

Non-pharmacological treatments for cluster headache

In patients with chronic cluster headache, surgical treatment may be the only alternative when medical therapy, either in an in-patient or an out-patient setting, is ineffective, is limited by contraindications, or is poorly tolerated [1]. Patients to be treated surgically must be carefully selected and meet the following mandatory criteria:

1. Total resistance to pharmacological treatment (severe side-effects and contraindications to the treatments);
2. Headache strictly located on the same side, since in patients where the headache alternates sides, there is a risk of recurrence after surgical treatment;
3. Pain primarily in the region of the ophthalmic branch of the trigeminal nerve;
4. Patients with stable personality and psychological profile with little tendency to somatization.

Many anatomical sites have been considered in an attempt to stop cluster attacks. The parasympathetic pathway has been interrupted by sectioning the intermedius nerve, the great superficial petrosal nerve and the sphenopalatine ganglion. In many cases the benefits have been inconsistent or, when the procedures appeared to be effective, there was a risk of recurrence of the cluster headache. The surgical procedures that give the best results are those involving the sensory component of the trigeminal nerve, particularly percutaneous retrogasserian rhizotomy with radiofrequencies (PRFR) [2–6] and percutaneous retrogasserian rhizolysis with glycerol (PRGR) [7–9].

Rhizotomy with radiofrequencies

This technique, introduced in 1932 by Kirschner [10] with the term of electrocoagulation, but then immediately abandoned because of many complications, was modified by White and Sweet in 1986 [11, 12]. It is based on the demonstration that the nociceptive C fibers, being thinner than the A fibers responsible for tactile sensitivity, may be destroyed with a gradual thermal lesion, leaving tactile sensitivity intact.

After having placed the patient on the operating table in a supine position, under local anesthesia, a particular needle cannula is introduced about 3 cm from the lip margin, homolaterally to the head pain, for about 5 cm, under continuous fluoroscopic control, until it passes beyond the oval foramen and reaches the cistern of the Gasserian ganglion. After removing the stylet of the needle, cerebrospinal fluid may leak from the ganglion cistern. An electrode is then introduced and a stimulation is applied; the tingling or burning feeling felt by the patient near the stimulated root confirms the exact position of the needle cannula. After a brief neuroleptoanalgesia, thermocoagulation is carried out at a temperature of around 70° C for about 2 min.

The results are encouraging: at least 75% of patients obtain good to excellent results [3, 5]. The duration of the procedure is also favorable, with recurrence in the long-term follow-up of only 20%, while some patients remain pain-free for 20 years [6].

The best results were obtained when strong analgesia or strong hypoalgesia occurred. If pain is predominantly located in the orbital, retrorbital, infraorbital or supraorbital areas, a lesion of the V1 and V2 branches of the trigeminal nerve is adequate. If pain also involves the temple and the area of the ear, a lesion of the V3 branch is needed, because the temple and the ear are innervated by the auricular branch of the mandibular nerve.

In the immediate post-surgical period, several complications may occur which are, on the other hand, relatively few. These include: transitory diplopia, piercing pain in the territory of distribution of the trigeminal nerve, difficulty in mastication on the side of the lesion and deviation of the jaw. These complications are usually transitory and, as a rule, there is complete recovery. A more annoying complication is painful anesthesia. The incidence of painful anesthesia is low (less than 4%). Because of the corneal analgesia caused by the radiofrequencies, patients must be instructed to pay adequate attention to their eyes after the procedure. The patients are invited to wear dark glasses and to not allow dust or other foreign bodies to enter their eyes

when they are exposed to the wind. Moreover, they are recommended to consult an ophthalmologist, if there are signs of corneal infection. The untreated corneal infections may easily cause corneal opacity because of the lack of corneal sensitivity.

Percutaneous retrogasserian rhizolysis with glycerol

An alternative treatment to PRFR is glycerolysis of the Gasser ganglion. This method consists of penetrating the Gasser ganglion cistern, using the same technique described previously. To be certain of the exact position of the needle cannula, neurostimulation is performed and/or 0.5 ml metrizamide is injected, with the aim of visualizing the trigeminal cistern. After removal of the metrizamide, a mixture of glycerol (0.15-0.20 ml) and cerebrospinal fluid is introduced into the cistern, making sure that the patient remains in a semi-seated position for about two hours.

In a recent study [13], 83% of the patients assessed (15 out of 18) showed an improvement of the crises after 1-2 injections; the patients were followed for 5.2 years and none of them complained of corneal anesthesia or facial dys-

thesia. Recurrence was seen in 39% of these patients, who necessitated a second intervention.

The disadvantages of glycerol injections are:

1. Incomplete analgesia in comparison to the lesions induced with radiofrequencies;
2. Difficult control of the lesion with glycerol, while with the lesions caused by radiofrequencies, a selective destruction of the V1, V2 or V3 branches of the trigeminal nerve is possible;
3. Possible leakage of glycerol from Meckel's cave with possible chemical meningitis.

Recently gamma-knife surgery has been used in patients with cluster headache resistant to drug therapy [14]. Relief was immediate and within a week the patients were free from pain and relief was maintained for more than eight months. The complete effectiveness, duration and tolerability of the technique are not known at the moment. Being a noninvasive procedure with fewer collateral effects than ablative surgery, it may represent a good alternative to destructive procedures.

In conclusion, surgical treatment of cluster headache may be considered the last resource and should be limited to cases of chronic cluster headache which are disabling and resistant to medical therapies.

References

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