Comparison of ABCD2 scoring between first healthcare-contact and stroke-specialist physicians for transient ischaemic attack in a rapid-access clinic

SIR—The ABCD2 stroke risk scoring system based on clinical features found to be independently predictive of stroke following TIA is now in widespread use [1–4]. The Department of Health for England (DoH) aims for 60% of patients with ABCD2 scores of ≥4 at presentation to complete specialist assessment within 24 h of first healthcare-contact and those scoring <4 within 7 days [5]. A systematic review of studies evaluating ABCD2 and its prediction of stroke risk found the greatest predictive value to be where score derivation had been conducted by stroke specialists through face-to-face consultation or retrospective secondary-care case notes review. Studies involving score derivation from retrospective review of emergency department (ED) case notes show ABCD2 to have a much poorer predictive value [1, 2, 6]. To date, studies of ABCD2 use by non-specialists are lacking, yet the urgency of specialist review is mostly based upon this mode of assessment.

Non-specialist versus specialist derivation of ABCD2 cannot necessarily be assumed to result in the same score. The stroke specialist is forearmed to identify and extract the expected clinical features from a clinical history. Recall of events may change over time and blood pressure levels cannot necessarily be assumed to result in the same score. To date, studies of ABCD2 prediction of stroke risk found the greatest predictive value [1, 2, 6]. To date, studies of ABCD2 use by non-specialists are lacking, yet the urgency of specialist review is mostly based upon this mode of assessment.

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Subjects and methods

Data from consecutive patients attending a daily rapid-access one-stop TIA clinic between 2008 and 2009 were reviewed. Referrals originated from local general practitioners (68%), acute medical assessment units (19%) and the ED (9%). A standardised single-sided referral form included a written definition and associated tick box for each individual score element: (A) Age (≥60 years, 1 point); (B) blood pressure (≥140/90 mmHg, 1 point); (C) clinical features (unilateral weakness, 2 points; speech disturbance without weakness, 1 point); (D) duration of TIA symptoms (≥60 min, 2 points; 10–59 min, 1 point); (D2) presence of diabetes (1 point). No specific training was offered to the first-contact clinicians, all of whom were medically trained doctors and working in general practice, internal medicine or ED in routine clinical service.

An electronic database was employed to prospectively capture the clinical assessment and referral ABCD2 scores were hidden from view during the specialist consultation. Appropriate scores for clinical features and symptom duration were selected by the specialist with the remaining elements automatically derived from inputted data. Data collection was in accordance with institutional guidelines. Analysis was restricted to patients receiving final diagnoses of acute cerebrovascular disease and reporting just one discrete neurological episode. In order to ensure a high quality of symptom recognition and final diagnostic accuracy, only data from assessments performed by consultant-grade stroke physicians (all of whom had been in post more than 2 years) were included.

Statistical analyses were performed using SPSS Version 17.0. Differences in classification between the assessments for total ABCD2 and elements were evaluated using McNemar’s test or Wilcoxon signed-rank test where there were dichotomous (A, B and D2) or ranked variables (C, D and ABCD2), respectively. Cohen’s K was used to measure the interobserver agreement between assessments for the total score and elements [10]. Higher risk of stroke was defined as ABCD2 ≥4 and lower risk ABCD2 < 4.

Results

Of 1,378 consecutive clinic attendances, the final analysis group consisted of 342 patients (excluding patients with non-cerebrovascular diagnoses, without paired ABCD2 scores or reporting >1 discrete neurological episode). Of the total, 245 (72%) cases were TIA and 97 (28%) minor ischaemic stroke. Age ranged from 27 to 97 years, median 74 years, inter-quartile range (IQR) 64–81 years; 52% were male. The median interval between symptom onset and first-healthcare contact was 3 days (IQR 1–7 days) and between first-healthcare contact and specialist review 36 h (IQR 25–63 h).

There was agreement of the total ABCD2 score between each assessment in 46% of the cohort. The referrer’s score was higher than the specialists in 21% and lower in 32%. Paired comparison of the scores indicated that they were drawn from different populations (P = 0.003). Scores differed by 2 or more points in 15% of the patients (Figure 1). In 266 patients (78%) there was concordance in the assessment of the stroke risk (higher versus lower). Of the 131 (38%) patients referred at lower risk, 47 (36%) were reclassified to higher stroke risk at specialist review. The referrer’s ABCD2 had a sensitivity and specificity value of 0.79 and 0.74 in predicting the specialist’s score with negative and positive predictive values of 0.64 and 0.86, respectively. Results of K values yielded ‘almost perfect’ agreement for age (κ = 0.90) and diabetes status (κ = 0.92) and ‘substantial’ agreement between the assessment of clinical features (κ = 0.68) and symptom duration (κ = 0.68) [10]. Absolute patient numbers in each BP category were similar between assessments but the low kappa statistic for BP elements was ‘poor’ (κ = 0.41) inferring frequent cross-over between the BP categories (Table 1). Stroke-specialists tended to more frequently score motor symptoms and longer symptom durations (P = 0.06, P = 0.03, respectively).
Interobserver agreement of recall elements (clinical features and duration) remained similar when data were dichotomised by the median assessment interval (element, \( \kappa < 36 \) h, \( \kappa > 36 \) h): (C) 0.66, 0.68, (D) 0.67, 0.66.

**Discussion**

This study finds significant differences between referrer and specialist scores, a relevant finding because initial treating doctors are responsible for determining the stroke risk after TIA and delays may occur where a patient truly at higher risk is deemed lower risk. If the specialist score is taken as the gold standard, a potentially deleterious delay occurred for more than one-third of TIA patients referred at lower risk.

The majority of the difference in the interobserver agreement for ABCD2 was for blood pressure, clinical features and symptom duration. The original ABCD2 validation studies utilised the first BP measurement taken after the index TIA with a median time interval between symptom onset and BP measurement of 0–1 days. In routine clinical practice, the time taken to seek medical attention following TIA is often longer than in the validation studies; between one-third and half of TIA patients do not seek medical attention within the first day of symptom onset [11–13]. However, high levels of variability in BP measurements within the first few days of a TIA are observed [9, 14]. Further, visit-to-visit variability in systolic BP has been shown to be a more powerful predictor of stroke in TIA patients than the absolute mean SBP level [15]. Whether BP variability rather than absolute level provides additional stroke risk information deserves further exploration. The ‘white-coat’ effect and individual variation and bias in measurement technique may have also contributed to the BP differences.

Discrepancy between the assessment of clinical features and symptom duration may have been due to several factors. Patient recall of events might be argued to be clearer at first presentation than a few days later, although no change in the correlation of recalled events over time was demonstrated. A trend for specialist physicians to score increased symptom severity and symptom duration may have represented a longer time interval available for the patient to reflect on and be questioned about presenting symptoms, with more targeted questioning of TIA symptoms. The less structured and time-limited assessment environment at the front-line of healthcare may also contribute; in the TIA clinic a consultation typically lasts 30–40 min but usually fewer than 10 min are available for most consultations in primary care [16].

A study evaluating the stroke predictive value of referrer versus specialist scores would be required to determine

![Figure 1. Difference between primary and secondary care ABCD2 scores (secondary minus primary care score).](https://academic.oup.com/ageing/article-abstract/41/1/115/47345)
whether these findings truly have clinical relevance as it cannot be assumed which of the two scores conveys the greatest value in predicting stroke risk: ABCD2 validation is mostly based on scoring by stroke specialists, but the score performed soonest after the event may be more relevant.

Comparative predictive value of first contact versus specialist-physician-derived ABCD2 scores is not addressed by this study but would be difficult to evaluate: ABCD2 has been shown to be most useful in predicting early rather than late stroke risk (the stroke event occurs within the first 2–3 days in about half of patients) and a large sample size would be required because prompt specialist intervention, whatever the score, has been shown to be highly effective at reducing stroke risk (90 day event rate of 2–3%) [17, 18]. The study is limited to data collected from a single referral centre and may not be fully representative of a UK population, although does reflect routine clinical practice.

The results indicate differences between referrer and specialist ABCD2 scores for the same patient over a relatively short-time-interval although clinical relevance cannot be firmly established; there is a continuum of stroke risk across the ABCD2 score range, the dichotomisation of which can only be made on arbitrary grounds and, as is shown by the study, even with this arbiter in place there is significant variability in classification. We believe the study does raise relevant questions about the validity of a non-specialist ABCD2 score in providing an effective secondary care specialist TIA service.

Key points

• In specialist use, the short-term risk of stroke following TIA is predicted by the ABCD2 score.
• The widespread employment of ABCD2 by non-specialists has not yet been validated.
• Significant differences in the ABCD2 scoring are found between non-specialists and stroke specialists in a cohort of TIA patients.
• The majority of the difference lies in assessment of blood pressure, followed by clinical features and symptom duration.
• There may be inappropriate scheduling of TIA patients to specialist assessment according to these differing assessments of stroke risk.

Conflicts of interest

This study was presented in abstract form at the European Stroke Conference, Barcelona 2010.

References

Perceived barriers in the outdoor environment and development of walking difficulties in older people

SIR—Older people with mobility limitations often report more barriers in their outdoor environment than people with intact mobility [1]. However, it is uncertain whether older people perceive their environment as problematic because of their mobility limitations or whether the environmental barriers precede incident mobility limitation, as most studies have been limited to cross-sectional analyses [2–5]. Only a few longitudinal studies have shown that barriers in the outdoor environment, such as poor street conditions, poor lighting and heavy traffic, increase the risk for overall functional loss [6, 7] and decrease physical activity participation [8]. More knowledge is needed about the characteristics of outdoor environments that threaten the mobility of older people [9].

The aim of the study reported in this letter was to explore whether perceived barriers in the outdoor environment predict development of difficulties in advanced and basic mobility among community-dwelling people who did not have walking difficulties at baseline.

Methods

Study design
This study is based on prospective semi-annual follow-up data over a 3.5-year period on the control group recruited for a randomised controlled trial entitled Screening and counselling for physical activity and mobility in older people (SCAMOB, ISRCTN 07330512) [10]. The study was approved by the Ethical Committee of the Central Finland Central Hospital. Participants were recruited from the population register and selected based on that they were community-dwelling, aged 75–81-years, living in the city centre of Jyväskylä, Finland, were able to walk 500 m without help from another person, were moderately physically active or sedentary, had a Mini-Mental State Examination (MMSE) score >21 and no medical contraindications for physical activity [10]. The study design has been described in detail elsewhere [10]. Of 632 people included in a randomised controlled trial, 314 (the control group) were followed up at 6-month intervals for the naturally occurring changes in mobility for 3.5 years. Of them, at baseline 100 people had difficulty walking 2 km and were excluded, leaving 214 people for the analysis on incident difficulty in 2-km walking. The corresponding figures for 0.5-km walking were 48 and 266, respectively. Over the 3.5-year follow-up, among those without difficulties in walking 2 km, 28 dropped out and among those without difficulties in walking 0.5 km, 35 dropped out.

Measurements

Walking difficulty
It was assessed as perceived difficulties in walking 2 km (advanced mobility) and 0.5 km (basic mobility) semi-annually over the 3.5-year follow-up period. The questions were formulated as follows: ‘Do you have difficulty in walking 2 km/0.5 km? with the response options: (1) able to manage without difficulty, (2) able to manage with some difficulty, (3) able to manage with great deal of difficulty, (4) able to manage only with the help of another person and (5) unable to manage even with help. For the analyses, options were dichotomised as ‘no difficulty’ (1) and ‘difficulty’ (2–5).

Barriers in the outdoor environment
The participants were asked whether there were barriers in the outdoor environment which encumbered their possibilities for moving independently outdoors (yes/no). The barriers studied were lack of resting places and long distances that were combined and recoded into the dichotomised variable Distances; noisy traffic and dangerous crossroads into the variable Traffic and hilly terrain and streets in poor condition into the variable Terrain. For each of the three constructed variables, 0 indicates that neither of the barriers was reported and 1 that either one or both were present.

Background characteristics
The sociodemographic indicators studied were age, years of education and perceived financial position. Information on chronic conditions was elicited as self-reported physician-diagnosed chronic conditions which were later confirmed by the nurse examiner in the clinical examination and then categorised into cardiovascular, musculoskeletal and lung diseases. Cognitive functioning was assessed with the MMSE [11] and depressive symptoms with the Center for Epidemiologic Studies Depression Scale (CES-D) [12]. Habitual physical activity was self-reported [13].