Auditory hallucinations of Buddhist sutras as an initial symptom of mild cognitive impairment with Lewy bodies: A case report

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Case Report

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Abstract

**Background:** Visual hallucinations are a core feature of dementia with Lewy bodies. However, in the present case, no visual hallucinations were experienced. Instead, auditory hallucinations as represented by hearing of Buddhist sutras appeared as the initial symptom of mild cognitive impairment with Lewy bodies (MCI-LB).

**Case presentation:** An 87-year-old Japanese man presented with auditory hallucinations which he described as ambiguous; however, they consisted in the "Namu Amida Butsu" Buddhist sutra chanted by more than 100 people in a loud voice. The patient presented no visual hallucinations. Probable MCI-LB was diagnosed based on the clinical features and examination findings.

**Conclusions:** Hallucinations of rhythmic Buddhist sutras, which may fall between verbal and musical categories within auditory hallucinations, are reported as the initial symptom in a patient with MCI-LB. This report highlights the importance of considering auditory hallucinations as a potential symptom of MCI-LB. Clinicians should be aware that rhythmic chanting auditory hallucinations, categorized between verbal and musical auditory hallucinations, can be the first manifestation of MCI-LB.

Background

Visual hallucinations are a core feature of dementia with Lewy bodies (DLB) [1], appearing in approximately 61.8% (49.1 to 73.0%) of patients with this condition [2]. In contrast, although auditory hallucinations are an important symptom for DLB diagnosis [3], they are generally considered of secondary concern [2]. Auditory hallucinations are common among patients with DLB; however, a limited number of studies show that their prevalence varies from 6.7 to 45% [3]. In recent years, there have been many reports of musical hallucinations occurring as a result of mild cognitive impairment and dementia. Musical hallucinations accompanying hearing loss may reflect deterioration of cerebral function [4, 5]. Pure sensory hallucinations are believed to be less common, as only to cases pure auditory hallucinations were reported in DLB [2].

Here, we report a case of mild cognitive impairment with Lewy bodies (MCI-LB) accompanied with auditory hallucinations characterised by the hearing of Buddhist sutras, without visual hallucinations. In this report, we intend to highlight the atypical symptomatology associated with MCI-DLB, consisting of only auditory hallucinations.

Case Presentation

An 87-year-old Japanese man presented with auditory hallucinations. He had no history of mental disorders or Parkinson's disease. He had been aware of his declining hearing for seven years. Since the previous year, his wife noticed that he was less responsive to her calls and less active. Since January, he started developing auditory hallucinations and was referred to our department for admission on 26 January.
He did not present a mask-like face, and he spoke loudly and clearly. He had a mild hearing loss; however, he was able to communicate at a normal volume. He said that his auditory hallucinations started suddenly, triggered by loud noises or voices, and lasted for 1–2 hours, although there were times within that period when he did not hear any noise. He described the auditory hallucination as ambiguous; however, as he described, he heard more than 100 people chanting the "Namu Amida Butsu" Buddhist sutra in a loud voice. The indistinct human voices had a certain rhythm and choruses, as well as approximately three different fixed patterns. Auditory hallucinations appeared at all times of the day. He also said that auditory hallucinations appeared to come from outside his head rather than from inside. It could be speculated that his auditory hallucinations were not autogenic thoughts, although they were considered genuine auditory hallucinations. He had a delusion of reference regarding religious groups walking close to him. However, his behaviour was not influenced by these delusions. Both the patient and his wife declared he experienced no visual hallucinations. He had mild tremor, stiffness of the left fingers and upper limbs, and constipation. He had no bradykinesia, impaired postural retention, orthostatic hypotension, or olfactory abnormalities.

His daily activities were generally independent, although he was accompanied by his wife for instrumental activities and those involving mobility. His Mini Mental State Examination score was 24 points, with disqualification for disorientation (-1 point), calculation (-4 points), and tracing pentagon (-1 point) (Fig. 1a). Blood tests showed no abnormalities. Otolaryngologists diagnosed mild age-related hearing loss; however, they ruled out aural tinnitus due to sensorineural hearing loss. An electroencephalogram showed no slow-wave findings that would suggest a disturbance in consciousness. Head computed tomography showed atrophic changes in the bilateral medial temporal lobes (arrows in Fig. 1b). There was an old haemorrhage in the right putamen (arrow in Fig. 1c) and a few lacunar infarctions in the left putamen and thalamus (arrowheads in Fig. 1c). Brain perfusion with technetium-99m ethyl cysteinate dimer revealed bilateral medial occipital hypoperfusion (Fig. 1d). Reduced cardiac uptake and enhanced washout were observed on $^{123}$I-meta-iodobenzylguanidine scintigraphy (Fig. 1e). We diagnosed probable MCI-LB based on the clinical features and examination findings [6]. The diagnostic criteria for Parkinson's disease were not satisfied [7].

**Discussion And Conclusions**

This is a report of a unique auditory hallucination consisting of rhythmic Buddhist sutras, which may fall between verbal and musical categories within auditory hallucinations, as the initial symptom in a patient with MCI-LB. Thus, this report highlights the importance of recognising auditory hallucinations as a potential symptom of MCI-LB.

In general, auditory hallucinations in DLB typically develop at moderate and late stages of the disease; thus, they are considered supportive rather than suggestive or a core feature [8]. A study showed that auditory hallucinations, although they are are common neuropsychiatric symptoms in DLB, do seldom present alone, and usually appear as a background soundtrack accompanying visual hallucinations [3]. The most common type of auditory hallucination is verbal, reported as human voices emanating from
outside the patient's head, often indistinct or unintelligible [2]. This characteristic is similar to that observed in our case. However, the most notable aspect in this case was the rhythmic chanting auditory hallucination.

Musical auditory hallucinations can appear in dementia, especially in cases of hearing loss [9]; consistently, mild hearing loss was observed in this case. The physiopathological mechanism of musical hallucinations is unknown; however, it is known to be associated with learned melodies, which suggests that musical auditory hallucinations are derived from perceptual experiences accumulated in musical memory circuits. In cases of deafness or compromise of the pontine inhibitory pathways over these musical memory circuits, anomalous disinhibition of these circuits and liberation of this type of memory in the form of musical auditory hallucinations may occur [10, 11]. In terms of verbal auditory hallucinations, a recent report suggested that patients with schizophrenia who exhibited this type of hallucinations had significantly smaller bilateral hippocampal volumes and smaller surface areas in the left superior frontal cortex and caudal middle frontal gyrus [12]. Although functional changes in the occipital lobe have been noted in DLB, atrophy of the medial temporal lobe, especially the hippocampus, has been observed in some cases, albeit to a lesser extent than in Alzheimer's disease [13]. A previous study showed that in patients with DLB and visual hallucinations, there were significant decreases in the left inferior parietal lobule, left superior temporal gyrus, and right primary visual cortex, while in patients with auditory hallucinations, there were significant increases in the right middle occipital and right inferior occipital gyri as observed by brain perfusion single-photon emission computed tomography [14].

This case shows atrophic changes in the bilateral medial temporal lobes; however, it does not coincide with previous studies in terms of areas of reduced cerebral blood perfusion. The head single-photon emission computed tomography findings in this case are suggestive of reduced blood flow observed in patients with DLB; however, they do not point to blood flow changes as reported in patients with DLB with auditory hallucinations. The actual relationship between reduced cerebral blood flow, auditory hallucinations, and their underlying mechanisms in DLB is still unknown, as it is unclear why this case of MCI-LB presented only with auditory hallucinations. Further phenomenological and pathophysiological studies focusing on auditory hallucinations in MCI-LB during the prodromal phase of DLB are required in this regard. Head single-photon emission computed tomography reflects synaptic function; however, its accuracy is generally lower than that of positron emission tomography [15]. Positron emission tomography was not performed in this case; however, it may be useful to investigate the association of MCI-LB or DLB with verbal and musical auditory hallucinations. Auditory hallucinations are often considered a sign of psychotic disorder [16]. The use of antipsychotics generally exacerbates Parkinsonism, especially when complicated by DLB [16]. Thus, clinicians should be alert not only to visual hallucinations but also to auditory hallucinations as an initial symptom of MCI-LB, the precursor stage of DLB.

In conclusion, clinicians should be aware that rhythmic chanting auditory hallucinations, considered as categorised between verbal and musical auditory hallucinations, can appear as the first manifestation of MCI-LB.
Abbreviations
DLB; dementia with Lewy bodies.
MCI-LB; mild cognitive impairment with Lewy bodies.

Declarations

Ethical Approval and Consent to participate
All actions described in this case report were conducted in accordance with ethical guidelines. This was a case report, and the Ethics Committee of the University of Occupational and Environmental Health excused the review. Informed consent was obtained from the patient for participation in this case report.

Consent for publication
Informed consent was obtained from the patient for publication of anonymous information in this manuscript.

Availability of data and materials
Data supporting the findings of this report are available from the corresponding author upon reasonable request.

Competing interests
All authors do not have any conflict of interest.

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Author’s Contributions
NO investigated and made a significant contribution to the draft of the manuscript. NO, TH, and HT contributed to patient treatment. SI supervised the imaging findings and the imaging part of the manuscript. AI and RY contributed to supervision and revision. All authors have agreed to the journal to which the article has been submitted. All authors have read and approved the final manuscript.

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References


Figures

Figure 1

(a) The Mini-Mental State Examination shows disqualification in tracing pentagons. (b) Head computerised tomography showing atrophic changes in the bilateral medial temporal lobes (arrow). (c) Presence of old haemorrhage in the right putamen (arrow) and a few lacunar infarctions in the left putamen and thalamus (arrowheads). (d) Brain perfusion with technetium-99m ethyl cysteinate dimer showing bilateral medial occipital hypoperfusion. (e) Reduced cardiac uptake and enhanced washout are shown in $^{123}$I-meta-iodobenzylguanidine scintigraphy