

Serum Potassium Is Associated with Cognitive Decline in Patients with Lewy Body Dementia

Article type: Research Article

Authors: [Giil, Lasse Melvaer](https://content.iospress.com:443/search?q=author%3A%28%22Giil,%20Lasse%20Melvaer%22%29) (https://content.iospress.com:443/search?q=author%3A%28%22Giil,%20Lasse%20Melvaer%22%29)^{a; b; *} | [Solvang, Stein-Erik Hafstad](https://content.iospress.com:443/search?q=author%3A%28%22Solvang,%20Stein-Erik%20Hafstad%22%29) (https://content.iospress.com:443/search?q=author%3A%28%22Solvang,%20Stein-Erik%20Hafstad%22%29)^{a; b} | [Giil, Malin Melvaer](https://content.iospress.com:443/search?q=author%3A%28%22Giil,%20Malin%20Melvaer%22%29) (https://content.iospress.com:443/search?q=author%3A%28%22Giil,%20Malin%20Melvaer%22%29)^c | [Hellton, Kristoffer H.](https://content.iospress.com:443/search?q=author%3A%28%22Hellton,%20Kristoffer%20H.%22%29) (https://content.iospress.com:443/search?q=author%3A%28%22Hellton,%20Kristoffer%20H.%22%29)^d | [Skogseth, Ragnhild Eide](https://content.iospress.com:443/search?q=author%3A%28%22Skogseth,%20Ragnhild%20Eide%22%29) (https://content.iospress.com:443/search?q=author%3A%28%22Skogseth,%20Ragnhild%20Eide%22%29)^{a; e} | [Vik-Mo, Audun Osland](https://content.iospress.com:443/search?q=author%3A%28%22Vik-Mo,%20Audun%20Osland%22%29) (https://content.iospress.com:443/search?q=author%3A%28%22Vik-Mo,%20Audun%20Osland%22%29)^{b; f} | [Hortobágyi, Tibor](https://content.iospress.com:443/search?q=author%3A%28%22Hortobágyi,%20Tibor%22%29) (https://content.iospress.com:443/search?q=author%3A%28%22Hortobágyi,%20Tibor%22%29)^{g; h} | [Aarsland, Dag](https://content.iospress.com:443/search?q=author%3A%28%22Aarsland,%20Dag%22%29) (https://content.iospress.com:443/search?q=author%3A%28%22Aarsland,%20Dag%22%29)^{f; h} | [Nordrehaug, Jan Erik](https://content.iospress.com:443/search?q=author%3A%28%22Nordrehaug,%20Jan%20Erik%22%29) (https://content.iospress.com:443/search?q=author%3A%28%22Nordrehaug,%20Jan%20Erik%22%29)^{a; b}

Affiliations: [a] Department of Internal Medicine, Haralds plass Deaconess Hospital, Bergen, Norway | [b] Institute of Clinical Sciences, University of Bergen, Norway | [c] Semmelweis University, Budapest, Hungary | [d] Norwegian Computing Center, Oslo, Norway | [e] Institute of Clinical Medicine, University of Bergen, Norway | [f] Center for Age-Related Diseases (SESAM), Stavanger University Hospital, Norway | [g] MTA-DE Cerebrovascular and Neurodegenerative Research Group, University of Debrecen, Debrecen, Hungary | [h] Department of Old Age Psychiatry, Institute of Psychiatry, Psychology and Neuroscience, Kings College, UK

Correspondence: [*] Correspondence to: Lasse Melvaer Giil, MD, Department of Internal Medicine, Haralds plass Deaconess Hospital, Bergen, Norway. E-mail: lassegiil@gmail.com (<mailto:lassegiil@gmail.com>).

Abstract: Background: Epidemiological studies link serum potassium (K⁺) to cognitive performance, but whether cognitive prognosis in dementia is related to K⁺ levels is unknown. Objective: To determine if K⁺ levels predict cognitive prognosis in dementia and if this varies according to diagnosis or neuropathological findings. Methods: This longitudinal cohort study recruited 183 patients with mild Alzheimer's disease or Lewy body dementia (LBD). Serum K⁺ and eGFR were measured at baseline and medications which could affect K⁺ registered. The Mini-Mental State Examination (MMSE) was measured annually over 5 years, and mortality registered. Association between K⁺ and $\sqrt{(30 - \text{MMSE})}$ was estimated overall, and according to diagnosis (joint model). Associations between MMSE-decline and K⁺ were assessed in two subgroups with neuropathological examination (linear regression) or repeated measurements of K⁺ over 3 years (mixed model). Results: Serum K⁺ at baseline was associated with more errors on MMSE over time (Estimate 0.18, p=0.003), more so in LBD (p=0.048). The overall association and LBD interaction were only significant in the 122 patients not using K⁺ relevant medication. Repeated K⁺ measures indicated that the association with MMSE errors over time was due to a between-person effect (p<0.05, n=57). The association between the annual MMSE decline was stronger in patients with autopsy confirmed LBD and more α -synuclein pathology (all: p<0.05, n=41). Conclusion: Higher serum K⁺ predicts poorer cognitive prognosis in demented patients not using medications which affect K⁺, likely a between-person effect seen mainly in LBD.

Keywords: α -synuclein, Alzheimer's disease, cognitive decline, kalium, Lewy body dementia, Mini-Mental State Examination, MMSE-decline, potassium, prognosis

DOI: 10.3233/JAD-181131

Journal: [Journal of Alzheimer's Disease](https://content.iospress.com:443/journals/journal-of-alzheimers-disease) (https://content.iospress.com:443/journals/journal-of-alzheimers-disease), vol. 68, no. 1, pp. 239-253, 2019

Accepted 18 December 2018 | **Published:** 12 March 2019