

Steroid-Induced Musical Hallucinations

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Musical hallucinations, a phenomenon where music is perceived in the absence of an external auditory stimulus, have been associated with diverse etiologies including neurological, psychiatric, and pharmacologic. Thus far, there has only been one other case reported in the literature: a case¹ of betamethasone-induced musical hallucinations in a patient with premorbid psychopathology. We describe a unique case of a 59-year-old Spanish-speaking man with no prior psychiatric history who developed musical hallucinations following the administration of methylprednisolone.

Case Report

A 59-year-old Spanish-speaking man with a history of interstitial pulmonary fibrosis, subsequent right lung transplant, and no known psychiatric history was admitted to the hospital due to nausea/vomiting, hyponatremia, and a decline in pulmonary function tests. His declining medical status was thought to be the result of acute cellular rejection, for which he was prescribed methylprednisolone 500 mg daily for 3 days.

Within hours of his initial steroid administration, the patient reported experiencing auditory hallucinations in the form of a Mexican song, “Mi Morena.” The hallucinations were continuous, primarily right-sided, and experienced as hearing the singer’s voice and band instruments played through a speaker. Reality testing remained intact with an otherwise noncontributory mental status examination, denying visual or tactile hallucinations, symptoms of mania, depression, trauma, changes in vision, headaches, syncope, photophobia, or phonophobia. There was no evidence

of delirium, and a bedside neurological evaluation was without focality. A computed tomography examination of the head was unremarkable, and interval full metabolic panels showed hyponatremia resolution prior to hallucination onset without other notable abnormalities. Within 24 hours of methylprednisolone cessation, the musical hallucination intensity decreased to intermittent frequency with silence between multihour episodes, and within 48 hours, they ceased without recurrence. Given the brief time-limited methylprednisolone course and minimal patient distress, antipsychotic treatment was deferred, and the antirejection regimen was not altered.

Discussion

Musical hallucinations typically manifest as the perception of songs, melodies, or musical elements in the absence of external auditory input and can vary in complexity.² They are broadly categorized as idiopathic or secondary (symptomatic) with heterogeneous etiologies, including neurological sources (brain injury, stroke, and epilepsy), psychiatric sources (psychosis, depression, obsessive-compulsive disorder, and substance use), and pharmacologic precipitants (intoxication and withdrawal).^{3,4} Literature discussing pharmacologic precipitants to musical hallucinations is sparse, with case reports implicating ototoxic agents (salicylates, quinine, and cisplatin), antidepressants (clomipramine and imipramine), antiepileptics (phenytoin and carbamazepine), antihypertensives/antiarrhythmics (propranolol and amiodarone), and neurotransmitter modulators (benzodiazepines, amphetamines, and ethanol).^{5,6}

Even more limited is the association of steroids with musical hallucinations. Steroid neuropsychiatric sequelae include mood disturbances (depression and mania), anxiety, personality changes (aggression and inhibition), and psychosis (delusions, auditory/visual hallucinations, and thought disorders).⁷ The exact mechanism of steroid-induced musical hallucinations is unknown. Current hypotheses regarding musical hallucination pathophysiology involve hypoacusis or reduced hearing sensitivity. Hypoacusis, whether age-related or due to auditory circuit disruption (ie, ototoxicity), results in sensory deprivation–induced disinhibition of auditory cortices, leading to overactivity of the auditory cortex and related hallucinations.⁸ The phenomenon, coined Oliver Sacks syndrome, is akin to phantom limb sensations in amputees or the visual release phenomenon described in Charles Bonnet syndrome. Additionally, there are known risk factors for musical hallucinations, including age and affinity for music, which may have contributed to our patient’s presentation.⁹ Dopamine and serotonin signal alteration, the driving force for steroid-induced psychosis and mania, may further increase risk of development of musical hallucinations.

Musical hallucination treatment options are equally as diverse as etiologic sources. Hearing aids are indicated in patients where hypoacusis is present and serve to reduce auditory cortex overactivity by reducing sensory deprivation.⁸ In cases of musical hallucinations due to ototoxic agents, reversibility of symptoms depends on various factors, including the extent of damage and duration of exposure, though musical

hallucinations appear largely self-limited with agent cessation.¹⁰ Psychopharmacologic interventions have been studied including antidepressants, antiepileptics, acetylcholinesterase inhibitors, antipsychotics, and benzodiazepines, with emerging evidence for transcranial magnetic stimulation of the left temporoparietal junction in reducing musical hallucination intrusiveness and frequency with resolution preserved with once-weekly treatment.^{11–14}

Indication for use depends on underlying etiology and related comorbidities, though none are curative with a focus on reducing symptom severity and patient distress.

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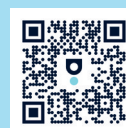
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References

1. Kanemura S, Tanimukai H, Tsuneto S. Can “steroid switching” improve steroid-induced musical hallucinations in a patient with terminal cancer? *J Palliat Med*. 2010;13(12):1495–1498.
2. Berrios GE. Musical hallucinations. A historical and clinical study. *Br J Psychiatry*. 1990;156(2):188–194.
3. Evers S, Ellger T. The clinical spectrum of musical hallucinations. *J Neurol Sci*. 2004;227(1):55–65.
4. Mahendran R. The psychopathology of musical hallucinations. *Singapore Med J*. 2007;48(2):e68–e70.
5. Hase T, Yasui-Furukori N, Yamaguchi S, et al. A case of musical hallucinations induced by tramadol. *Neuropsychopharmacol Rep*. 2023;43(1):160–162.
6. Al-Awad FA. The phenomenon of musical hallucinations: an updated review. *Electron J Gen Med*. 2023;20(6):em533.
7. Bachu AK, Davis V, Abdulrahim M, et al. Corticosteroid-induced psychosis: a report of three cases. *Cureus*. 2023;15(5):e39221.
8. Zein M, Sher Y. Musical memories—musical hallucinations in a lung transplant recipient: case report and literature review. *J Acad Consult Liaison Psychiatry*. 2021;62(1):140–149.
9. Cope TE, Baguley DM. Is musical hallucination an otological phenomenon? a review of the literature. *Clin Otolaryngol*. 2009;34(5):423–430.
10. Rizk HG, Lee JA, Liu YF, et al. Drug-induced ototoxicity: a comprehensive review and reference guide. *Pharmacotherapy*. 2020;40(12):1265–1275.
11. Coebergh JAF, Lauw RF, Bots R, et al. Musical hallucinations: review of treatment effects. *Front Psychol*. 2015;6:814.
12. Blom JD, Coebergh JAF, Lauw R, et al. Musical hallucinations treated with acetylcholinesterase inhibitors. *Front Psychiatry*. 2015;6:46.
13. Colon-Rivera HA, Oldham MA. The mind with a radio of its own: a case report and review of the literature on the treatment of musical hallucinations. *Gen Hosp Psychiatry*. 2014;36(2):220–224.
14. Nordberg J, Taiminen T, Virtanen L, et al. Successful suppression of musical hallucinations with low-frequency rTMS of the left temporo-parietal junction: a case report. *Brain Stimul*. 2021;14(6):1467–1469.

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