Predicting delirium in older non-intensive care unit inpatients: development and validation of the DELIrium risK Tool (DELIKT)

Angela E Schulthess-Lisibach [1 2 3 4 5], Giulia Gallucci [1], Valérie Benelli [1], Ramona Kälin [1], Sven Schulthess [1], Marco Cattaneo [6], Patrick E Beeler [7 8], Chantal Csajka [9 10 11 12], Monika Lutters [13 14]

[1]Clinical Pharmacy, Department Medical Services, Cantonal Hospital of Baden, Baden, Switzerland.
[2]Center for Research and Innovation in Clinical Pharmaceutical Sciences, University Hospital and University of Lausanne, Rue du Bugnon 17, 1005, Lausanne, Switzerland.
[3]School of Pharmaceutical Sciences, University of Geneva, Geneva, Switzerland.
[4]Institute of Pharmaceutical Sciences of Western Switzerland, University of Geneva, Geneva, Switzerland.
[5]Institute of Pharmaceutical Sciences of Western Switzerland, University of Lausanne, Écublens, Switzerland.
[6]Department of Clinical Research, University of Basel, Schanzenstrasse 55, Basel, Switzerland.
[7]Division of Occupational and Environmental Medicine, Epidemiology, Biostatistics and Prevention Institute, University of Zurich & University Hospital Zurich, Zurich, Switzerland.
[8]Center for Primary and Community Care, University of Lucerne, Lucerne, Switzerland.
[9]Center for Research and Innovation in Clinical Pharmaceutical Sciences, University Hospital and University of Lausanne, Rue du Bugnon 17, 1005, Lausanne, Switzerland.
[10]School of Pharmaceutical Sciences, University of Geneva, Geneva, Switzerland.
[11]Institute of Pharmaceutical Sciences of Western Switzerland, University of Geneva, Geneva, Switzerland.
[12]Institute of Pharmaceutical Sciences of Western Switzerland, University of Lausanne, Écublens, Switzerland
[13]Swiss Federal Institute of Technology, Zurich, Switzerland.
[14]Hospital Pharmacy, Cantonal Hospital of Aarau, Aarau, Switzerland.

Abstract

Background: Effective delirium prevention could benefit from automatic risk stratification of older inpatients using routinely collected clinical data.

Aim: Primary aim was to develop and validate a delirium prediction model (DELIKT) suitable for implementation in hospitals. Secondary aim was to select an anticholinergic burden scale as a predictor.

Method: We used one cohort for model development and another for validation with electronically available data collected within the first 24 h of admission. Included were patients aged ≥ 65, hospitalised ≥ 48 h with no stay > 24 h in an intensive care unit. Predictors, such as administrative and laboratory variables or an anticholinergic burden scale, were selected using a combination of feature selection filter method and forward/backward selection. The final model was based on logistic regression and the DELIKT was derived from the β-coefficients. We report the following performance measures: area under the curve, sensitivity, specificity and odds ratio.

Results: Both cohorts were similar and included over 10,000 patients each (mean age 77.6 ± 7.6 years) with 11% experiencing delirium. The model included nine variables: age, medical department, dementia, hemi-/paraplegia, catheterisation, potassium, creatinine, polypharmacy and the anticholinergic burden measured with the Clinician-rated Anticholinergic Scale (CrAS). The external validation yielded an AUC of 0.795. With a cut-off at 20 points in the DELIKT, we received a sensitivity of 79.7%, specificity of 62.3% and an odds ratio of 5.9 (95% CI 5.2, 6.7).

Conclusion: The DELIKT is a potentially automatic tool with predictors from standard care including the CrAS to identify patients at high risk for delirium.

Published in: Int J Clin Pharm. 2023 Apr 15. doi: 10.1007/s11096-023-01566-0
Contact: monika.lutters@ksa.ch