

POSTER PRESENTATION

Open Access

P038. Effects of non-invasive vagus nerve stimulation on cerebral vasomotor reactivity in patients with chronic migraine during intercritical phase: a pilot study

Riccardo Altavilla, Matteo Paolucci, Claudia Altamura, Fabrizio Vernieri*

From Abstracts from the 1st Joint ANIRCEF-SISC Congress
Rome, Italy. 29-31 October 2015

Introduction

Different strategies of neurostimulation have been developed as treatment tools for migraine. Among them, vagus nerve stimulation (VNS) can be performed both invasively and non-invasively. Recently, “Gammacore” has been approved as a non-pharmacological and non-invasive tool for headache, and a recent study demonstrated its efficacy in 22% of patients with acute migraine attacks [1].

Although the pathophysiology of migraine is not yet fully understood, many studies have shown a role of sterile inflammation of cerebral vessels and of the change in diameter of the intracranial arteries. Blood flow velocities and vasomotor reactivity (VMR) in patients suffering from migraine without aura in the intercritical phase were found either increased or normal compared to non-migraineurs healthy controls [2,3]. Since the vagus nerve is the largest parasympathetic nerve of the body, it is probable that its neuromodulation can affect cerebral hemodynamics. The purpose of the study was to evaluate the effects of external vagus nerve stimulation on VMR of patients suffering from chronic migraine.

Study design

We enrolled 20 patients aged between 18 and 65 years, suffering from chronic migraine and 20 healthy non-migraineur subjects matched for demographic characteristics. None of them assumed vaso-reactive drugs for at least 30 days before registration.

Subjects enrolled underwent registration of blood flow velocity in the middle cerebral artery bilaterally through

transcranial Doppler (TCD), in the morning and fasting from food and caffeine. The monitoring was performed at baseline, during and after apnea lasting 30 seconds. After the recording, the subjects underwent external stimulation of the vagus nerve with “Gammacore” device for 90 seconds, and 20 minutes after we once again registered VMR through apnea test. VMR was calculated by means of Breath holding index according to the following formula [4]: VMR/apnea duration in seconds.

Preliminary results

No statistically significant differences emerged comparing VMR before and after VNS in our population, irrespective of groups. No patient suffered from adverse event during or after VNS.

Conclusions

Non-invasive VNS resulted safe and did not seem to influence VMR, neither in migraineurs nor in healthy volunteers. However, the small sample of our study population does not allow to draw definitive conclusions, hence the study will be further continued to extend sample size.

Written informed consent to publication was obtained from the patient(s).

Published: 28 September 2015

References

1. Goadsby PJ, Grosberg BM, Mausekott A, Cady R, Simmons KA: **Effect of noninvasive vagus nerve stimulation on acute migraine: an open-label pilot study.** *Cephalalgia* 2014, **34**(21):986-93.
2. Silvestrini M, Matteis M, Troisi E, Cupini LM, Bernardi G: **Cerebrovascular reactivity in migraine with and without aura.** *Headache* 1996, **36**:37-40.

* Correspondence: f.vernieri@unicampus.it
Headache Centre, Neurology Unit, University Campus Bio-Medico, Rome, Italy

3. Vernieri F, Tibuzzi F, Pasqualetti P, Altamura C, Palazzo P, Rossini PM, Silvestrini M: **Increased cerebral vasomotor reactivity in migraine with aura: an autoregulation disorder? A transcranial Doppler and near-infrared spectroscopy study.** *Cephalalgia* 2008, **28**:689-95.
4. Markus HS, Harrison MJ: **Estimation of cerebrovascular reactivity using transcranial Doppler, including the use of breath-holding as the vasodilatory stimulus.** *Stroke* 1992, **23**:668-73.

doi:10.1186/1129-2377-16-S1-A62

Cite this article as: Altavilla et al.: P038. Effects of non-invasive vagus nerve stimulation on cerebral vasomotor reactivity in patients with chronic migraine during intercritical phase: a pilot study. *The Journal of Headache and Pain* 2015 **16**(Suppl 1):A62.

Submit your manuscript to a SpringerOpen[®] journal and benefit from:

- Convenient online submission
- Rigorous peer review
- Immediate publication on acceptance
- Open access: articles freely available online
- High visibility within the field
- Retaining the copyright to your article

Submit your next manuscript at ► springeropen.com
