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Review Article

Consensus Approaches to Identify Incident Dementia in Cohort Studies: Systematic Review and Approach in the Successful Aging after Elective Surgery Study

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A B S T R A C T

Objectives: To survey the current methods used to ascertain dementia and mild cognitive impairment (MCI) in longitudinal cohort studies, to categorize differences in approaches and to identify key components of expert panel methodology in current use.
Methods: We searched PubMed for the past 10 years, from March 6, 2007 to March 6, 2017 using a combination of controlled vocabulary and keyword terms to identify expert panel consensus methods used to diagnose MCI or dementia in large cohort studies written in English. From these results, we identified a framework for reporting standards and describe as an exemplar the clinical consensus procedure used in an ongoing study of elective surgery patients (the Successful Aging after Elective Surgery study).
Results: Thirty-one articles representing unique cohorts were included. Among published methods, membership of experts panel varied significantly. There was more similarity in what types of information was use to ascertain disease status. However, information describing the diagnostic decision process and resolution of disagreements was often lacking.
Conclusions: Methods used for expert panel diagnosis of MCI and dementia in large cohort studies are widely variable, and there is a need for more standardized reporting of these approaches. By describing the procedure in which our expert panel achieved consensus diagnoses, we hope to encourage the development and publication of well-founded and reproducible methods for diagnosis of MCI and dementia in longitudinal studies.

In longitudinal studies of aging, tracking progression of cognitive changes over time often requires detection of the onset of clinically significant mild cognitive impairment (MCI) or dementia. The reference standard diagnosis of MCI or dementia requires direct evaluation by a clinician, integrating information obtained through history from patient and family members, physical examination,

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laboratory testing, and neuroimaging, to determine if the findings meet established clinical criteria, such as the National Institute on Aging-Alzheimer Association (NIA-AA) criteria for all-cause dementia,[1] the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*, or the *International Classification of Diseases, Tenth Revision* criteria for major neurocognitive disorders.[2] However, in large epidemiologic or cohort studies, this approach may not be feasible because of expense and/or logistical constraints. An alternative method uses expert panels for diagnosing MCI or dementia in cohort studies. However, there is currently no standardized approach and limited evidence on preferred methodology.[3]

For our own large-scale, prospective epidemiologic study of cognitive outcomes following major surgery, we wanted to implement rigorous methods for a clinical consensus procedure for cognitive outcomes following accepted approaches by expert panels. Thus, we first conducted a systematic literature review on expert panel consensus diagnosis methods for MCI and dementia used in cohort studies to provide detailed information on each of the approaches, and to identify key components of the expert panel methodology. Next, we provide a description of the clinical consensus procedure we developed for the Successful Aging after Elective Surgery Study (SAGES),[4] and describe its alignment with and extension of the other approaches. Finally, based on lessons learned, suggested reporting standards are presented.

Methods

Literature Review

A systematic literature review was conducted according to PRISMA guidelines.[5,6] To identify relevant articles on the expert panel diagnosis of MCI or dementia, a PubMed search using the search strategy ([dementia] AND [diagnosis] AND ([expert panel] OR [consensus methods] OR [consensus diagnosis])) was performed by one of the authors. The search was limited to articles published in the past 10 years (March 6, 2007-March 6, 2017), in human persons, and written in English. Studies were required to be original investigations that included diagnosis of MCI or dementia as an outcome measure, for example, cohort studies of dementia prevalence or incidence. We specifically excluded studies where a clinical diagnosis of MCI or Alzheimer disease was supported by biomarkers, such as in the Alzheimer Disease Neuroimaging Initiative or Australian Imaging, Biomarker and Lifestyle Flagship Study of Aging studies,[7] or studies which use pathologic results from autopsy to confirm diagnoses, such as in the Nun study[8] or the Rush Religious Orders Study.[9] In addition, we excluded review articles, reports that described consensus guidelines intended for diagnostic use in clinical practice, letters, and case reports (Figure 1).

We identified a total of 1168 articles. After exclusion of articles based on title and abstract (Figure 1), 56 remaining full-text articles were reviewed. It is important to note that the overall goal of this review was to identify varying approaches to consensus methods, not to provide an exhaustive review of all studies of incident dementia. In addition, following Institute of Medicine standards for systematic reviews,[10] 3 articles describing the Aging, Demographics, and Memory Study, Women's Health Initiative Memory Study, and Honolulu Asian-American Study cohort, were added based on hand-review of references because these cohorts are frequently referenced by other studies and are considered to be important among longitudinal studies on aging.

Information on the consensus method for diagnosing MCI or dementia was abstracted for each study by 1 of 3 study authors into a

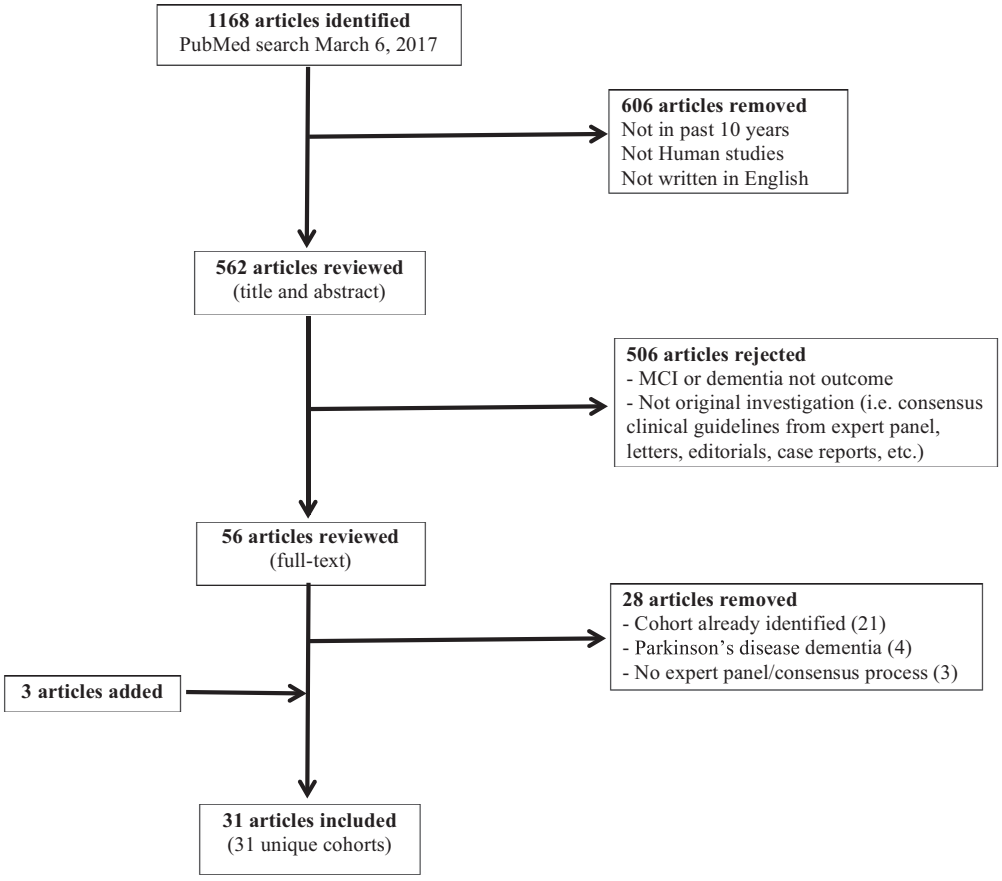

Fig. 1. Flowchart for article selection for inclusion in systematic review of study methods.