CASE STUDY

Palinacousis Secondary to Brain Damage From Methotrexate

Palinacusia secundaria a daño cerebral por metotrexato

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Clinical Case

A 33-year-old woman, diagnosed with stage IVB Burkitt’s lymphoma, with multisystemic involvement. Treated with chemotherapy (protocol R-CODOX/M/IVAC) and allogeneic transplantation.

The patient attended the ENT department with left-sided peripheral facial paralysis, from which she is recovering. When we took her clinical history she told us that she had started to hear sounds in her left ear that repeated over and over again until they disappeared spontaneously. These were noises that she had heard previously (the doorbell, peal of bells, etc.). The noises were so real to her that she would answer them and ask if anybody else could hear them.

Hearing screening by tone audiometry, verbal audiometry, acoustic otoemissions and brainstem auditory evoked potentials was completely normal.

Shortly afterwards the patient was admitted to the neurology department presenting with a tonic-clonic seizure. Neurological examination and CSF were normal. MRI showed a periventricular leukoencephalopathy in the right temporal region, and was interpreted as the toxic effect of methotrexate that did not subsequently alter (Fig. 1). Four seizures were recorded on the EEG, one was electroclinical (Fig. 2), with persistent auditory sensations in the left ear and intense headache.

The patient was started on antiepileptic treatment with levetiracetam. The hearing symptoms disappeared one week later and EEG was normal.

Discussion

The term palinacousis derives from the Greek words "palin" meaning again and "acousis" meaning hearing. Jacobs et al. (1971) described the condition for the first time, as an auditory illusion consisting of a noise persisting for seconds, minutes, hours, etc., after the auditory stimulation that triggered it has stopped. It is a strange phenomenon, which is probably more common than has been published. Although its pathophysiology is unknown, it might be the consequence of some dysfunction in the inhibitory neurons of the primary auditory areas. When it appears in the context...
of epileptic seizures, it is a matter of debate whether it is an ictal phenomenon, or a phenomenon of postictal brain tissue discharge. In our case, it was probably an ictal phenomenon as we were able to record a right temporal lobe electrical seizure (Fig. 2) that coincided with the clinical manifestations. In addition, the disappearance of symptoms and anomalies on the EEG with anti-epileptic treatment, lead us to assume that in this patient the palinacousis was a manifestation of her seizures. Experimentally, the persistent auditory sensations were triggered by electrical stimulation of the dominant temporal lobe.

One of the characteristics of palinacousis is that it does not start spontaneously (as occurs with hallucinations), but rather is triggered by an environmental stimulus. It is usually perceived immediately after the sound that causes it, and less frequently it appears after a variable period of latency. Human voices are usually the main source, but non-verbal stimuli can also be the trigger, as in the case described. The content of the voices or sounds is neutral and does not cause distress (unlike the persecuting voices of psychosis), but the sounds are frequently so real, that the patient responds by looking for their source, as in our case. In 46% of the processes published (11 out of 24) the auditory illusion is perceived in the opposite ear to the lesion, which in 50% is the left and in 21% the right (in the remainder, the damage is bilateral or cannot be located). It is usually the temporal lobe that is affected.

Palinacousis can present with different brain disorders, such as vascular malformations, haemorrhage or ictus, primary or metastatic tumours, trauma, meningoencephalitis, and even when there is no apparent lesion in cases of alcohol abuse, epileptic seizures or after discontinuation of antipsychotic medication.

It is important to differentiate this auditory illusion from a hallucination, which appears in the context of a psychiatric disease. The neutral content, the trigger being environmental and the absence of mental symptoms provide the key to this difference.

In summary, the patient we describe presented with a left palinacousis. She reported hearing some non-verbal sounds repeatedly in her left ear, which she had heard previously (environmental stimulus) that did not trigger an emotional response (neutral) other than trying to find the source of the noises, because she considered them real. The ENT study was normal, and neurological examination using EEG revealed partial complex seizures with their focus in the temporal lobe, which disappeared along with the symptoms, after anti-epileptic treatment.
Conflict of Interests

The authors have no conflict of interests to declare.

References