

Technical Notes & Surgical Techniques

Prophylactic effect of topical diluted papaverine in preventing hearing loss during microvascular decompression for typical trigeminal neuralgia: Case report and technical note



Carlo Giacobbo Scavo, MD, Raffaelino Roperto, MD, Guglielmo Cacciotti, MD,
Francesco Corrivetti, MD, Luciano Mastronardi, MD, PhD*

San Filippo Neri Hospital, Department of Surgical Specialties, Division of Neurosurgery, Roma, Italy

ARTICLE INFO

Keywords:

ABR
Hearing preservation
Microvascular decompression
Retrosigmoid approach
Trigeminal neuralgia

ABSTRACT

Background and objective: Papaverine hydrochloride is a direct-acting vasodilator used to manage vasospasm during various neurosurgical operations. Transient hearing loss due to vasospasm of Internal auditory artery during Posterior Fossa Microvascular Decompression (MVD) for Typical Trigeminal Neuralgia (TTN) is one of possible complications of this surgical procedure. The aim of this technical note is to underline the potential efficacy of the use of intracisternal diluted papaverine and its proper use.

Materials and methods: BAEP is routinely used to monitoring functionality of vestibulocochlear nerve during MVD for TTN. In one patient recently operated on, during arachnoid dissection BAEP showed a lag of V wave of 1 ms, likely due to vasospasm of Internal Auditory Artery (IAA) probably caused by arachnoid traction. Intracisternal injection of pure papaverine without excipients (60 mg/2 ml) diluted in 20 cm³ of 0,9% saline solution (0,3%) was used as a direct therapeutic action to manage vasospasm of IAA artery.

Results: Few minutes after the intracisternal injection of diluted papaverine, BAEP's wave V started to get back to normal length and at the end of procedure was the same evoked before starting MVD. After surgery hearing was bilaterally normal.

Conclusions: There is large uncertainty about dose-related efficacy and side effects of intracisternal papaverine (iPPV). Dilution of papaverine in saline is recommended to avoid complications. In our practice, in line with the literature, we use 0,3% diluted pure papaverine to prevent hearing loss during MVD for TTN.

1. Introduction

Topical application of papaverine hydrochloride was first described to treat cerebral vasospasm during neurosurgical operation in the '50s [1]. Despite an uncertain understood mechanism of action, papaverine is still used to treat complications related to vasospasm during several neurosurgical procedures. Several reports suggest that papaverine may cause adverse effects lasting hours to days [2,3].

The purpose of this technical note is to underline the potential efficacy of intracisternal diluted papaverine (iPPV) during a MVD for typical trigeminal neuralgia (TTN) and to describe its proper use, in particular for preventing hearing loss related to possible spasm of Internal Auditory Artery (IAA).

2. Case description

We report the case of a 62 years old man who was referred to our Department with a 6 years history of right TTN (mainly 2nd and 3rd branches), already treated with carbamazepine without success. The cerebral MRI TOF images at level of brainstem showed the neurovascular "conflict" in the cerebello-pontine angle cistern between trigeminal nerve (TN) and a vessel, presumably the superior cerebellar artery (SCA). The patient underwent MVD of right trigeminal nerve by retrosigmoid microneurosurgical approach.

3. MVD surgical procedure and Intraoperative BAEP monitoring

For MVD procedures, we place the patient was in lateral Fukushima position. In all MVD for TTN and hemifacial spasm, brainstem potentials (BAEP) evoked by LS-CE-Chirp® stimulus are always

* Corresponding author at: Via Reno 14, 00198 Roma, Italy.

E-mail address: mastro@tin.it (L. Mastronardi).

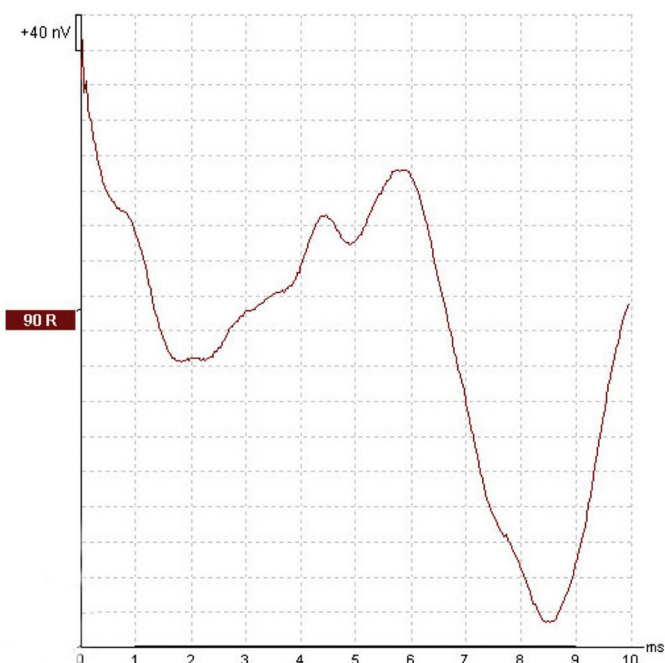


Fig. 1. The graphic shows wave V latency before starting surgery (5.7 ms).

intraoperatively used since 2015 [3], in order to continuously monitor the hearing function. LS-CE-Chirp® BAEP provides enhanced neural synchronicity and faster detection of larger amplitude wave V (Fig. 1). Retromastoid skin incision of 5 cm and 3 × 3 craniotomy exposing sigmoid and transverse sinus is performed. Dura and superior lateral cerebellar cistern are opened allowing cerebellar detention and parenchyma gentle retraction until TN and its root entry zone (REZ) are easily exposed.

In the reported case, TN was ventrally compressed by the SCA, confirming the impression coming from MRI images. With microsurgical technique, cutting all arachnoid folds between TN and SCA, this artery was displaced from the nerve, obtaining an optimal decompression. As usual, small pieces of Teflon were placed between TN and SCA and a small piece of gelfoam was inserted at the level of the REZ of the TN (as a “pontine stopper”) to maintain the distance between the two elements, finally covered with fibrin glue.

During arachnoid dissection BAEP showed a temporary lag of V wave (Fig. 2). Intracisternal injection of pure papaverine without excipients (60 mg/2 ml) diluted in 20 cm³ of 0,9% saline solution (0,3% of iPPV) was applied as a direct therapeutic action, in order to contrast possible vasospasm of IAA artery.

Five minutes after the injection of diluted iPPV, BAEP's wave V started to get back to normal length (Fig. 3) and at the end of procedure wave V was the same evoked at the beginning of the procedure (Fig. 4). After surgery hearing was bilaterally normal.

4. Discussion

Typical trigeminal neuralgia (TTN) is characterized by severe facial pain in the distribution of the TN. It is unilateral, paroxysmal, provokable by touching “trigger points”, in absence of sensory loss [1,2]. The pain typically lasts only few seconds, but is described as one of the most painful conditions in human clinical practices, and is triggered by sensory stimuli [4].

The incidence of TTN is reported to be approximately 4 per 100,000 population and gradually increases with age [5,6]. Though the condition has been well-studied, it is still debated its pathophysiology. Most experts agree that the etiology is segmental demyelination of trigeminal sensory nerves in the nerve root or brainstem, and the demyelination is

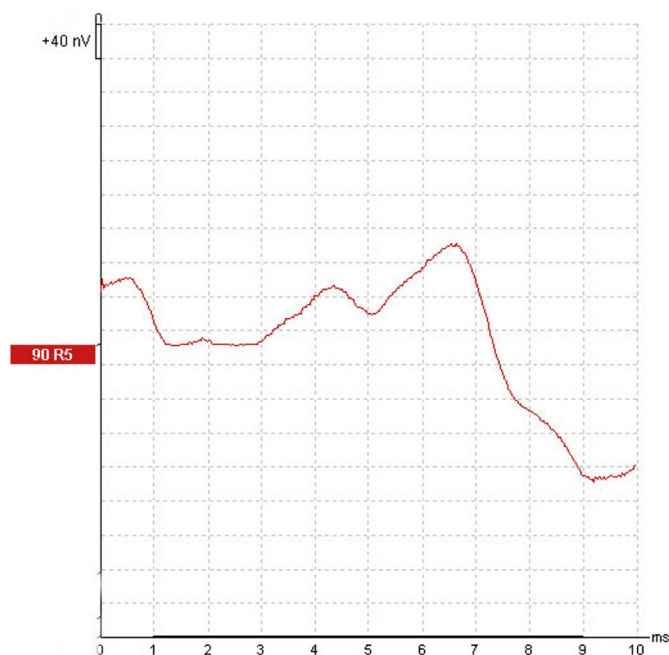


Fig. 2. During arachnoid dissection BAEP showed a lag of V wave of 1 ms, likely due to vasospasm of Internal auditory artery probably caused by arachnoid traction.

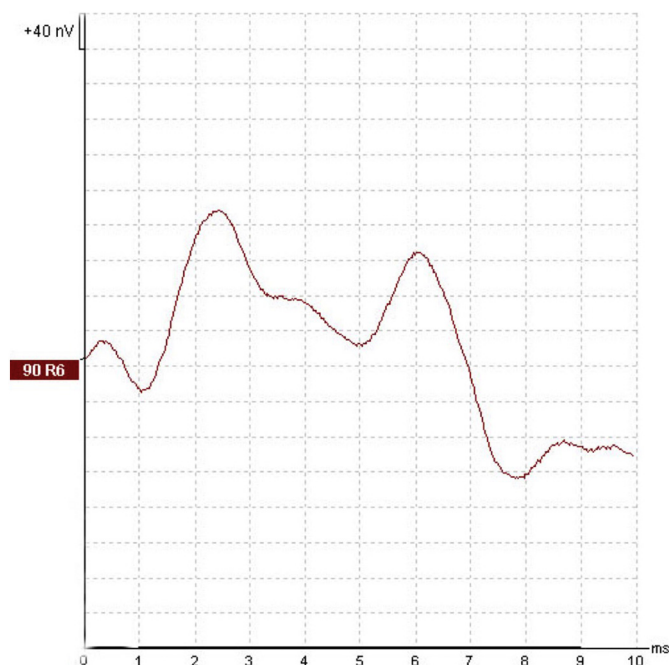


Fig. 3. BAEP's wave V started to get back to normal length from 5 min after the intracisternal injection of 0,3% papaverine.

due to chronic compression of the nerve root where it comes out from the pons [4,6,7]. This chronic compression brings to an ephaptic transmission occurred at micro-injury site of TN fibers compressed by a vessel, which may also result in hyperexcitability of trigeminal nucleus [8]. Mostly the nerve is compressed by the superior cerebellar artery (SCA) [10,11].

Most theories, however, consider compression from an artery and/or vein at TN exit point as the main cause of typical TTN [12]. As regards possible treatments, at first patients would take medications, usually antiepileptic drugs like carbamazepine; other choices are

Download English Version:

<https://daneshyari.com/en/article/11017110>

Download Persian Version:

<https://daneshyari.com/article/11017110>

[Daneshyari.com](https://daneshyari.com)