

Hallucinations: Common features and causes



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Awareness of manifestations, nonpsychiatric etiologies can help pinpoint a diagnosis

Not all patients who experience hallucinations have a psychotic disorder. Many physical and psychiatric disorders can manifest with hallucinations, and some patients have >1 disorder that could cause different types of hallucinations. To avoid providing unnecessary or ineffective treatments—and to ensure that patients receive proper care for nonpsychiatric conditions—it is important to accurately diagnose the disorder causing a patient’s hallucinations.

In this article we describe common features and psychiatric and nonpsychiatric causes of auditory, visual, olfactory, gustatory, tactile, and somatic hallucinations. Awareness of typical presentations of hallucinations associated with specific disorders can help narrow the diagnosis and provide appropriate treatment.

Shahid Ali, MD

Assistant Professor, Clinical Psychiatry

Milap Kumar Patel, MD

Research Associate

Jaymie Avenido, MD

Research/Forensic Psychiatry Associate

Rahn K. Bailey, MD, FAPA

Associate Professor

Shagufta Jabeen, MD

Assistant Professor, Clinical Psychiatry

Wayne J. Riley, MD, MPH, MBA, MACP

Professor of Family Medicine

• • • •

Department of Psychiatry and Behavioral Sciences
Meharry Medical College
Nashville, TN

Auditory hallucinations

Also known as paracusia, auditory hallucinations are perceptions of sounds without identifiable external stimuli. This type of hallucination has various causes (Table 1).¹ A frequent symptom of schizophrenia, auditory hallucinations can cause substantial distress and functional disability.² Approximately 60% to 90% of patients with schizophrenia and up to 80% of those with affective psychoses experience auditory hallucinations.¹

Auditory hallucinations in psychosis usually are formed and complex.³ A common manifestation is hearing ≥ 1 voices. A patient might experience 2 voices talking about him in the third person. The voices may be perceived as coming from inside or outside

Table 1

Common causes of auditory hallucinations

Peripheral lesions
Middle ear disease
Inner ear disease
Auditory nerve disease
CNS disorders
Temporal lobe epilepsy
Pontine lesions
Stroke
Arteriovenous malformations
Syncope
Toxic metabolic disturbances
Alcoholic hallucinosis
Delirium
Hallucinogens
Schizophrenia
Mania
Psychotic depression
Dissociative identity disorder
Posttraumatic stress disorder
Source: Reference 1

Clinical Point

Auditory perceptions of music have been associated with partial seizures

the patient’s head. Some might hear their own thoughts spoken aloud. According to DSM-IV-TR, “hearing voices” is sufficient to diagnose schizophrenia if the hallucinations consist of a voice keeping up a running commentary on the person’s behavior or ≥2 voices conversing with each other.⁴ Auditory hallucinations also are seen in mood disorders but tend to be milder than their psychosis-induced counterparts.

Simple (unformed) auditory hallucinations—referred to as tinnitus—can be caused by disease of the middle ear (otosclerosis) or inner ear. These unformed hallucinations consist of buzzing or tones of varying pitch and timbre.¹

Partial seizures may cause auditory hallucinations. Perceptions of music have been associated with partial seizures.⁵ Curie and colleagues found that 17% of 514 patients with temporal lobe epilepsy had auditory hallucinations as a component of their seizures.⁶ These hallucinations typically are brief, stereotyped sensory impressions and, if formed, may be trivial sentences, previously heard phrases, or commands.

Alcoholic hallucinosis is a hallucinatory syndrome caused by alcohol withdrawal. These hallucinations usually are vocal and typically consist of accusatory, threatening, and/or critical voices directed at the patient.¹ Patients with alcohol hallucinosis also may experience musical auditory hallucinations.^{7,8}

CNS neoplasms can produce auditory hallucinations in 3% to 10% of patients.⁹ Hemorrhages and arteriovenous malformations in the pontine tegmentum and lower midbrain have been associated with acute onset of auditory hallucinations. The sounds typically are unformed mechanical or seashell-like noises or music.¹⁰

Patients with migraines rarely report auditory hallucinations. When they occur, they typically consist of perceived unilateral tinnitus, phonophobia, or hearing loss.

Visual hallucinations

Visual hallucinations manifest as visual sensory perceptions in the absence of external stimuli.¹¹ These false perceptions

may consist of formed images (eg, people) or unformed images (eg, flashes of light).¹² Visual hallucinations occur in numerous ophthalmologic, neurologic, medical, and psychiatric disorders (*Table 2, page 24*).¹³

DSM-IV-TR lists visual hallucinations as a primary diagnostic criterion for several psychotic disorders, including schizophrenia and schizoaffective disorder,⁴ and they occur in 16% to 72% of patients with these conditions.^{14,15} Patients with major depressive disorder or bipolar disorder also may experience visual hallucinations. Visual hallucinations in those with schizophrenia tend to involve vivid scenes with family members, religious figures, and/or animals.¹⁶

Delirium is a transient, reversible cause of cerebral dysfunction that often presents with hallucinations. Several studies have shown that visual hallucinations are the most common type among patients with delirium. Webster and Holroyd found visual hallucinations in 27% of 227 delirium patients.¹⁷

continued



Hallucinations

Clinical Point

Up to one-half of patients with Parkinson's disease may experience visual hallucinations

Table 2

Common causes of visual hallucinations

Neurologic disorders
Migraine
Epilepsy
Hemispheric lesions
Optic nerve disorders
Brain stem lesions (peduncular hallucinosis)
Narcolepsy
Ophthalmologic diseases
Glaucoma
Retinal disease
Enucleation
Cataract formation
Choroidal disorder
Macular abnormalities
Toxic and metabolic conditions
Toxic-metabolic encephalopathy
Drug and alcohol withdrawal syndromes
Hallucinogens
Schizophrenia
Affective disorders
Conversion disorders
Sensory deprivation
Sleep deprivation
Hypnosis
Intense emotional experiences
Source: Reference 13

Delirium tremens typically is accompanied by visual hallucinations. Visions of small animals and crawling insects are common.¹⁸ Hallucinations due to drug intoxication or withdrawal generally vary in duration from brief to continuous; such experiences often contribute to agitation.¹⁹

Migraines are a well-recognized cause of visual hallucinations. Up to 31% of those with migraines experience an aura, and nearly 99% of those with aura have visual symptoms.^{20,21} The classic visual aura starts as an irregular colored crescent of light with multi-colored edges in the center of the visual field that gradually progresses toward the periphery, lasting <60 minutes.

These simple visual hallucinations are most common; more complex hallucinations are seen more frequently in migraine coma and familial hemiplegic migraine.

Approximately 5% of patients with epilepsy have occipital seizures, which almost always have visual manifestations. Epileptic visual hallucinations often are simple, brief, stereotyped, and fragmentary. They usually consist of small, brightly colored spots or shapes that flash.²² Complex visual hallucinations in epilepsy are similar to hypnagogic hallucinations but are rare. Intracranial electroencephalography recordings have shown that pathological excitation of visual cortical areas may be responsible for complex visual hallucinations in epilepsy.¹⁹

Dementia with Lewy bodies (DLB) is associated with visual hallucinations.²³ Visual hallucinations occur in >20% of patients with DLB.²⁴ Patients with DLB may see complex scenarios of people and items that are not present. Visual hallucinations have an 83% positive predictive value for distinguishing DLB from dementia of the Alzheimer's type.²⁵ There is a strong correlation between Lewy bodies located in the amygdala and parahippocampus and well-formed visual hallucinations.²⁶

Visual hallucinations are common in Parkinson's disease and may occur in up to one-half of patients.²⁷ Patients with Parkinson's disease may experience hallucinations similar to those observed in DLB, which can range from seeing a person or animal to more complex, formed, and mobile people, animals, or objects.

Olfactory hallucinations

Also known as phantosmia, olfactory hallucinations involve smelling odors that are not derived from any physical stimulus. They can occur with several psychiatric conditions, including schizophrenia, depression, bipolar disorder, eating disorders, and substance abuse.²⁸ Olfactory hallucinations caused by epileptic activity are rare. They constitute approximately 0.9% of all auras and typically are described as unpleasant. Tumors that affect the medial temporal lobe and mesial temporal

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sclerosis are associated with olfactory hallucinations.²⁹ Olfactory hallucinations also have been reported in patients with multi-infarct dementia, Alzheimer's disease, and alcoholic psychosyndromes. In patients with schizophrenia, the smell may be perceived as coming from an external source, whereas patients with depression may perceive the source as internal.³⁰ Patients who perceive that they are the source of an offensive odor—a condition known as olfactory reference syndrome—may wash excessively, overuse deodorants and perfumes, or become socially withdrawn.³⁰

Gustatory hallucinations

Patients with gustatory hallucinations may experience salivation, sensation of thirst, or taste alterations. These hallucinations can be observed when the sylvian fissure that extends to the insula is stimulated electrically.³¹ Similar to olfactory hallucinations, gustatory hallucinations are associated with temporal lobe disease and parietal operculum lesions.^{31,32} Sinus diseases have been associated with olfactory and gustatory hallucinations.³³ Brief gustatory hallucinations can be elicited with stimulation of the right rolandic operculum, parietal operculum, amygdala, hippocampus, medial temporal gyrus, and anterior part of right temporal gyrus.³⁴

Tactile hallucinations

These hallucinations may include perceptions of insects crawling over or under the skin (formication) or simulation of pressure on skin.³⁵ They have been associated with substance abuse, toxicity, or withdrawal.²⁸ Tactile hallucinations are characteristic of cocaine or amphetamine intoxication.³⁵

Tactile hallucinations are a rare symptom of schizophrenia. Heveling and colleagues reported a case of a woman, age 68, with chronic schizophrenia who experienced touching and being touched by a "shadow man" several times a day in addition to auditory and visual hallucinations.³⁶ Her symptoms disappeared after 4 weeks of antipsychotic and mood stabilizer therapy.

Related Resource

• Teeple RC, Caplan JP, Stern TA. Visual hallucinations: differential diagnosis and treatment. *Prim Care Companion J Clin Psychiatry*. 2009;11(1):26-32.

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Tactile hallucinations have been associated with obsessive-compulsive disorder (OCD).³⁷ Fontenelle and colleagues suggested that OCD and psychotic disorders may share dysfunctional dopaminergic circuits.³⁷

Somatic hallucinations

Patients who have somatic hallucinations report perceptions of abnormal body sensations or physical experiences. For example, a patient may have sense of not having a stomach while eating.³⁵

This type of hallucination has been associated with activation of postcentral gyrus, parietal operculum, insula, and inferior parietal lobule on stereoelectroencephalography.³⁴ In a study of cerebral blood flow in 20 geriatric patients with delusional disorder, somatic type who were experiencing somatic hallucinations, positron emission testing scan demonstrated increased perfusion in somatic sensory processing regions, particularly the left postcentral gyrus and the right paracentral lobule.³⁸ Other researchers have linked somatic hallucinations with activation in the primary somatosensory and posterior parietal cortex, areas that normally mediate tactile perception.³⁹

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Clinical Point

Sinus diseases have been linked to olfactory and gustatory hallucinations

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Clinical Point

Sensations of insects crawling on or under the skin are characteristic of cocaine or amphetamine intoxication

Bottom Line

Auditory, visual, olfactory, gustatory, tactile, and somatic hallucinations can be caused by a wide range of physical and psychiatric conditions. Awareness of common presentations of hallucinations associated with specific disorders can help narrow the diagnosis and lead to more efficacious treatment.