Reviewer’s report

Title: The impact of attack frequency and duration on neurocognitive processing in migraine sufferers: evidence from event-related potentials using a modified oddball paradigm

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Reviewer: Marco Lisicki

Reviewer's report:

The impact of attack frequency and duration on neurocognitive processing in migraine sufferers: evidence from event-related potentials using a modified oddball paradigm.

In this study the authors analyzed event related potentials (P-300) of 25 migraine patients and 21 healthy controls. The conventional stimulation paradigm was modified in order to include both a target and a novel stimulus. Patients were interrogated about their migraine history, frequency, and duration of attacks during the last year. Furthermore, participants had to complete self-rating scales of anxiety and depression. The authors report differences in P300 amplitudes and N1 and N2 latencies between migraine patients and controls, correlations of some electrophysiological results with migraine frequency and attack duration, and increased scores of anxiety and depression in migraineurs.

The study of the P-300 event related potential in migraine is of some interest given that there are only a few published studies and they are not exempt of methodological limitations. Nonetheless, in my personal opinion, this manuscript needs to be thoroughly revised before being considered for publication.

My suggestions:

* Given that attack frequency and duration were quantified by asking the patient about the last year, which is enormously affected by recall bias, I would not suggest you to focalize your manuscript on these variables.

* How was the sample size calculated?

* Why would you choose Self-Rating Anxiety Scale, which in includes items about headache, fatigue, spells, gastrointestinal symptoms and so on, to evaluate anxiety on a cohort of migraine patients?

* P3a and P3b are first mentioned in the results section. The methods used for identification and statistical analyses should be clarified earlier.
* From the 66 correlations performed in the study, only the columns of SDS score and SAS score are reliable. Migraine history is somewhat affected by recall bias, but to a lesser extent compared to the remaining variables; I would also leave it.

* The spatial resolution of electrical fields on figures 2 and 4 is very limited. Has baseline activity been subtracted on these plots? Have you tried by applying any spatial filters? Have you considered running ICA and plotting independent components?

* Page 13 line 42 reads: "In this study, we discovered that migraine patients were more anxious and depressed than their control counterparts." I would suggest changing the word - discovered- for -corroborated- and make reference to prior studies addressing this issue.

* For the discussion, smaller P300 amplitudes in migraine patients could also be due to a higher baseline degree of activation. This phenomenon is known as the ceiling theory.[1]

* The presence of brain lesions was not evaluated in this study, yet results seem to be interpreted as if they were present.

Bottom line is there are some interesting findings, but try to focus on the more reliable data (both positive and negative results). For the introduction and discussion, I would suggest you to emphasize functional over structural conjectures and hypotheses as imaging analyses were not performed on this electrophysiological experiment.


**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.

Yes

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.

Yes

**Are the conclusions drawn adequately supported by the data shown?**
If not, please explain in your comments to the authors.

No
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