

Different treatment methods in a patient with idiopathic trigeminal neuralgia

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Abstract

Idiopathic trigeminal neuralgia (TN) still lacks an effective treatment procedure. At first, we applied non-invasive treatment, pharmacological and anticonvulsant medicines, and in the absence of an effect or the appearance of secondary manifestations, we chose surgical intervention. This study presents the therapeutic process in a patient who had been complaining for about 24 years of pain of a neuralgic character, described in the II (V_2) and III (V_3) branch of the trigeminal nerve (V) on the left side. Until 2007, the patient was treated pharmacologically, prosthetically, his vascular-nervous conflict was surgically decompressed through the treatment of the Gasserian ganglion using thermolesion. In 2008, the patient was directed to the Maxillofacial Surgery Department of the Medical University in Lublin where he was diagnosed with neuralgia of the V_2 and V_3 of the left side. A cryoblockade was performed with the result of a V_3 remission of pain which lasted 20 months.

Keywords

trigeminal neuralgia, pain attacks, cryoblockade of peripheral branches of the trigeminal nerve

INTRODUCTION

Idiopathic trigeminal neuralgia is a severe, sudden pain attack, mainly unilateral, in the area of the innervation of one or a few branches of the trigeminal nerve. It has a chronic and cyclic character, concerning most often the II and III branch of the V nerve [1-5], with remissions and relapses observed in its course. The patients thus affected describe it as attacks of a very painful electric current to the face, lasting from a few up to a dozen or so seconds, spreading in the area of insensitivity of individual branches of the TN [3,6]. The attacks are often provoked by an irritating impulse to so-called release zones situated on the skin of the face or the mucous membrane of the oral cavity. Sick individuals leading a careful lifestyle can avoid irritating the sore areas. Constant fear of the onset of pain causes isolation, physical and psychological exhaustion, and depression.

Everyday life activities, touching of the skin lightly, face hygiene, speaking, cold air, and eating foods trigger intense pain. Periods of total insensitivity of the nerve appear between pain attacks. It is not obvious what kind of sensory fibres transmit impulses from the release zones. Reliable evidence shows that the sensation of intense paroxysmal pain in neuralgia can be conducted through mechanoreceptors of low excitability (fibres A beta), which react excessively to excitable C fibres. After the pain attack, a latency period occurs, which is caused by after-shock hyperpolarisation [7-9]. The prevalence of the disease is determined at 4-5 cases per 100,000 inhabitants [2]. It increases with age, with the peak of falling ill at decades 5-7 of life [2, 3, 7].

To date, the etiology of spontaneous neuralgia has not been discovered. Dandy and Jannetta consider the presence of a vascular-nervous conflict which results from the pressure on a sclerotically changed vessel, most often of an upper

cerebellar artery on axons of the V nerve near its entry to the pons, as the probable cause of TN [6,10,11]. Prolonged pressure on the trunk of the V nerve through pulse waves in the vessel causes the degeneration of the myelin sheath nerve fibres, leading to permanent contact between axons which pick up superficial impulses (touch and temperature) with the pain waves [2]. In the short-circuit mechanism, there occurs stimulation of the pain fibres and triggering of spasms of pain [3,4,12].

Symptomatic TN causes can sometimes be explained based on interviews with the patients and clinical trials based on X-ray diagnosis of the bony face and the neurocranium. The illness can be caused by distortions of the base of the skull, vascular deformities, tubers of the bridge-cerebellar angle, or other pathological processes taking place in the trigeminal nerve [2,3]. The disease occurs in 2-4% of patients with multiple sclerosis, in which case it may appear on both sides [7]. This confirms one of the theories that the demyelization processes of the V nerve play a role in causing the pain.

Trigeminal neuralgia treatment can be divided into pharmacological and surgical methods [3,4,7,13,14]. In the presented case, at first we administered medicines from the phenytoin, baclofen, carbamazepines, lamotrigine, and gabapentin groups [2-5,15], supplemented by the application of physiotherapy – laser, diadynamic currents, iontophoresis, acupuncture, ultrasounds, and polarized light. These increase the blood supply to the nerve fibres and elevate the pain threshold [4]. Local injections of anesthetics such as lignocaine and marcaine into the area of the exit of the district trigeminal nerve branch, causes remission of pain from 2 up to a few hours [4,7,14], and sometimes can provoke remission of the disease.

During the next stage, surgical procedures on peripheral branches were applied. Since 1982 at the Maxillofacial Surgery Clinic of the Medical University in Lublin, sick individuals have been undergoing treatment consisting of a cryoblockade. In cryo-surgery, liquid gases – cryogenic liquids – are applied. Liquid nitrogen (boiling point on the tip of the applicator is -196°C) and that of the nitrous oxide

(-89°C) were applied directly to the exposed nerve [4,5,15-18]. According to Seddon, the low temperature damages the continuity of the axon of the axonothemesis [4,5], interrupting conduction of the imitation. The connective tissue shield of the nerve becomes more resistant to the destructive factor. Waller degeneration of the district segment of the nerve and its subsequent regeneration occurs. Clinically, we observed a lack of the nerve function. The return of its activity was spontaneous, slow, and can last from a few months up to a few years, depending on the level of damage [5].

Some centres of Maxillofacial Surgery still perform exeresis treatment with a simultaneous alcoholisation of the district trigeminal nerve branches [14]. Treatments are also undertaken on the Gasserian ganglion, i.e. the transdermal gangliolysis, with alcohol [15], coagulation [6, 19], microcompression [7, 15] and thermolesion. Here, the percutaneous ganglionic structures are damaged by using a temperature above 45°C, and airwaves at frequencies of 300-500 kHz which have a destructive influence. In English nomenclature, the treatment is determined as radiofrequency thermolesion (RF) [2,6,15,19]. The thermal impact is directed against nonmyelinated C fibres and A fibres conducting nociceptive impulses. At the same time, motor fibres and proprioceptors are preserved.

The method is laden with such complications as the impairment of feeling in over 25% of cases, anesthesia dolorosa in about 1%, corneitis in 1-2%, and in 20% of cases a hypoesthesia of the cornea can appear. Muscle spasms of the face, hyperesthesia, burning pains, and swelling are among frequent complications [7].

From among different endocranial interventions, the most recommended method of decompression of the trigeminal nerve is near the entry to the pons – a microvascular decompression (MVD) [2,6,8,10,20-23]. This procedure performed under general anesthetic consists of isolating the vessel that is in conflict with the trunk of the nerve, and with a suitable material, e.g. muscle, Teflon fiber, Gore-Tex material, or vascular prosthesis. MVD is partly effective as trigeminal neuralgia treatment and can have different undesirable symptoms, such as dyesthesia within the scope of the nerve in 0.5-8% of cases, paraesthesia in 36% of cases, hypoesthesia of the face in 20%, hypoesthesia of the cornea in 3%, impaired hearing in 0.8-4.5%, endocranial haemata in 1%, liquorrhea in 2%, and mortality below 1% of cases [7,10,14,21].

CASE REPORT

In this study, a therapeutic process of the patient born in 1945 is described. Information was obtained from an interview and on the basis of documentation available. The patient had been complaining of pains of the area of the left temporomandibular joint for about 24 years, and increased in intensity when eating food and when performing hygienic activities. Until 2003, the patient had been treated pharmacologically, prosthetically. Diagnosed with neuralgia of the V₂ and V₃ of the left side, the patient was operated on twice at the Neurosurgery Clinic at the Bielański Hospital in Warsaw, with a retro-mammary craniotomy and decompression of a vascular-nervous conflict. After the first treatment in 2003, the pain did not reoccur for a year. In March 2006, the treatment was repeated, but

with no therapeutic effect. Three months later, in June 2006, due to strong pain attacks, the patient was directed to the Neurosurgery Clinic in Łódź for treatment of the Gasserian ganglion using thermolesion. However, there was no improvement.

In the period 2006 -2008, the patient was treated with anticonvulsant medicines, strong opiates and laser treatment, but without the expected remission of the illness. In 2008, the patient was directed to the Maxillofacial Surgery Department at the Medical University in Lublin, where he has been under treatment to this day. After triple stays, in August 2008, h was diagnosed with neuralgia of the V₂ and V₃ of the left side, and the cryoblockade was performed on left mental nerve. Complaints from the side the II branch were absent after the anaesthetizing blockades. Relapse of pain, but in the V₃ only, resulted in the treatment having to be repeated after 20 months. In October 2010, complaints were from the region of the V₂. Once again, cryoblockade was used which achieved the desired effect of obtaining a remission of pain which has lasted to this day, 9 months later.

DISCUSSION

Trigeminal neuralgia is an illness which, to a large extent, reduces the quality of life of persons of middle-age and older. Individuals affected with the problem live in constant fear of violent pain that is difficult to endure. The treatment, therefore, is a challenge for doctors seeking new therapeutic opportunities to achieve long-lasting remission. The fundamental idea of therapy is advancing from less invasive methods to those which are more invasive [12,14]. Treatment with drugs is the basic procedure in trigeminal neuralgia and can be effectively applied in the first stage of illness, even for 3-5 years [7,15]. Medicines, especially antiepileptic, are the main application, although their ineffectiveness though increasing tolerance and serious side-effects compel doctors to apply invasive treatment procedures. .

Blockades from anaesthetics applied topically to the infraorbital foramen, mental foramen, mandibular and supraorbital foramina, display a certain effectiveness in the early stages of the illness, inducing remission of pain on average for up to 13 months [14], according to own observation, up to 6 months. At our centre, on average, we perform about 4-5 blockades, in conjunction with physiotherapy treatment: laser, diadynamic current, ionophoresis, or ultrasound. Lack of the improvement forces patients to undergo surgery under local anesthetic in our clinic. Some centres are still carrying out exeresis of the peripheral branch of the trigeminal nerve. According to Borgiel, due to hole in the bone overgrowing, it is possible for the procedure to be repeated three times, with remission of pain each time becoming shorter, with an average reduction from 21 months to 18 obtained, and after the third exeresis to 17 months.

In the Maxillofacial Surgery Department at the Medical University in Lublin, the application of cryoblockade treatment to the peripheral trigeminal nerve branches has resulted in the following remissions being obtained: a year-long in 46% patients, 2 years in 32%, 3 years in 19%, and 4-5 years or longer remission in a few individuals [4]. The administration of Amizepin is favourable for extending the pain-free periods. Recurrence of the problem allows for cryoapplication, stimulating the next remission [4,5,17-19].

Some groups of patients with a severe course of neuralgia are qualified for neuro-destruction of the Gasserian ganglion with glycerol or thermolesion. The effectiveness of the latter method and the appearance of complications depend on the technique applied. Relief from complaints is observed directly after the treatment, in 1-17% of cases a relapse takes place from 1 up to a few months [7].

In patients with trigeminal neuralgia, if X-ray computed tomography or magnetic resonance imaging of the brain reveals a vascular-nervous conflict, and a secondary cause of neuralgic pains is excluded, it is possible to arrive at the decision to perform an endocranial operation under general anesthetic - microsurgical vascular-nervous decompression (MVD) [10,12,20,21]. It must be taken into consideration that some group of patients do not qualify for this treatment on account of serious systemic diseases, while others - having been informed of possible complications - resign from the operation and choose less invasive treatments such as cryoblockades [5,4,17,18]. According to Burchiel [7], in as many as 91-97% of patients, after MVD one can observe a good painkilling effect for a period of about 28 months. Bogucki and Czernicki [11] report 80% of patients having longer remissions and satisfactory results of the treatment, whereas Czepko [21] cites 70% satisfactory results according to the Slettebo-Eide scale.

CONCLUSIONS

The applied surgical method of cryoblockade of the peripheral branch of the trigeminal nerve is a treatment performed under local anesthetic that provides good therapeutic effects, and satisfying remission periods. The procedure can also be repeated several times. In the presented case study, this method provided the only possibility of curing a nagging pain after all other courses of treatment had been exhausted. It definitely is a less invasive treatment compared with the neurosurgeries applied to persons burdened with systemic diseases, and it does not require general anesthesia or highly specialist instrumentation necessary in the case of other treatments. Access to the operative field is good, and the treatment technique is not complicated. The short period of hospitalization of the patient is a definite advantage.

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