Małgorzata Malec-Milewska[1], Agnieszka Sękowska[1, 2], Iwona Kolęda[1], Iwona Trytko[1], Dariusz Kosson[1, 3, 4]

[1]Pain Clinic in the Department of Anaesthesiology and Intensive Care CMKP, Warsaw, Poland
[2]Department of Gynecology and Obstretics CMKP, Warsaw, Poland
[3]Department of Anaesthesiology and Intensive Care at Medical University of Warsaw, Division of Teaching, Poland
[4]Polish Academy of Sciences and the Department of Neuropeptides of the Institute of Experimental and Clinical Medicine in Warsaw, Poland

Thermocoagulation of the Gasserian ganglion in patients with trigeminal neuropathy resistant to pharmacotherapy

Abstract

Indication for thermocoagulation of the Gasserian ganglion is trigeminal neuralgia resistant to pharmacologic treatment, which either is not effective or cannot be applied due to its side effects. In Pain Clinic of Clinic of Anaesthesiology and Intensive Care in Warsaw in the period from July of 2008 to June of 2011 there were 31 thermocoagulation procedures performed in 19 patients. Age of the patients varied between 46 and 86 years. The time of symptoms was between 2 and 30 years and pain was of intermittent character and its intensity in NRS was between 8 and 10 points. Thermocogulation was performed on ambulatory basis but in conditions of an operating room. Image of the foramen ovale was received through proper positioning of the patients and adjustment of the X-ray C-arm. Location of the tip of the electrode was verified by the C-arm, sensory and motor stimulation and injection of a dye. Time of the procedure was 60 seconds. In 18 patients a decrease in pain lasted from 7 to 24 months was reached. For one patient data has been missing. In none of the patients no serious adverse effects were noted.

Key words:

Adv. Pall. Med. 2012; 11, 1: 6–9

Introduction

Facial pains, due to variable pathomechanism and etiology, amount for a difficult diagnostic and medical management problem. They stay within interest boundaries of many physicians of various specializations. Rare prevalence, lack of objective diagnostic tests and very wide spectrum of causes and symptoms of the facial pain syndromes make proper diagnosis and introduction of effective treatment may be difficult [Kitt and col. 2000, Stępień, 2005]. Facial pain can be due to trigeminal or other cranial nerves damage, degeneration within musculoskeletal system or may have psychogenic bases [Dobrogowski and Wordliczek 2002]. Epidemiology material shows that trigeminal neuralgia (TN) is one of the most common causes of unilateral facial pain. Prevalence of TN is 3–5 per 100,000/year [Katusic

Address for correspondence: Małgorzata Malec-Milewska
Klinika Anestezjologii i Intensywnej Terapii Szpitala CMKP
ul. Czerniakowska 231, 00–416 Warszawa, Poland
e-mail: lmilewski@post.pl

Advances in Palliative Medicine 2011, 10, 6–9

and ass.1990]. TN has been known in medicine for may centuries. The oldest description of pain due to TN comes from the 1st century AD. Its author was a Greek physician Aretheus [Zakrzewska i Patsalos 1999]. First contemporary description of the disease originates from the second half of the 17th century and is written by an American physician John Locke. The intermittent nature of the pain was brought general attention by Nicolaus Andre in his thorough depiction of the illness published in 1756 [Terrence i Fromm, 1993]. Theoretical basis for the modern pharmacotherapy was derived from, proclaimed in 1853 by Rousseau, hypothesis explaining the intermittent nature of the pain by abnormal, similar as in epilepsy, conduction of nerve impulses. Trousseau had even proposed a new name for the disorder: 'epileptiform trigeminal neuralgia' [Terrence i Fromm, 1993]. Effective pain reduction became possible with introduction of phenytoine. Carbamazepine was added to pharmacotherapy of TN in 1962 [Bloom 1962, Zakrzewska et al.1997]. In 1934 Dandy observed that neurovascular conflict might be a potential cause of TN [Dandy 1934]. The first surgical decompression of the neurovascular conflict was performed by Gardnem in 1959 and in 1967 it had been popularized by Jannetta [Gardnem i Miklos 1959]. Neurovascular conflict theory had gained publicity and acceptance mainly owing to the results gathered by Jannetta [Jannetta 1967, Linsky et al. 1994]. Compression of the nerve by a vessel, usually superior cerebellar artery, accompanied by the damage to the myelin sheath of the nerve turned out to be the cause of neuralgia in most patients treated surgically and decompression of the conflict resulted in an immediate withdrawal of the symptoms [Jannetta 1967, Kozakiewicz i wsp. 1998]. Nowadays, a theory combining peripheral and central etiopathogenesis of TN, proposed by Rappaport and Devor in 1994, has been gaining an increasing acceptance. They hypothesised that compression damage to the trigeminal nerve root causes hyperactivity of a bundle of neurons within trigeminal nerve, which acts as ingnition-starter [Rappaport i Devor 1994]. The best method of treatment should be chosen individually for each patient and decided based on its effectiveness and ability to introduce a second-line treatment method in case of failure. There is a number of patients not responding to a given method of treatment or side effects of the therapy prevent its continuation. Very often, age and general clinical status of a patient enforces on a physician one concrete method of treatment. Unfortunately, all methods, even the most radical once, are bargained by some percentage of failure. It is always advised to apply treatment in a manner of increasing intensity and is usually started with pharmacotherapy, which is effective in 80% of patients. Invasive methods of treatment are introduced in cases when pharmacotherapy had failed [Malec-Milewska 2005]. This means that from the beginning there was no positive reaction to the drugs, side effects disallowed raising dosage to the effective level or after long-term therapy there was resistance to the currently used drugs [Kozakiewicz 1998]. Invasive methods of treatment include destructive procedures burdened with a big number of potential complications, decompression procedures involving microsurgical decompression of neural root from the neighbouring vessels and neurodestructive procedures [Zakrzewska et al. 1997; Kozakiewicz 1998; Nurmikko et al. 2002]. Majority of the neurodestructive procedures involve the Gasserian ganglion and the most popular and most commonly performed is thermocoagulation [Zakrzewska et al. 1999].

Material and methods

In our Pain Clinic at the Department of Anaesthesiology and Intensive Care in Warsaw in the period from July of 2008 to June of 2011 there were 31 thermocoagulation procedures performed in 19 patients. Age of the patients varied between 46 and 86 years. Duration of the pain was between 2 and 30 years and pain was of intermittent character and its intensity in NRS was weighed between 8 and 10 points. In 5 patients, a few years from the beginning of the illness, a constant pain of 4–5 points in NRS persisted. Pharmacological treatment could not be implemented due to side effects. Prior to the procedure each patient was informed about benefits and complications related to thermocoagulation of Gasser ganglion. Each patient, before signing a consent form, was given an opportunity ask any questions concerning the procedure. On the day of surgery a patient would report at the Pain Clinic accompanied by a close relative or friend. The procedure of thermocoagulation is performed on an ambulatory basis in an operating room, where it was started with inserting an intravenous cannula. Electrocardiogram, blood pressure and saturation were monitored throughout the procedure. The equipment used for the thermocoagulation included: Neuro-Therm RDG R/JK2C apparatus and 10-centimeter long electrodes Top Neuropole Needle supplied by EQUIP MEDIKEY B.V. (non-isolated tip length of 5 mm). Patient was placed in a supine position with

the head slightly tilted backwards. Image of the foramen ovale was received through proper positioning of the patients and adjustment of the X-ray C-arm over the chest. The active electrode was placed in the neighbourhood of the Gasserian ganglion through the exposed foramen ovale and the reference electrode was placed on the patient's abdomen or lap. Following disinfection of the surgical area the area of the active electrode's entrance, 2–3 cm laterally to the oral angle in the line joining the oral angle and mastoid process was infiltrated with local anaesthetic. The proper electrode location was confirmed by the C-arm, sensory stimulation the electrode absence of back flow of cerebrospinal fluid and/or blood was ensured. Damaged tissue was anaesthetized with 1 ml of 2% lignocaine. Thermocoagulation was applied for 60 seconds with voltage of 21 mV and amperage of 50 mA. Current with such parameters generates at the tip of the active electrode temperature about 65 °C.

Conclusions

Eighteen out of nineteen patients had experienced decrease in pain. One of our patient's data regarding effectiveness of the procedure was missing. The rest of the patients continue to stay in contact with our clinic. There was total of 31 thermocoagulation procedures performed in 19 patients. Ten patients had the procedure performed once, 6 patients twice and on three patients the procedure was performed three times. Time free of pain varied from 7 and 24 months (in case of recurrent pains). Eight of our patients after just one thermocoagulation has no pain until now and in 3 of the patients time free of pain exceeds 2 years. Seventeen patients are in remission phase for symptoms. For one patient we lack data, and for another one, due to recurrence of pain after 7 months, decided to undergo radical surgical treatment which resulted in alleviation of pain. In none of the patients w observed severe side effects. The complications of the procedure such as transient swelling and bruising of the cheek occurs in 5 patients, transient loss of sensory function in 2 patients and transient eyelid drooping in 1 patient.

Discussion

Thermocoagulation of the Gasserian ganglion has been performed in our clinic since July 2008, the time when we had in our disposition thermocoagulation apparatus. Before July of 2008 in the patients resistant to pharmacotherapy we performed neurolysis of the spheno-palatine ganglion, the procedure which is now reserved for patients suffering from trigeminal neuralgia [Malec- Milewska, 2005]. The effectiveness of the thermocoagulation procedure in our material is high: in 18 out of 19 patients we managed to eliminate pain. In medical literature there is divergent data on the efficiency of this procedure. Pain relief in patients treated with the thermocoagulaton of The Gasserian ganglion varies from 56 to 100% the effectiveness immediately following the procedure reaches 98%. In 1–17% of cases there are early, one to a few months after the therapy, recurrences of ailments and 4–32% of patients recurrence some time after the procedure[Burchiel 1988, Fraioli et al. 1989; Broggi et al. 1990; Taha et al. 1996; Zakrzewska et al. 1999; Kanpolat et al. 2001; Dobrogowski et al. 2011]. The shortest time to the recurrence of the pain in our material was 7 months. In 8 patients after one-time procedure we still do not observe recurrence of pain and for 3 of them the time free of pain is more than 2 years. Thermocoagulation of the Gasserian ganglion performed in technically proper manner is a safe method with a little number of sustained complications. Serious adverse events such as meningitis, abscess, cranial nerve palsy or blindness occur sparsely. Twenty five per cent of patients are endangered with sensory disorder due to the procedure, 1% anaesthetic dolorosa, 1–2% with corneal inflammation, and 20% corneal hypoaesthesia. Fairly common complications also include: contracture of the facial muscles, hyperaesthesia of the dermatome responding to the damaged nerve, swelling and bruising of the cheek [Zawirski et al. 1991; Terrence et al. 1993; Bergenheim i Hariz 1995; Kapral i Merhail 2001; Kanpolat et al. 2001]. In our material there were no serious adverse events observed in none of the patients. There were minor complications reported such as transient swelling and bruising of the cheek in 5 patients, transient sensory disorder in 2 and eyelid drooping in 1.

References

1. Bergenheim AT, Hariz MI. Influence of previous treatment on outcome after glycerol rhizotomy for trigeminal neuralgia. Neurosurgery 1995; 36: 303–310.
2. Bloom S. Trigeminal neuralgia: its treatment with the new anticonvulsant drug. Lancet 1962; 1: 839–840.
3. Broggy G., Franzoni A. Long term results of percutaneus retrogssserian thermorhizotomy for "essential" trigeminal neuralgia: considerations in 1000 cosecutive cases. Neurosurgery 1990; 26: 783–786.
4. Burchiel K. Percutaneus retrogasserian rhizilysis in the management of trigeminal neuralgia. Journal of Neurourgery 1988; 69: 361–366.

5. Dandy W.E. Concerning the cause of trigeminal neuralgia. Am. J. Surg. 1934; 24: 447–455.
6. Dobrogowski J., Wordliczek J. Bóle twarzy. In: Dobrogowski J., Wordliczek J. (ed.). Ból przewlekły. CMKPUJ, Kraków 2002; 105–115.
7. Dobrogowski J., Wordliczek J., Malec-Milewska M. Blokady neurolityczne i inne zabiegi neurodestrukcyjne. In: Dobrogowski J., Wordliczek J. (ed.). Leczenie bólu. PZWL, Warszawa 2011 (in press).
8. Fraioli B., Esposito V. Treatment of trigeminal neuralgia by thrrmocoagulation, glycerrolization and percutaneous compression of the gasserian ganglion and/or retrogasserian rootlets: long-term results and therapeutic protocol. Neurosurgery 1989; 24: 239–245
9. Gardner W.J., Miklos M.V. Response of trigeminal neuralgia to "decompression" of sensory root. Discusion of cause trigeminal neuralgia. JAMA 1958; 170: 240–244.
10. Jannetta P.J. Arterial compressionof the trigeminal nerve at the pons in patients with trigeminal neuralgia. J. Neurosurg. 1967; 26: 159–162.
11. Kanpolat Y., Savas A., Bakar A., Berk C. Percutaneous controlled radiofrequency trigeminal rhizotomy for the treatment of idiopatic trigeminal neuralgia: 25-year experience with 1600 patients. Neurosurgery 2001; 48: 524–532.
12. Kapural L., Mekhail N. Radiofrequency ablation for chronic pain control. Current pain and Headeache Report 2001; 5: 517–525.
13. Katusic S., Beard C.M., Bergstralh E., Kurland L.T. Incidence and clinical features of trigeminal neuralgia. Rochester Minnesota, 1945–1984. Ann. Neurol. 1990; 27: 89–95.
14. Kitt C.A., Gruber K., Davis M., Woolf C.J., Levine J.D. Trigeminal neuralgia; opportunities for research and treatment. Pain 2000; 85: 3–7.
15. Kozakiewicz M., Medwid K., Sawrasewicz-Rybak M. Patogeneza i leczenie neuralgii nerwu trójdzielnego. Porównanie teorii i możliwości terapeutycznych na podstawie danych z piśmiennictwa. Czas Stoma 1998; 536–546.
16. Linskey M.E., Jannetta P.J. Microvascular decompression for trigeminal neuralgia caused by vertebrobasilar compression. Neurosurg. 1994; 81: 1–9.
17. Malec-Milewska M. Skuteczność blokady neurolitycznej zwoju skrzydłowo-podniebiennego w leczeniu opornej na farmakoterapię neuralgii i neuropatii nerwu trójdzielnego. Ból 2005; 6: 23–31.
18. Rapaport Z.H., Devor M. Trigeminal neuralgia: the role of self-sustaining discharge in the trigeminal ganglion. Pain 1994: 56: 127–138.
19. Stępień A., Dobrogowski J. Bóle twarzy. In: Dobrogowski J., Wordliczek J. (ed.). Medycyna bólu. PZWL, Warszawa 2005: 243–251.
20. Taha J.M., Tew J.M. Compression of surgical treatments for trigeminal neuralgia; reevaluation of radiofrequency rhizotomy. Neurosurgery 1996; 38: 865–871.
21. Terrence Ch.F., Fromm G.H. Trigeminal neuralgia and other facial neuralgies. The headaches, chapter 114. In: Olesen J, Tfelt-Hansen P, Welch LMA (ed.). Raven Press, Ltd. New York 1993: 773–783.
22. Zakrzewska J.M., Chaudhry Z., Nurrmikko T.J., Paton D.W., Mullens E.L. Lamotrygine (Lamictal) in refractory trigeminal neuralgia: results from a duble-blind placebo controlled trial. Pain 1997; 73: 23–230.
23. Zakrzewska J.M., Jassim S., Bulman J.S. A prospective, longitudinal study on patients with trigeminal neuralgia who underwent radiofrequency termocoagulation of Gasserian ganglion. Pain 1999; 79: 51–58.
24. Zakrzewska J.M., Patsolos P.N. Drugs used in the management of trigeminal neuralgia. Oral Surg. Med. Oral Pathol. 1999; 79: 439–449.
25. Zawirski M., Wróbel-Wiśniewska G., Polis L. Leczenie neuralgii nerwu V metodą przezskórnej termokoagulacji zwoju Gassera. Neurologia Neurochirurgia Polska 1999; 25: 762–767.