Major consensus criteria currently in use include: (1) National Institute on Aging-Alzheimer’s Association (NIA-AA; McKhann 2011), (2) International Working Group (IWG; Dubois 2007, Dubois 2010, Dubois 2014), (3) International Classification of Diseases (ICD-10; WHO 2010), and (4) Diagnostic and Statistical Manual of Mental Disorders (DSM-5; APA 2013).

The National Institute of Neurological and Communicative Disorders – Alzheimer’s Disease and Related Disorders Association (NINCDS-ADRDA; McKhann 1984) criterion remains an important comparator standard given its role in AD research prior to the advent of the newer, biomarker-driven criteria.

A preliminary study of participants from the Sunnybrook Dementia Study (SDS; ClinicalTrials.gov NCT01800214) demonstrated notable discordance between criteria, in particular between the subtype and co-pathology permissive NIA-AA, and the prototypic and biomarker-requiring IWG.

To examine the diagnostic agreement between current criteria and the NINCDS-ADRDA “bronze standard”

Clinical history and imaging for 155 participants from the SDS who met 1984 NINCDS-ADRDA criteria for probable or possible AD were reviewed retrospectively including:

- function (Alzheimer’s Disease Functional Assessment of Change Scale)
- cognitive screening (MMSE and Behavioural Neurology Assessment)
- cognitive testing (Dementia Rating Scale)
- MRI, and single photo emission computed tomography (SPECT)

Te⁶⁷-sect was used instead of FDG-PET for NIA-AA and IWG criteria.

Diagnostic re-classification by new criteria is show in Table 1 and Table 2. Comparing across broad diagnostic categories (AD vs. not AD), agreement with the NINCDS-ADRDA was best for the NIA-AA (94%) and DSM-5 (96%), and poor for the IWG 1 (54%) and ICD-10 (55%). Agreement with the NINCDS-ADRDA probable AD subgroup was better for the IWG (76%) and ICD-10 (71%), and much worse for the possible AD subgroup – IWG (13%) and ICD-10 (27%).

Table 1: Breakdown of re-classified diagnoses among new criteria for NINCDS-ADRDA defined AD (n=155). AD includes: (1) for NINCDS-ADRDA - probable and possible AD; (2) for NIA-AA - probable and possible AD; (3) for IWG 1 – probable AD; (4) for ICD-10 – dementia due to AD; (5) DSM-5 – major neuropsychiatric disorder due to probable or possible AD. % refers to percentage agreement with NINCDS-ADRDA

Table 2: Breakdown of re-classified diagnostic subcategories among new criteria for NINCDS-ADRDA defined AD subgroups; probable (n=100) and possible (n=55)

Individuals diagnosed with AD by the NINCDS-ADRDA will generally still be diagnosed with AD by the NIA-AA and DMS-5. However, a significant portion will not when using the IWG or ICD-10. Disagreement is especially high for those previously diagnosed with only possible disease.

Factors contributing towards classification disagreement include presence of co-occurring medical conditions, especially cerebrovascular disease.

References and Acknowledgements


We gratefully acknowledge financial support from the Canadian Institute of Health Research (MITK135257), Alzheimer Society of Canada’s Association (ASC), the L. C. Campbell Foundation, the Heart and Stroke Foundation Canada Partnership for Stroke Recovery, Sunnybrook Health Sciences Centre, Toronto, Canada.