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Working

Validity of screening instruments for the detection of dementia and mild cognitive impairment in hospital inpatients: A systematic review of diagnostic accuracy studies - Study protocol

Version 2

Aljoscha Benjamin Hwang[1], Stefan Boes[2], Thomas Nyffeler[3], Guido Schuepfer[1]

[1]Staff Medicine, Cantonal Hospital Lucerne, [2]Department of Health Sciences and Health Policy, University of Lucerne, [3]Clinic for Neurology and Neurorehabilitation, Cantonal Hospital Lucerne

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Aljoscha Benjamin Hwang
Cantonal Hospital Lucerne

ABSTRACT

Introduction: As the population ages, Alzheimer's disease and other subtypes of dementia are becoming increasingly prevalent. However, in recent years, diagnosis has often been delayed or not made at all. Thus, improving the rate of diagnosis has become an integral part of national dementia strategies. Although screening for dementia remains controversial, the case is strong for screening for dementia and other forms of cognitive impairment in hospital inpatients. For this reason, the objective of this systematic review was to provide clinicians, who wish to implement screening, an up-to-date choice of cognitive tests with the most extensive evidence base for the use in elective hospital inpatients.

Methods: For this systematic review, PubMed, PsycINFO and Cochrane Library were searched by using a multi-concept search strategy. The databases were accessed on April 10, 2019. All cross-sectional studies that utilized brief, multi-domain cognitive tests as index test and a reference standard diagnosis of dementia or mild cognitive impairment as comparator were included. Only studies conducted in the hospital setting, sampling from unselected, elective inpatients older than 65 were considered.

Discussion: This is only the study protocol. Results and discussion are pending and will be published after completion of this study.

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INTRODUCTION

1 Rationale

Despite the absence of a cure for dementia, numerous dementia strategies emphasize earlier diagnosis and intervention. This drive toward earlier diagnosis and intervention has been accompanied by a debate about the value of arriving at a diagnosis of dementia earlier in the disease process. Several studies reported evidence that supports a possible beneficial effect of early and accurate diagnosis. As a result, changes in health care policies and priorities, such as the introduction of an opportunistic "dementia case-finding scheme" in the United Kingdom, or the implementation of cognitive assessments in the Medicare Annual Wellness Visit in the United States have occurred.

Country-specific guidelines and/or systematic literature reviews on which instruments to favor have already been published for the primary care setting. For the hospital setting however, where dementia and cognitive impairment are much more prevalent comparable guidelines do not exist.

Even though screening instruments advocated for the use in primary care setting are often not restricted to primary care, variations in demographic features, disease prevalence, and severity but also, differences in test conditions (e.g., timing, interventions between index test and reference standard) entail external validation prior to general application in hospital setting. In response to this demand, two systematic reviews have been conducted to establish adequate tools for dementia screening, considering the particularities of the population to be evaluated. However, while B.A. Appels et al. (2010) mostly reported validation studies sampling from selected outpatients with a focus on rather extensive screening instruments (10 to 45min administration time), Jackson et al. (2013) found a remarkable lack of robust evidence; the largest evidence base was found for the use of the Abbreviated Mental Test Score (AMTS), and reported a clear need

for more validation studies to inform screening for dementia in hospital inpatients best.

In the hospital setting, the knowledge that a patient has or might have dementia is essential because of the multiple immediate implications for care. Hospital medical staff may administer brief cognitive screening tests before or on the day of admission and, depending on the test results, cause additional investigations to be made to confirm whether a diagnosis is present; provide appropriate care during the hospital stay (e.g., choice of anesthesia, involvement of primary caregiver, medication management, etc.), and realize adequate discharge management, which may then lead to avoiding new medical events known to be more likely among patients with dementia and promoting earlier diagnosis.

Objective

The objective of this review is to provide clinicians, who wish to implement screening for dementia or MCI, an up-to-date choice of practical and accurate instruments that have been validated well for the use in unselected, elective hospital inpatients.

Methods

2 Eligibility criteria

Language: English and German

Study size: > 100

Target condition: Mild cognitive impairment (MCI), dementia, and any common dementia subtype

Setting: General or University hospital

Population: Unselected samples of elective inpatients (male and female) older than 64 years; mixed cohorts only if separate data was presented for outnumbered elective inpatients; patients of wards providing services for patients with disease related to dementia were excluded

Index test: Multi-domain, brief (<15min), cognitive performance tests, excluding informant rated, telephonic or computerized tests, excluding measures, assessing daily living activities and functional status, excluding self-administered tests

Reference standard: Studies will be included that used a reference standard for MCI, all-cause dementia or any standardized definition of subtypes. For MCI, the reference standard diagnosis had to be made according to published criteria, that is, Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V), National Institute of Ageing-Alzheimer's Association criteria, Petersen, Gauthier, or Winblad criteria. For all-cause dementia, any version of the DSM, and the International Classification of Diseases (ICD) criteria will be included. For dementia subtypes (e.g. AD or probable AD, vascular dementia, or Lewy body dementia) common diagnostic criteria will be included. In order not to further restrict the number of eligible studies, diagnostic accuracy studies that compared the index test with a diagnosis based on an expert consensus, or results of the Mini-Mental State Examination (MMSE) test will be also included. Studies that applied a neuropathological diagnosis which needs to be verified post-mortem will be excluded.

Study design: Cross-sectional studies, in which inpatients received the index test and reference standard diagnostic assessment during a hospital stay, preferably on the day of admission and before the commencement of treatment, will be included. Studies will be excluded for inadequate reporting (e.g., studies that did not report sensitivity or specificity), non-availability of the full-text article, or if subjects with prevalent target disease at baseline were included. Case-control studies and longitudinal studies (or related, nested case-control studies) will be excluded due to the high risk of spectrum bias.

3 Information sources

Databases: PubMed, Cochrane library and PsycINFO (+ systematic reviews, reference sections and similar article feature in PubMed); excluding grey literature and unpublished studies

Date coverage: All published articles

Contact with study authors: If further data was required (due to missing data, lack of clarity etc.) than reported in the studies, the corresponding authors were contacted via e-Mail (max. three attempts)

4 Search strategy

The search strategy for PubMed is attached; adapted versions for the other databases can be requested from the corresponding author.

5 Data management

For literature management EndNote will be used.

6 Selection process

Screening (titles and abstracts) and full-text assessment will be performed by two independent reviewers using eligibility criteria. Disagreements will be decided by consensus.

7 Data collection process

Data extraction will be done by at least one author and one reviewer, disagreements will be decided by consensus. Corresponding authors will be contacted in case of uncertainties (via Mail).

8 Data items

Extract country; type of hospital; patient group; target condition; sample size; age, and mean age; gender ratio; level of education; index test and applied cut-off; reference standard; point in time of screening; other assessments; assessment for delirium; prevalence, and accuracy data (2x2 table, sensitivity, specificity, etc. will be calculated) using piloted extraction sheet.

Extract all data required for quality assessments (QUADAS2).

General instrument characteristics (Instrument name, method of administration, administration time, availability, cognitive functions covered, advantages and disadvantages)

9 Outcomes

Sensitivity and specificity data, thresholds

10 Risk of bias

Two reviewers will independently assess, discuss and reach consensus on the methodological quality of all included studies (QUADAS2 and STARD 2015)

11 Data synthesis

Statistical analysis will be performed according to the Cochrane guidelines for diagnostic test accuracy reviews. Diagnostic accuracy data will be presented in a 2x2 table. Based on the 2x2 table, sensitivity and specificity values as well as measures of statistical uncertainty will be calculated. Diagnostic accuracy data will be plotted on a coupled forest plot. Only sensitivity and specificity data at the most common threshold will be included.

For meta-analysis of sensitivity and specificity, bivariate random-effects model approach (if studies use the same index test at a common threshold) or the hierarchical summary ROC (HSROC) method (if multiple thresholds are reported) will be used. For the investigation of heterogeneity, in addition to the visual examination of the forest plot, meta-regression will be done by fitting HSROC models with pre-specified covariates (e.g., baseline prevalence, reference standard, quality criteria from QUADAS2 assessment).