Research Letter

‘Attended alone’ sign: validity and reliability for the exclusion of dementia

SIR—The diagnosis of dementia according to DSM-IV-TR criteria is based on clinical findings [1]. NINCDS–ADRDA criteria for Alzheimer’s disease (AD) are clinically based and supported by investigation findings [2]. Proposed new diagnostic criteria for AD attempt to incorporate biomarkers, but not all of these may be easily available outside major research centres [3]. Hence, the need remains for simple, reliable, valid tests based on clinical assessment to confirm or exclude the diagnosis of dementia.

The importance of collateral history from a knowledgeable informant when assessing individuals complaining of memory problems and in the diagnosis of dementia syndromes, particularly AD, has been emphasised in diagnostic guidelines [4, 5]. It has been previously reported that failure to attend memory clinic consultation with an informant, despite prior provision of written instruction to do so included with the clinic appointment information, was a robust sign of the absence of dementia [6]. A further study was undertaken to measure the reliability of the ‘attended alone’ sign in an independent patient cohort and to validate it against clinical diagnostic criteria.

Patients and methods

All consecutive patients seen by one consultant neurologist when attending the Cognitive Function Clinic based in a regional neuroscience centre over a 4-year period (September 2004–August 2008 inclusive) were included in the study. On arrival, it was noted whether the patient attended alone or with informant(s) (relatives, friends or carers). This information was not used in the diagnosis of dementia to avoid incorporation bias [7] although clearly the clinician could not be blinded to the information.

Dementia was diagnosed by DSM-IV-TR criteria [1] based on clinical interview, informant interview where possible, neuropsychological testing and structural brain imaging (CT ± MRI), as in previous cohorts reported from this clinic [6, 8, 9].

The ‘attended alone’ sign was considered as a test for dementia and compared with clinical criteria-based diagnosis. The STARD checklist for reporting diagnostic accuracy studies was observed [10] and basic principles of evidence-based diagnosis were applied [11] to calculate test sensitivity, specificity, positive and negative predictive values (PPV, NPV), diagnostic odds ratio (DOR) and positive and negative likelihood ratios (LR+, LR−) with 95% confidence intervals (CI).

Results

Of 552 patients seen (Table 1), 419 adhered to written instructions and attended with an informant (75.9%, 95% CI = 72.3–79.5%). The remaining 133 patients attended alone (24.1%, 95% CI = 20.5–27.7%).

A total of 240 patients were diagnosed with dementia, and 312 were adjudged not demented, a dementia prevalence (43.5%, 95% CI = 39.3–47.6%) similar to that reported in previous cohorts from this clinic [6, 8]. The demented patients were significantly older (range 40–90 years, mean 67.1 ± 9.2 years) than the non-demented patients (range 20–87 years, mean 56.9 ± 11.9 years; t = 10.5, df = 550, P < 0.001).

In the demented group, 236 patients attended with an informant and only 4 attended alone. Two of these patients reached the hospital by means of an ambulance arranged by the general practitioner, and one in a taxi arranged by a relative. It was not possible to ascertain how the fourth patient had arrived (>2 h late for appointment). In the non-demented group, 183 attended with an informant and 129 attended alone.

Considering the ‘attended alone’ sign as a diagnostic test for dementia, in this cohort it had an accuracy of 0.66, sensitivity of 0.98 and specificity of 0.41 (Table 1, left column). PPV was modest (0.56) but NPV was very high (0.97). Positive and negative likelihood ratios, measures of diagnostic gain, were 1.68 (unimportant) and 0.040 (large), respectively.

Discussion

Although the ‘attended alone’ sign did not fulfil all the desired parameters of a dementia bedside diagnostic test (i.e. both sensitivity and specificity no less than 80%, PPV approaching 90%) [12], nonetheless the very high sensitivity translated to both a very large NPV and a small negative LR—indicating a large diagnostic gain. The test therefore appears to be robust in the exclusion of dementia; in other words, there are very few false negatives. The findings replicate those of a prior study [6] (Table 1, right column), but in a cohort over three times larger and seen over twice as long a time period.

Some caveats apply, for example, the fact that the study was conducted at a regional neuroscience centre, one of several hospitals within a city, and with a large catchment area. Different findings might occur in a clinic based in a district...
Table 1. Diagnostic utility of the ‘attended alone’ sign for dementia (with 95% confidence intervals)

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<thead>
<tr>
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<tbody>
<tr>
<td>N</td>
<td>552</td>
<td>183</td>
</tr>
<tr>
<td>M:F, % male</td>
<td>280:272, 51%</td>
<td>104:79, 57%</td>
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<tr>
<td>Age range, mean (years)</td>
<td>20–90, 61.4 ± 11.9</td>
<td>25–82, 59.2 ± 12.3</td>
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<tr>
<td>Dementia, %</td>
<td>240, 43.5%</td>
<td>90, 49.2%</td>
</tr>
<tr>
<td>Not demented</td>
<td>312</td>
<td>93</td>
</tr>
<tr>
<td>Attended with informant</td>
<td>419</td>
<td>150</td>
</tr>
<tr>
<td>Attended alone</td>
<td>133</td>
<td>33</td>
</tr>
<tr>
<td>Demented + attended alone</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Test accuracy</td>
<td>0.66 (0.62–0.70)</td>
<td>0.67 (0.60–0.74)</td>
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<td>Sensitivity</td>
<td>0.98 (0.97–1.00)</td>
<td>1.00 (0.96–1.00)</td>
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<tr>
<td>Specificity</td>
<td>0.41 (0.36–0.47)</td>
<td>0.35 (0.26–0.46)</td>
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<tr>
<td>Positive predictive value (PPV)</td>
<td>0.56 (0.52–0.61)</td>
<td>0.60 (0.52–0.67)</td>
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<tr>
<td>Negative predictive value (NPV)</td>
<td>0.97 (0.94–0.99)</td>
<td>1.00 (0.90–1.00)</td>
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<tr>
<td>Diagnostic odds ratio (DOR)</td>
<td>41.6 (37.8–45.7)</td>
<td>∞</td>
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<tr>
<td>Positive likelihood ratio (LR+)</td>
<td>1.68 (1.53–1.84)</td>
<td>1.55 (1.33–1.80)</td>
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<tr>
<td>Negative likelihood ratio (LR-)</td>
<td>0.040 (0.036–0.044)</td>
<td>0</td>
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general hospital, especially if it were the only hospital in the locality. Cases with MCI were not specifically extracted from the non-demented group, so it is not known whether these patients attended alone or accompanied.

Attending the clinic alone may be indicative of preserved executive function in the domain of private or public transport use. Loss of this instrumental activity of daily living has been identified as one of the predictors of dementia in community-based epidemiological studies, and it is incorporated into the 4-IADL scale for dementia screening [13]. However, 4-IADL did not prove to be a good test for dementia diagnosis in an outpatient cognitive clinic setting [9]. Further examination of the ‘attended alone’ sign to exclude dementia is therefore recommended.

Key points

- There remains a need for simple, reliable and valid clinically based tests to confirm or exclude the diagnosis of dementia.
- Collateral history from a knowledgeable informant is deemed highly desirable when assessing patients with memory complaints, as enshrined in diagnostic guidelines for dementia.
- Attending the memory clinic alone, despite receiving written instruction to bring an informant, proved to be a robust sign of the absence of dementia.

Conflicts of interest

There are no financial disclosures or conflicts of interest.

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References


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