



"Sound attacks": a case report of migraine with hearing aura

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Abstract

Introduction

Migraine with aura is less frequent than the subtype form without aura. Normally, auras are typically manifested visual symptoms, but it is possible to have an auditory and olfactory complaints as aura symptomatology.

Case report

An 8-year-old boy with family cases of migraine, complained of auditory hallucination episodes, since he was 5 years-old, with a duration of 10 to 20 minutes, followed by cure with intense photophobia and nausea. He called these episodes as "sound attacks". The frequency of the crises ranges from 4 to 5 episodes per month, with the maximum of 11 episodes in one month. Neurological examination was normal. He performed angio-MRI of skull and EEG, without any changes. Treatment was initiated with 250 mg sodium divalproate at night with reduction of events, already in the first month, for 2 to 3 episodes per month. The medication was adjusted for 500 mg of sodium divalproate with a good result, not presenting new episodes in the last 2 months.

Conclusion

We report a case of migraine crises preceded by auditory aura, in a boy of 8 years. This is a rare and extremely interesting presentation of migraine, with great improvement after the prophylactic treatment.



Introduction

Migraine is a complex neurological disorder that affects various cortical, subcortical, and brainstem areas.¹ This disorder manifests as a painful headache event characterized by acute, recurrent, disabling attacks associated with systemic repercussions, such as gastrointestinal and neurological.²

Migraine with aura is less frequent than the forms without aura. Typically, auras are visual in nature, but an auditory and olfactory nature is possible. However, since they are less prevalent than visual auras, the current guidelines on the Classification of Headache Disorders do not recognize them as part of the typical symptomatology of migraine with auras, despite their relevance, since they may offer new insights into the pathophysiology of primary headaches.^{3,4}

Although little is known about the pathophysiology of auras of a sensory nature, cortical spreading depression (CSD) is believed to be responsible for such dysfunctions, as CSD provides changes in cortical excitabilities triggering disturbances in the entire length of the neocortex during multisensory auras.^{5,6} As far as the auditory manifestations of the auras are concerned, it is assumed that these arise from neurophysiological alterations originating in the temporal lobe, expressed by phantasmia, auditory hallucinations and tinnitus.⁶

Since auditory aura associated with migraine is an uncommon event, the aim of the present study is to report a case of auditory events preceding headache in a male schoolchild, highly suggestive of auditory aura.

Case study

An 8-year-old boy with a family history of migraine reports that since he was 5 years old, he has had episodes of hearing alteration, which he calls "sound attacks", lasting 10 to 20 minutes, followed by headache with intense photophobia and nausea. The frequency of attacks ranged from 4 to 5 episodes per month, with a maximum of 11 episodes in 1 month. Neurological examination was normal. He underwent skull MRI and EEG without alterations. Treatment with divalproate sodium was started at 250 mg at night, with a reduction of episodes in the first month to 2 to 3 episodes per month. The medication was adjusted to 500 mg of divalproate with good results, with no new episodes in the last two months of treatment.

Discussion

The focal neurological phenomena that precede or accompany a migraine attack are called aura. This may involve visual, somatosensory, olfactory, or auditory changes. Auditory

symptoms rarely occur as part of an aura.⁷ The auditory symptom most often associated with migraine is phonophobia, which is present in more than two-thirds of patients.⁷ Besides this, oscillography, tinnitus, sudden deafness, and fluctuating hearing loss are also reported.^{7,9} Different studies also show the presence of auditory hallucinations such as aura in migraine patients who do not have psychotic illnesses. These hallucinations involve voices that last throughout the migraine attacks, as well as oscillucusia and tinnitus.¹⁰

It is believed that migraine attacks may increase the potentiation of the auditory cortex and, sporadically, stimulate acoustic auras with auditory hallucinations, since studies with auditory evoked potentials have demonstrated an absence of habituation in the auditory cortex of migraine patients.¹¹ Auditory hallucinations, such as the knowledge of sounds in the absence of identifiable external stimuli, have been specified in children without psychopathy associated with migraine attacks. It seems reasonable to consider that hallucinations are related to migraine pictures, because they start close to the headache phase and reduce when attacks are treated by prophylactic methods,^{10,12} as in this case report.

In a study carried out by Dash et al.¹³, audio vestibular functionality was observed in migraine patients with or without associated vertigo. It was concluded that all patients in the study had some alteration in auditory responses stimulated by brainstem auditory evoked potential (BAEP); and that such alterations may configure the first sign of an auditory involvement in migraine.

Migraine with aura is described as recurrent attacks, lasting minutes, of unilateral reversible visual, sensory, or other CNS symptoms, which usually develop gradually and are usually followed by headache and other associated symptoms.¹⁴ To define the diagnosis of migraine with aura it is fundamental that the patient fulfills some criteria, such as: at least two crises in which the patient has at least one of the auras: visual, sensory, language, motor, brainstem or retinal.¹⁴ In addition, at least three characteristics among: aura spreading gradually over more than five minutes, two or more aura symptoms in succession, individual aura symptoms last between 5 and 60 minutes, at least one aura symptom is unilateral, at least one aura symptom is positive, the aura is accompanied or followed by headache within 60 minutes.¹⁴ Furthermore, it is valid to point out that for this diagnosis to be defined it is fundamental that there is no other disease that can better explain the patient's condition.¹⁴

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References

- Burstein R, Nosedá R and Borsook D. **Migraine: Multiple Processes, Complex Pathophysiology.** *The Journal of neuroscience : the official journal of the Society for Neuroscience* 2015;35(17):6619-6629 Doi: 10.1523/jneurosci.0373-15.2015
- Silberstein SD. **Migraine.** *Lancet (London, England)* 2004;363(9406):381-391 Doi: 10.1016/s0140-6736(04)15440-8
- The International Classification of Headache Disorders**, 2nd edition. *Cephalalgia: an international journal of headache* 2004;24 Suppl 1(9-160) Doi: 10.1111/j.1468-2982.2003.00824.x
- Li D, Christensen AF and Olesen J. **Field-testing of the ICHD-3 beta/proposed ICD-11 diagnostic criteria for migraine with aura.** *Cephalalgia: an international journal of headache* 2015;35(9):748-756 Doi: 10.1177/0333102414559731
- Foroozan R and Cutrer FM. **Transient neurologic dysfunction in migraine.** *Neurologic clinics* 2009;27(2):361-378 Doi: 10.1016/j.ncl.2008.11.002
- Lauritzen M. **Pathophysiology of the migraine aura. The spreading depression theory.** *Brain : a journal of neurology* 1994;117:199-210 Doi: <https://doi.org/10.1093/brain/117.1.199>
- Whitman BW and Lipton RB. **Oscillopsis: An Unusual Auditory Aura in Migraine.** *Headache Medicine* 1995;35(7):428-429 Doi: 10.1111/j.1526-4610.1995.hed3507428.x
- Harker L. **Migraine-associated vertigo.** In: Nova York: *Oxford Univ Press* 1996; 407-417
- Olsson J. **Neurologic Findings in Basilar Migraine.** *Laryngoscope* 1991;101(S52):1-41 Doi: 10.1002/lary.1991.101.s52.1
- Schreier HA. **Auditory Hallucinations in Nonpsychotic Children With Affective Syndromes and Migraines: Report of 13 Cases.** *Journal of child neurology* 1998;13(8):377-382 Doi: 10.1177/088307389801300803
- Ambrosini A, Rossi P, De Pasqua V, Pierelli F and Schoenen J. **Lack of habituation causes high intensity dependence of auditory evoked cortical potentials in migraine.** *Brain: a journal of neurology* 2003;126(9):2009-2015 Doi: 10.1093/brain/awg206
- Rubin D, Mcabee GN and Feldman-Winter LB. **Auditory Hallucinations Associated With Migraine.** *Headache* 2002;42(7):646-648 Doi: 10.1046/j.1526-4610.2002.02153.x
- Dash AK, Panda N, Khandelwal G, Lal V and Mann SS. **Migraine and audiovestibular dysfunction: is there a correlation?** *American journal of otolaryngology* 2008;29(5):295-299 Doi: 10.1093/brain/awg20610.1016/j.amjoto.2007.09.004
- Kowacs F, Pereira de Macedo D, da Silva-Néto R. **Classificação Internacional das Cefaleias (ICHD-3).** *Comitê de Classificação das Cefaleias da Sociedade Internacional de Cefaleia; "Tradução da Sociedade Brasileira de Cefaleia com autorização da Sociedade Internacional de Cefaleia."* São Paulo, Omnifarma, 2018 <https://ihs-headache.org/wp-content/uploads/2021/03/ICHD-3-Brazilian-Portuguese.pdf>