

Data supplement

Table DS1 Clinical neuropsychological studies predicting dementia in amnesic mild cognitive impairment

Author (Date)	Predictors	Follow-up, years	Mean MMSE/ACE at baseline	Age in years, mean	Sample size, <i>n</i>	Mean NART IQ and/or mean education level, years	Cut-off	% converters, total (per year)	Results
Thompson (2002) ¹²	Graded Faces Naming Test	1.1	27.4	66.6	28	117/13	-2 s.d.	25 (22)	Graded Faces Naming Test PPV 0.6, NPV 0.94 Sens 0.86, Spec 0.81 Graded Naming Test PPV 1.00, NPV 0.78 Sens 0.14, Spec 1.00
Ahmed (2008) ¹⁰	Addenbrooke's Cognitive Examination; Associative Learning Battery buildings & patterns	1	Converters 25.7/77.3 Non-converters 29/86	71	18	Converters 11.9 Non-converters 14	<88 >14 errors i.e. -2 s.d.	39 (39)	Addenbrooke's Cognitive Examination and/or Paired Associate Learning Sens 1.00, Spec 0.82 PPV0.78, NPV1.00
Lehner (2005) ³²	Mini-Mental State Examination, Block span; (Alters-Konzentrations Test); Digit symbol, misplaced objects, name-face association, Selective Reminding Test, total; Reminding Test, delay	2	Converters 25.8 Non-converters 28	Converters 71 Non-converters 66	107	Converters 10 Non-converters 12	<7	40 (20)	Selective Reminding Test delayed recall Sens >0.80, Spec >0.80 AUC 0.94, PPV <0.40
Griffith (2006) ³³	Dementia Rating Scale total; Semantic fluency, Dementia Rating Scale memory Visual Reproduction II, Visual Reproduction % retention; Dementia Rating Scale, initiation/perseveration	2	28	Converters 70 Non-converters 67	49	13	<37 <26%	34.22 (17)	Dementia Rating Scale initiation/perseveration score & Wechsler Memory Scale-III Visual Reproduction % retention Classification accuracy 0.86, Sens 0.77, Spec 0.89
Amieva (2004) ³⁴	Age; Mini-Mental State Examination total, Mini-Mental State Examination word recall; Benton Visual Retention Test; Isaacs Set Test; Digit Symbol Substitution Test; Letter Cancellation Test	2	27	Converters 73 Non-converters 68	90	89% primary school diploma			Letter Cancellation Test only stand-alone predictor in regression model
Schmidtke (2007) ³⁵	None	1.6	Converters 25.7 Non-converters 26.6	Converters 76 Non-converters 73	75	Converters 10.2 Non-converters 9.6	NA	NA	
Perri (2007) ³⁶	Word list recall all indices	2	Converters 26.3 Non-converters 27.7	Converters 73 Non-converters 68	190	Converters 7.5 Non-converters 7.7	-1.5 s.d.	41.5 (20.8)	Cumulative delayed recall index Sens 0.75, Spec 0.69

(continued)

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Author (Date)	Predictors	Follow-up, years	Mean MMSE/ACE at baseline	Age in years, mean	Sample size, n	Mean NART IQ and/or mean education level, years	Cut-off	% converters, total (per year)	Results
Tabert (2006) ⁶	Selective Reminding Test; Wechsler Memory Scale-Visual Reproduction; Benton Visual Retention Test, recog; Boston Naming Test; Animal Naming Test; Block Design; Object Assembly; Digit symbol; CFL (lexical fluency using these letters), Similarities, Mattis identities and oddities	3.5	Converters 26.1 Non-converters 28.1	Converters 73 Non-converters 64	115	Converters 13.9 Non-converters 15		48 (13.7)	Selective Reminding Test total immediate recall score Digit symbol time to completion Sens 0.76, Spec 0.90 Accuracy 0.86 PPV 0.76, NPV 0.90
Lee (2006) ³⁷	Consortium to Establish a Registry for Alzheimer's Disease word list subtests and constructional recall subtest; Mini-Mental State Examination; Clinical Dementia Rating ³⁸	3	Converters 25 Non-converters NA	Converters 71 Non-converters 74	72			19.4 (6)	NA
Loewenstein (2007) ³⁹	Semantic Interference Test; Object Memory Evaluation	3	26	77	76	Converters 14 Non-converters 12	<4	35.5 (12)	Semantic Interference Test recall PPV 0.70, NPV 0.74, AUC 0.78
Estevez-Gonzalez (2004) ⁴⁰	Mini-Mental State Examination; Age; Face naming	2	Converters 26.3 Non-converters 27.9	Converters 73 Non-converters 66	53	Converters 7.1 Non-converters 8.1	NA	48 (24)	NA
Albert (2001) ⁴¹	California Verbal Learning Test total; Cued and Selective Reminding test; Trail Making Test Part B; Self Ordering Test; Alpha span; FAS (lexical fluency using these letters)	3	29	72	123	14	NA	19 (6.3)	Trail Making Test Part B, Wechsler Memory Scale-R Visual Reproduction immediate recall figures, Self Ordering Test total score Overall accuracy 0.80, Sens 0.74, Spec 0.83
Fox (1998) ⁵	Performance IQ; Recognition Memory Test words	6	Converters 29 Non-converters 29	44	63	100	NA	16	NA

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Author (Date)	Predictors	Follow-up, years	Mean MMSE/ACE at baseline	Age in years, mean	Sample size, <i>n</i>	Mean NART IQ and/or mean education level, years	Cut-off	% converters, total (per year)	Results
Blackwell (2004) ⁸	National Adult Reading Test; Alzheimer's Disease Assessment Scale-cog; Mini-Mental State Examination; Recognition Memory Test, words; Recognition Memory Test, faces; Cambridge Automated Neuropsychological testing Assessment Battery Pattern recognition, Doors recognition; Cambridge Automated Neuropsychological testing Assessment Battery, delayed matching to sample; Cambridge Automated Neuropsychological testing Assessment Battery, Paired Associate Learning, Wechsler Memory Scale-R; LM-II, Graded Naming Test; New semantic naming battery, Category fluency	2.5	Converters 25 Non-converters 29	Converters 72 Non-converters 62	43	Converters 117 Non-converters 119	NA	26 (10.4)	Paired Associate Learning and age PPV 0.81, PV 0.97 Paired Associate Learning, age and Graded Naming Test Overall accuracy 1.00
Estevez-Gonzalez (2003) ⁴²	All indices of the Rey Auditory Verbal Learning Test except learning	2	Converters 26.3 Non-converters 27.9	Converters 73 Non-converters 66	70	Converters 7.1 Non-converters 8.1	NA	NA	NA
Rami (2007) ⁴³	aMCI +prodromal Alzheimer's Disease (age, visual memory) aMCI only (delayed memory test, animal fluency)	1	26 aMCI 24 prodromal Alzheimer's Disease	73	48	7-8	NA	20 (20)	Logistic regression aMCI + prodromal Alzheimer's Disease visual memory and age were significant predictors Logistic regression aMCI alone no significant predictors of converters No details of model or accuracy of prediction provided

ACE, Addenbrooke's Cognitive Examination; aMCI, amnesic mild cognitive impairment; LM-II, Logical Memory delayed recall subtest, Wechsler Memory Scale⁴⁴; MMSE, Mini-Mental State Examination; NART IQ, National Adult Reading Test, full-scale IQ; PPV, positive predictive value; NPV, negative predictive value; Sens, sensitivity; Spec, specificity; NA, not applicable; AUC, area under the curve.

Additional references

- 32 Lehrner J, Gufler R, Guttmann G, Maly J, Gleib A, Auff E, Dal-Bianco P. Annual conversion to Alzheimer disease among patients with memory complaints attending an outpatient memory clinic: the influence of amnesic mild cognitive impairment and the predictive value of neuropsychological testing. *Wien Klin Wochenschr* 2005; **117**: 629–35.
- 33 Griffith H R, Netson K L, Harrell L E, Zamrini E Y, Brockington J C, Marson D C. Amnesic mild cognitive impairment: Diagnostic outcomes and clinical prediction over a two-year time period. *JINS* 2006; **12**: 166–75.
- 34 Amieva H, Letenneur L, Dartigues JL, Rouch-Leroyer I, Sourgen C, Alchee-Biree F. Annual rate and predictors of conversion to dementia in subjects presenting mild cognitive impairment criteria defined according to a population-based study. *Dement Geriatr Cogn Disord* 2004; **18**: 87–93.
- 35 Schmidtke K, Hermeneit S. High rate of conversion to Alzheimer's disease in a cohort of amnesic MCI patients. *Int Psychogeriatr* 2007; **20**: 96–108.
- 36 Perri R, Serra L, Carlesimo GA, Caltagirone C. Amnesic mild cognitive impairment: difference of memory profile in subjects who converted or did not convert to Alzheimer's disease. *Neuropsychology* 2007; **21**: 549–58.
- 37 Lee DY, Youn JC, Choo IH, Kim KW, Jhoo JH, Pak Y, Suh KW, Woo JI. Combination of clinical and neuropsychologic information as a better predictor of the progression to Alzheimer Disease in questionable dementia individuals. *Am J Geriatr Psychiatry* 2006; **14**: 130–8.
- 38 Morris JC. The Clinical Dementia Rating (CDR): current version and scoring rules. *Neurology* 1993; **43**: 2412–4.
- 39 Loewenstein DA, Acevedo A, Agron J, Duara R. Stability of neurocognitive impairment in different subtypes of mild cognitive impairment. *Dement Geriatr Cogn Disord* 2007; **23**: 82–6.
- 40 Estevez-Gonzalez A, Garcia-Sanchez C, Boltes A, Otermin P, Pascual-Sedano B, Gironell A, et al. Semantic knowledge of famous people in mild cognitive impairment and progression to Alzheimer's disease. *Dement Geriatr Cogn Disord* 2004; **17**: 188–95.
- 41 Albert MS, Moss MB, Tanzi R, Jones K. Preclinical prediction of AD using neuropsychological tests. *J Int Neuropsychol Soc* 2001; **7**: 631–9.
- 42 Estevez-Gonzalez A, Kulisevsky J, Boltes A, Otermin P, Garcia-Sanchez C. Rey verbal learning test is a useful tool for differential diagnosis in the preclinical phase of Alzheimer's disease: comparison with mild cognitive impairment and normal aging. *Int J Geriatr Psychiatry* 2003; **18**: 1021–8.
- 43 Rami L, Gomez-Anson B, Sanchez-Valle R, Bosch B, Monte G, Llado A, Molinvevo J. Longitudinal study of amnesic patients at high risk for Alzheimer's disease: clinical, neuropsychological and magnetic resonance spectroscopy features. *Dement Geriatr Cogn Disord* 2007; **24**: 402–10.
- 44 Wechsler D. *WMS-III: Wechsler Memory Scale Administration and Scoring Manual*. Psychological Corporation, 1997.