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# THE ENIGMA OF LEWY BODY DEMENTIA: A CASE REPORT

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SUMMARY – Lewy body dementia is a progressive neurodegenerative disease and is considered to be the second most common cause of dementia in the elderly. Because of the complexity of clinical presentation, it is often misdiagnosed and mistaken for other dementias, which may result in administering inappropriate therapy, and thus worsening of the patient condition. We reviewed a case of a 71-year-old patient whose clinical presentation gradually occurred with complex visual hallucinations, atypical extrapyramidal motor symptoms, fluctuating cognitive impairments with delirious episodes, and oscillating syncope. Depressive mood, impaired daily functioning and sensitivity to antipsychotics were also noted. Extensive diagnostic workup was performed with neuropsychological testing and use of single-photon emission computerized tomography. Considering the clinical presentation and diagnostic procedures performed, the diagnosis of Lewy body dementia was set and pharmacotherapy was revised. We discuss the importance of taking overall clinical presentation and diagnostic treatment in consideration and applying appropriate therapy to slow down the progression of the disease and exacerbation of the patient's psychological functions.

Key words: Lewy body disease; Cognitive dysfunction; Hallucinations; Parkinsonian disorders; Cholinesterase inhibitors; Dementia

## Introduction

Lewy body dementia (LBD) is a progressive neurodegenerative disease that is considered to be the second most common cause of dementia after Alzheimer's disease (AD)<sup>1,2</sup>. Usually, it is clinically and pathologically overlapping with Parkinson's disease dementia (PDD) or with AD, making it difficult to identify and differentiate in a timely manner<sup>3,4</sup>. The disease starts gradually, usually in the seventh decade, it is twice as common in men and can be initially presented with dementia or parkinsonism, although patients de-

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velop both clinical pictures over time<sup>5</sup>. LBD is characterized by cognitive fluctuations, behavioral REM sleep disturbance, early occurrence of visual hallucinations, and less frequently, by auditory hallucinations or delusions<sup>1</sup>. Parkinsonism in LBD differs somewhat from that in Parkinson's disease, but due to nonspecificity, LBD is diagnosed when cognitive impairment precedes parkinsonism or occurs within a year of the appearance of extrapyramidal symptoms ('one-year rule')<sup>3</sup>. In addition, significant autonomic dysfunction is present in more than half of the patients<sup>6</sup>, with frequent comorbid anxiety and depression<sup>7</sup>. Among other things, pronounced sensitivity to antipsychotics, especially dopamine antagonists, is clinically very important in recognizing LBD<sup>8</sup>.

Although the diagnosis of LBD can be confirmed with certainty only by autopsy of brain tissue, apart

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from basic clinical features, differentiation of the diagnosis is possible using magnetic resonance imaging (MRI) and single-photon emission computerized tomography (SPECT), i.e., a finding of temporoparietal and occipital hypoperfusion with reduced uptake of the striatal dopamine transporter<sup>3</sup>.

In this paper, we review a case of a man whose clinical presentation, hypersensitivity to antipsychotic therapy and diagnostic findings led us to suspect LBD. Our aim was to show the complexity of diagnosing LBD due to nonspecificity of various symptoms, which may result in the administration of inappropriate therapy and deterioration of clinical presentation, and thus of the patient condition.

# Case Report

A 71-year-old patient, a retired sailor, married, father to three children, was admitted to the hospital for diagnostic check-up and treatment of organic hallucinosis and mildly manifested extrapyramidal symptoms. He was unburdened with neuropsychiatric heredity. The patient described extrapyramidal disorders as initial symptoms, which had begun to appear two years after retirement (fifteen years before). At first, he was treated with pramipexole dihydrochloride monohydrate. Visual hallucinations then started to appear and every day he saw a person he knew but it was not real. Parkinson's disease was diagnosed based on the persistence of extrapyramidal symptoms and was treated with a combination of levodopa and carbidopa. It resulted in intensified visual hallucinations, and the patient described it as seeing the crew and ships. Shortly before hospitalization, the patient was examined at a psychiatric outpatient clinic and was diagnosed with organic hallucinosis and a depressive episode. Escitalopram and olanzapine were introduced in therapy but the patient did not adhere to treatment recommendations. In the last two years, the patient experienced hypotensive episodes and syncope that led to the diagnosis of a cervical syndrome. At the same time, the patient experienced deterioration of daily functioning with a marked decline in decision making. Previously, he was treated for syphilis and suffered from asthma and gout. During the examination, he complained of frequent urination and constipation. He denied taking any psychoactive substances.

On the day of hospital admission, the patient was occasionally disoriented, he responded with short latency, along with psychomotor slowing with noticeable choreiform movements of the body, predominantly of the head, torso and arms. Also, cogwheeling effect and lead-pipe resistance were mildly indicated. He appeared to be hypothymic with weak affective modulation and pronounced intrapsychic tension. His thought flow was mildly slowed without any delusions in the thought content. He confirmed complex visual hallucinations which he described in detail with affective engagement. In the domain of personality, he seemed inclined to suppression and projection with occasionally reduced tolerance to external frustration. The patient's cognitive functions fluctuated throughout the day, primarily with impairment of executive functions (positive Luria's test).

Neurological testing revealed dysarthria, bradykinesia, hypomimia and elevated muscle tone of extrapyramidal type in all extremities, without loss of sensation. In Romberg's position, there was latero- and retropulsion, while walking was characterized by smaller steps.

Routine laboratory check-up revealed no significant deviations. Brain CT, which was performed due to frequent oscillations of consciousness and syncope, excluded acute neurological events, as well as any sort of an expansion process. Brain MRI showed diffuse atrophic changes of the brain with widening of the subarachnoid fluid space and brain sulci in frontoparietal and temporo-occipital region and atrophic changes of the cerebellum with expanded pericerebellar fluid spaces. There was absence of the representation of both putamina and the left nucleus caudatus, while the accumulation in the right nucleus caudatus was relatively maintained on the SPECT scan with 123-I ioflupane (Fig. 1). Basal brain activity was elevated along with severe functional impairment of the striatal dopamine system. Serologic testing excluded HIV dementia while reactive quantitative TPHA test for syphilis was positive. However, due to history data on previously treated syphilis, differential diagnosis of neurosyphilis was excluded. Neurologically determined anosmia was differentiated as a condition that occurred due to postinfectious neuritis along with subsequent permanent damage to the olfactory nerve. Neuropsychological testing using the instruments of clinical interview, WB II Verbal Part, WB Memory Scales, FAS and Rey Complex Figure Test revealed impaired verbal fluency,



Fig. 1. SPECT scan with 123–I ioflupane showing elevated basal brain activity, along with severe functional impairment of the striatal dopamine system.

decreased memory and learning ability, reduced visualmotor abilities, and concentration disturbances.

Considering the diagnostic workup performed (clinical signs and neuroradiological confirmation), the diagnosis of LBD was made and pharmacotherapy was revised. During hospitalization, pramipexole was excluded from therapy due to worsening of visual hallucinations, while levodopa/carbidopa was continued at a dose of 250/25 mg TID. Rivastigmine was also introduced at a dose of 3 mg daily and divided into morning and evening applications as an acetylcholinesterase inhibitor recommended for the treatment of this type of dementia. Due to complex hallucinatory experiences and consequential affective engagement, clozapine was administered as an evening dose of 25 mg. Visual hallucinations then diminished and ceased, while the extrapyramidal symptoms were less pronounced, as well as cognitive fluctuations, with absence of delirium episodes and normalization of circadian rhythm.

## **Discussion and Conclusion**

The variety of clinical presentation in the reviewed patient manifested as fluctuating cognitive impairments primarily in executive functioning with fluctuating delirious episodes and daily drowsiness, complex visual hallucinations, and atypical extrapyramidal motor symptoms. Episodes of oscillating syncope were present, as well as depressive mood and sensitivity to antipsychotics. A similar clinical state is described by Wearne *et al.*<sup>9</sup>. Based on the clinical state and diagnostic workup performed, LBD was suspected, with difficult differentiation from other dementias, especially AD and PDD, as well as their possible combinations<sup>10,11</sup>.

It is considered that the main feature of LBD is fluctuation of cognitive functions, which can be observed in most patients<sup>12</sup>. However, there are difficulties in consistent assessment of their presence<sup>3,13</sup>. Neuropsychological assessment of the presented patient revealed reduced memory capacity and learning ability, with reduced visual motor abilities and concentration disturbances, which is consistent with the data available<sup>14</sup>. However, although memory impairment occurs at an earlier stage of both disorders, the pattern of neuropsychological deficits in LBD differs from that in AD in terms of less pronounced memory impairment and more serious impairment of visual spatial orientation, attention, and executive functions<sup>13,15</sup>.

Furthermore, in our patient, as well as in around half of the patients diagnosed with LBD, well-formed visual hallucinations are present, which also are the most frequent psychiatric symptom of LBD. They may be accompanied by auditory hallucinations, delusions, anxiety, and behavioral disturbances, all of which distinguish this disease from dementia of another etiology, or from delirium induced by external causes<sup>16,17</sup>. The presence of visual hallucinations and cognitive impairment is associated with acetylcholinesterase deficiency, which is more pronounced in LBD than in AD<sup>18</sup>, and a correlation of visual hallucinations with the distribution of Lewy bodies in temporal lobes was also noted<sup>19</sup>.

The above-mentioned extrapyramidal symptoms in LBD are present in 25% to 50% of patients, and they are similar to those in Parkinson's disease with more pronounced postural instability, reduced facial expression, and less pronounced tremor, but with regard to clinical similarity between LBD and PDD, they often are differentiated by the use of already mentioned 'one-year rule'<sup>3,20</sup>.

Depressive symptoms can be present in 33% to 50% of LBD patients, which was the case in our patient, which makes a greater percentage in relation to AD and similar percentage in relation to PDD<sup>17,21,22</sup>. Retrospective case-control studies indicate that the occurrence of depression or delirium before the diagnosis of dementia is more common in LBD than in AD<sup>7</sup>.

Spread of LBD related pathology to the brainstem and autonomic nervous system leads to orthostatic hypotension and/or carotid sinus hypersensitivity, which consequently leads to syncope episodes that are more common in LBD than in AD<sup>6</sup>. Other symptoms such as constipation, REM sleep disturbances with daily drowsiness and restlessness during the night, hyposmia and postural vertigo appear several years prior to memory disorder in LBD<sup>23,24</sup>. Untimely urinary incontinence was observed in LBD, unlike AD, and it reflects an autonomic nervous system disorder<sup>25</sup>. Symptoms of autonomic dysfunction were present in our patient, which is consistent with the data reported by Horimoto *et al.*, who established that all subjects exhibited some of the symptoms of autonomic dysfunction, and 62% experienced symptoms of severe autonomic dysfunction<sup>6</sup>.

In the available literature, there are abundant data on difficulties in differentiating among different types of dementia, LBD not being an exception. LBD could be misdiagnosed as PDD because of clinical manifestations<sup>26,27</sup>, as in the case presented, and often as AD<sup>26</sup> or frontotemporal dementia<sup>28</sup>. Although a specific biomarker is still not available to confirm the LBD diagnosis, MRI findings in those involved, as in our patient, show a relatively preserved medial temporal lobe cortex with global cortical atrophy in comparison to patients with AD<sup>29</sup>, while structural changes shown by MRI in LBD compared to PDD are relatively identical<sup>30</sup>. Furthermore, SPECT scans can be used to evaluate the integrity of dopaminergic nigrostriatal neurons, as well as to distinguish LBD from other forms of dementia. Namely, a possible indicative biomarker for LBD is a reduced intake of dopamine transporter into basal ganglia<sup>31</sup>, as confirmed in the case presented.

Regarding treatment, cholinesterase inhibitors may be used due to the already mentioned acetylcholine deficiency in LBD<sup>32-34</sup>, as confirmed in a case study<sup>35</sup>. They are effective in treating cognitive and behavioral symptoms, as well as visual hallucinations. We opted to use rivastigmine which improved the patient's condition. It is stated that more than 50% of patients have a strong reaction to antipsychotics in terms of hypersensitivity<sup>8</sup>, especially with typical antipsychotics, which also have a higher risk of parkinsonism, as well as a higher potency of atypical ones, such as olanzapine and risperidone<sup>36</sup>. But, due to complex hallucinatory experiences in our patient, clozapine was introduced to treatment, a drug with a proven positive effect on PDD<sup>37</sup>. However, quetiapine is the recommended choice for antipsychotic treatment in LBD because of the more favorable side effect profile, although evidence for its efficacy is limited<sup>38</sup>. Also, a combination of levodopa/carbidopa was introduced for the purpose of reducing motor disturbances, which is consistent with the recommendations for treating LBD<sup>39</sup>.

Lewy body dementia should be taken in consideration whenever there are well-formed visual hallucinations, cognition fluctuations, parkinsonism or neuropsychological deficits at clinical presentation. Due to the differential diagnostic complexity and sensitivity to psychopharmacotherapy, further research is required to minimize deterioration of mental functions and daily functioning and to slow down the progression of the disease.

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#### Sažetak

# ENIGMA DEMENCIJE LEWYJEVIH TJELEŠACA: PRIKAZ SLUČAJA

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Demencija Lewyjevih tjelešaca je neurodegenerativna bolest i drugi najčešći uzročnik demencije u starijih osoba. Zbog složenosti kliničke slike često se pogrešno dijagnosticira i nerijetko zamijeni s drugim demencijama, što dovodi do primjene neodgovarajuće terapije, a time i pogoršanja stanja bolesnika. Prikazujemo slučaj bolesnika u dobi od 71 godine kod kojega se klinička slika postupno prezentirala složenim vizualnim halucinacijama, atipičnim ekstrapiramidnim motoričkim ispadima, fluktuirajućim kognitivnim smetnjama uz delirantne epizode i oscilirajuće sinkope. Kod bolesnika je zabilježeno depresivno raspoloženje, narušeno svakodnevno funkcioniranje i osjetljivost na psihofarmake. Provedena je opširna dijagnostička obrada uz neuropsihologijsko testiranje i primjenu jednofotonske emisijske tomografije. Na temelju kliničke slike i diferencijalno dijagnostičke obrade posumnjalo se na demenciju Lewyjevih tjelešaca. Raspravljamo o važnosti uzimanja u obzir cjelokupne kliničke slike i dijagnostičke obrade te primjeni odgovarajućeg liječenja u svrhu prevencije progresije bolesti i pogoršanja psihičkih funkcija bolesnika.

Ključne riječi: Demencija Lewyjevih tjelešaca; Kognitivno oštećenje; Halucinacije; Parkinsonov sindrom; Inhibitori kolinesteraze; Demencija