Visual Hallucinations in Eye Disease and Lewy Body Disease

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Objectives: *Visual hallucinations (VH) most commonly occur in eye disease (ED), Parkinson disease (PD), and Lewy body dementia (LBD). The phenomenology of VH is likely to carry important information about the brain areas within the visual system generating them.* **Methods:** *Data from five controlled cross-sectional VH studies (164 controls, 135 ED, 156 PD, 79 [PDD 48 + DLB 31] LBD) were combined and analyzed. The prevalence, phenomenology, frequency, duration, and contents of VH were compared across diseases and sex.* **Results:** *Simple VH were most common in ED patients (ED 65% versus LBD 22% versus PD 9%, $\chi^2 = 31.43$, $df = 2$, $p < 0.001$), whereas complex VH were more common in LBD (LBD 76% versus ED 38%, versus PD 28%, $\chi^2 = 96.80$, $df = 2$, $p < 0.001$). The phenomenology of complex VH was different across diseases and sex. ED patients reported more "flowers" (ED 21% versus LBD 6% versus PD 0%, $\chi^2 = 10.04$, $df = 2$, $p = 0.005$) and "body parts" (ED 40% versus LBD 17% versus PD 13%, $\chi^2 = 11.14$, $df = 2$, $p = 0.004$); in contrast, LBD patients reported "people" (LBD 85% versus ED 67% versus PD 63%, $\chi^2 = 6.20$, $df = 2$, $p = 0.045$) and "animals/insects" (LBD 50% versus PD 42% versus ED 21%, $\chi^2 = 9.76$, $df = 2$, $p = 0.008$). Men reported more "machines" (13% versus 2%, $\chi^2 = 6.94$, $df = 1$, $p = 0.008$), whereas women reported more "family members/children" (48% versus 29%, $\chi^2 = 5.10$, $df = 1$, $p = 0.024$).* **Conclusions:** *The phenomenology of VH is likely related to disease-specific dysfunctions within the visual system and to past, personal experiences.* (Am J Geriatr Psychiatry 2015; ■■:■■–■■)

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Recurrent visual hallucinations (VH) are visual perceptions in the absence of an appropriate external visual stimulus. In later life, they occur mainly in the context of eye disease (ED)[1–3] and Lewy body diseases such as Parkinson disease (PD),[4,5] and Lewy body dementia (LBD) including Parkinson disease dementia (PDD)[5–7] and dementia with Lewy bodies (DLB).[2,7,8] There are numerous studies examining VH in these specific diseases, although there has been very little direct comparison of phenomenology across diseases.[9]

The phenomenology of VH is commonly classified into simple VH,[10] passage hallucinations/the feeling of presence,[11] visual illusions,[12] and complex VH.[7] Simple VH lack recognizable form and refer to dots, lines, shapes, patterns, and flashes.[10,13] Complex VH are well-formed and include faces, people, animals, objects, or landscapes.[7,13,14] The feeling of presence involves the sense of a person being present but not clearly visible in the room or house.[11] Illusions refer to experiences where it is clear that one object is distorted into another—for example, seeing a person in a curtain or perceiving blobs on the wall as faces.[12]

The phenomenology of VH likely refers to underlying dysfunction within the visual system.[13,15,16] Imaging of higher visual processing areas within the ventral and dorsal visual pathways in ED,[15] PD,[17–19] and DLB[8,20] has indicated that specific content may be related to particular patterns of neural activity. For example, a case report of ED suggested that VH consisting of letters or words are related to the left posterior fusiform gyrus, the visual word form area,[21] whereas VH involving color, faces, textures, and objects are due to increased activity in the ventral occipital lobe.[15] Functional magnetic resonance imaging studies show increased activation in the visual association cortex with deficits in the primary visual cortex[17] and hyperactivation in the frontal lobes in PD patients with VH.[19] In DLB, abnormalities in the occipitoparietal visual area have been related to VH[20] with complex VH of images of people associated with hypoperfusion in the bilateral parietal areas and left ventral occipital gyrus.[22]

VH are mostly assessed using questionnaires relying on informant or patient information. Existing questionnaires tend to underestimate the characteristics of VH.[11] Very few are designed to be used across diseases. The North East Visual Hallucination Inventory (NEVHI)[3] is an exception and has been developed for patients with visual and/or cognitive impairments and screens for different phenomenology and characteristics including frequency and severity. The aim of the present study was to compare the phenomenology and characteristics of VH in ED, PD, and LBD patients using the NEVHI[3] interview based on patient information.[23] We hypothesized that the phenomenology and characteristics of VH would be different across diseases. We further explored the effects of gender on hallucinatory content.

METHODS

Study Selection and Data Collection

There have been several studies[2–5,8,24] using NEVHI[3] since its original publication in 2008. Only controlled cross-sectional NEVHI studies with ED, PD, PDD, and DLB samples using similar methodology were included in this study. Three[3,4,8] of them had two sample groups (patients, controls), and the other two had three sample groups (controls, ED, DLB;[2] controls, PD, PDD[5]). The control groups, which included friends/relatives[2,8] or spouses of patients,[2,3,5,8] volunteers recruited via advertisement in the Newcastle Elders magazine[4] and in a local church,[3,4] and healthy controls from the research database held at the Institute for Ageing, Newcastle University,[3,5] constitute the comparison group in this study.

Diagnostic criteria were met using the revised International Consensus Guidelines from the third report of the DLB consortium for DLB, the Movement Disorder Society consensus criteria for dementia associated with PD for PDD, and the UK PD Society Brain Bank Clinical Diagnostic Criteria for PD. The principal investigators of these studies agreed to contribute their original data for the present study. Data were collected in accordance with the latest version of the Declaration of Helsinki and was approved by the National Health Service research ethics committee, United Kingdom. All procedures related to the study were explained to the participants and written informed consent was obtained prior to participation. All data were merged into a single database including 164 individuals in the comparison group and 383 patients (135 ED, 156 PD, 48 PDD, 31 DLB, 13 with combination of ED/PD/PDD/DLB). The latter 13 patients were excluded from further analysis. A sub-analysis of VH