.

In addition, four patients referred to a subjective decrease in lacrimation of the homolateral eye; this was confirmed by the test of Shirmer, showing a decreased lacrimation of 25–30% compared to the controlateral eye.

The last clinical control, varying from 6 to 34 months after surgery, gave further confirmation of the disappearance of the typical pain attacks, of lacrimation and profuse nasal secretion.

A slight, deep-seated, troublesome but not painful sensation persisted in all cases.

The moderate hypoalgesia in the distribution of the maxillary nerve disappeared slowly but almost completely in all cases.

## Discussion

Sphenopalatine ganglion neuralgia has been treated by means of a great variety of drugs and surgical procedures, most of which proved to be only partially or temporarily effective. So many medical measures with ergotamine derivatives<sup>6–20</sup> and caffeine<sup>17</sup> or steroids, methysergide and lithium<sup>9</sup> have been proposed and are often effective in relieving symptoms, although for a short time; also carbamazepine has been employed, as in other facial neuralgias<sup>22</sup>, without definitive results.

In an attempt to alleviate the excruciating pain of this syndrome, surgical treatment has also been proposed; these invasive procedures aim at creating a lesion of the sphenopalatine ganglion and its afferent and efferent nerves, since parasympathetic phenomena and pain distribution correspond to the area of their innervation. The first effort to perform a lesion of the sphenopalatine ganglion has been reported by Alajouanine<sup>2</sup>, by its cocaineization via a percutaneous needle.

The method, which proved to be useful for the pain control, showed, on the contrary, a very high incidence of one-year recurrence of pain. Similar results and limitations were found with alcoholization of the sphenopalatine ganglion, as proposed by Brown<sup>4</sup>. Recent experience with this technique on more than 100 patients has been reported by Devoghel<sup>5</sup>, who underlines, in particular, its good immediate results. More recently, Ray<sup>13</sup> and Meyer<sup>12</sup> have proposed the complete surgical removal of the ganglion. In particular the latter reports his experience of 13 patients treated by this way: although the immediate results prove to be excellent, 6 months after surgery 7 patients had partial recurrence of pain, 4 were referred to as satisfactory, 2 were completely free from pain and 1 was completely unsatisfactory.

We propose the rf percutaneous thermocoagulation of the sphenopalatine ganglion, the same technique widely employed for treating trigeminal<sup>21</sup> and glossopharyngeal neuralgias<sup>23</sup>, both essential and symptomatic. It is our opinion that this procedure is an excellent method for treating sphenopalatine neuralgia because it is well-tolerated, and there are no risks of major complications or unpleasant side-effects, save a slight and/or temporary hypoalgesia in the area of distribution of the maxillary nerve, and hospitalization is short.

After 6 to 34 months all our patients were free from paroxysms, even if a slight painful, deep-seated sensation persists.

It can be said that up till now no surgical procedure provided excellent and definitive results in all the patients suffering from lower half headache<sup>7,8,12,13</sup>, and also rf percutaneous thermocoagulation may probably be not a definitive solution.

It may be possible that a delayed recurrence of the pain will be observed even these in our patients, but our experiences with trigeminal<sup>15</sup> and glossopharyngeal thermocoagulation<sup>16</sup> suggest that this simple, relatively nontraumatic procedure may be repeated if pain recurs.

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Author's address: G. Salar, M. D., Institute of Neurosurgery, Via Giustiniani 5, I-35100 Padova, Italy.