



Published in final edited form as:

*Int Psychogeriatr*. 2015 April ; 27(4): 693–694. doi:10.1017/S1041610214001793.

## Does past or present depression differentiate Lewy body from Alzheimer disease?

Jed Falkowski<sup>1</sup>, Linda S. Hynan<sup>1,2,3</sup>, Kyle B. Womack<sup>3,4</sup>, Kimmo J. Hatanpaa<sup>3,5</sup>, Charles L. White III<sup>3,5</sup>, and Myron F. Weiner<sup>1</sup>

Jed Falkowski: JAF14@alumni.utsw.edu

<sup>1</sup>Department of Psychiatry, University of Texas Southwestern Medical Center, Dallas, Texas, USA

<sup>2</sup>Department of Clinical Sciences, Division of Biostatistics, University of Texas Southwestern Medical Center, Dallas, Texas, USA

<sup>3</sup>Alzheimer's Disease Center, University of Texas Southwestern Medical Center, Dallas, Texas, USA

<sup>4</sup>Department of Neurology and Neurotherapeutics, University of Texas Southwestern Medical Center, Dallas, Texas, USA

<sup>5</sup>Department of Pathology, University of Texas Southwestern Medical Center, Dallas, Texas, USA

Clinical differentiation of Lewy body disease (LBD) from Alzheimer disease (AD) is still problematic. Many persons with LBD lack the cardinal features of visual hallucinations, fluctuations in cognition, and mild Parkinsonism proposed by McKeith *et al.* (2005). Some studies suggest that history or presence of depression may help distinguish LBD from AD, but this is confounded because many clinically diagnosed LBD patients have significant co-morbid AD pathology and vice versa (Ranginwala *et al.*, 2008). We aimed to clarify whether history or symptoms of depression differentiate LBD from AD, in autopsy-confirmed patients, excluding patients with mixed AD and LBD pathology.

We examined clinical and pathological characteristics from the Alzheimer's Disease Center (ADC) database at the University of Texas (UT) Southwestern Medical Center collected between 1986 and 2011. The sample is composed of consecutive persons seen at the UT Southwestern ADC who had consented *antemortem* to autopsy or whose families sought *postmortem* confirmation of clinical diagnosis. All participants had consented for their data to be used on forms approved by the UT Southwestern Institutional Review Board.

Pathological diagnosis of AD was made with thioflavin-S stains for plaques and tangles. Neocortical Lewy bodies were detected by immunostaining for alpha synuclein. Our AD patients had essentially no neocortical Lewy bodies; LBD patients had only rare neuritic plaques and neurofibrillary tangles.

We used loose criteria for depression to reduce false negatives. Prevalent depression at initial visit was established by self report or observation of depressed mood by a clinician. Incident depression was diagnosed if either of the preceding criteria was met on any follow-up visit. Lifetime prevalence was defined as meeting the above criteria for depression on any visit, or report of a previous depression.

Depression and autopsy data were available for 195 AD and 20 LBD patients. There was a gender difference between groups ( $\chi^2 = 5.733$ ,  $df = 1$ ,  $p = 0.017$ ), with LBD participants more likely to be male (70% vs. 42%). The two groups did not differ in education, ( $M = 13.80$ ,  $SD = 3.04$  vs.  $M = 13.66$ ,  $SD = 3.08$  years), age at death ( $M = 79.82$ ,  $SD = 9.15$  vs.  $M = 78.18$ ,  $SD = 9.48$  years), at initial visit ( $M = 74.91$ ,  $SD = 7.86$  vs.  $M = 72.70$ ,  $SD = 9.59$  years), listed respectively. The two groups had a median of two visits, ranging from 1 to 19 visits for AD (with a range of <1 to 15 years from initial visit to death) and 1 to 22 visits for LBD patients (ranging from 1 to 13 years from first visit to death). Although data for depression were obtained from any visit, only visits that included cognitive testing are reported here.

We found an initial prevalence of depression in 5.0% (1/20) of the LBD and 6.6% (13/195) of the AD sample (Fisher's Exact  $p = 0.774$ ), and in 6.9% of combined LBD and AD patients.

Although groups did not differ significantly in initial prevalence of depression, incident depression was significantly higher among the LBD group; 20.0% (4/20) vs. 2.6% (5/195) for the AD group (Fisher's Exact  $p = 0.005$ ). The lifetime prevalence of depression also differed significantly between groups; 25% (5/20) for the LBD and 9.2% (18/195) for the AD group ( $\chi^2 = 3.75$ ,  $p = 0.030$ ).

Both incidence and lifetime prevalence predicted autopsy-confirmed LBD. In separate logistic regression models including sex, age at initial visit, and education (using the criterion of  $p < 0.15$ ), the lifetime prevalence of depression was 3.54 times higher (95% CI = 1.04 to 11.98,  $p = 0.043$ ) in the LBD group. Incident depression was 11.76 times (95% CI = 2.58 to 53.57,  $p = 0.001$ ) higher in the LBD group and the initial prevalence of depression was non-significant ( $p = 0.568$ ).

Our findings support investigations finding a difference in depression incidence between LBD and AD patients (Klatka *et al.*, 1996; Boot *et al.*, 2013). The difference between our findings and studies showing higher rates of depression in LBD may partly be due to methodological issues in assessing depression in demented patients, but we deliberately set a low threshold for the diagnosis of depression. No formal assessment of depressed mood was conducted in this study, which relied on self report and clinical observation of depression. Though this approach has limitations, such as the potential to inflate depression prevalence and incidence rates, this did not appear to occur in the current investigation. A limitation of our study is the small sample size while a strength is that we examined differences between "pure" AD and LBD patients. Because we used a convenience sample, participants may not represent the general population. Another possible weakness in our study is the use of retrospective self-report, possibly decreasing the report of lifetime depression prevalence.

In conclusion, we found a significant difference of incidence and lifetime prevalence of depression in autopsy-diagnosed LBD and AD patients and a preponderance of men in the LBD group. Thus, a history of past depressive episodes and the development of depression after the initial visit in a male should raise the suspicion of LBD alone or as a co-morbidity.

## Acknowledgments

This study was supported by NIA 5P30 AG012300, the Winspear Family Center for Research on the Neuropathology of Alzheimer's Disease, and the McCune Foundation.

## References

- Boeve BF, et al. Risk factors for dementia with Lewy bodies: a case-control study. *Neurology*. 2013; 81:833–840. [PubMed: 23892702]
- Klatka LA, Louis ED, Schiffer RB. Psychiatric features in diffuse Lewy body disease: a clinicopathologic study using Alzheimer's disease and Parkinson's disease comparison groups. *Neurology*. 1996; 47:1148–1152. [PubMed: 8909420]
- McKeith IG, et al. Diagnosis and management of dementia with Lewy bodies third report of the DLB consortium. *Neurology*. 2005; 65:1863–1872. [PubMed: 16237129]
- Ranginwala NA, et al. Clinical criteria for the diagnosis of Alzheimer disease: still good after all these years. *The American Journal of Geriatric Psychiatry*. 2008; 16:384–388. [PubMed: 18448850]