

# An urgent access neurovascular clinic: audit of timeliness

Dennis Briley, Chris Durkin and Tom Meagher

**ABSTRACT** – This study aimed to evaluate timeliness of an outpatient urgent access neurovascular clinic in a district general hospital setting through an audit of delay from event to completion of evaluation following transient ischaemic attack (TIA) or minor stroke. Participants included those referred for evaluation of suspected TIA or minor stroke. The median delay from event to completion was 16 days, with 45% seen within two weeks of symptom onset, and 15% within one week of symptom onset. A weekly TIA clinic is not capable of achieving the National Clinical Guidelines for Stroke recommendation for evaluation within one week of symptoms. This audit supports the National Stroke Strategy recommendation for immediate evaluation of patients presenting with a recent TIA or minor stroke.

**KEY WORDS:** imaging, outpatient clinic, stroke, transient ischaemic attack

## Introduction

Studies indicate that the highest risk of stroke after either a transient ischaemic attack (TIA) or minor stroke is within the first two weeks.<sup>1</sup> Interventions, such as carotid endarterectomy, have the greatest clinical benefit when performed quickly after the index event.<sup>2</sup> It is therefore recommended that patients receive urgent outpatient evaluations following such events. The initial version of the National Clinical Guidelines for Stroke recommended evaluation within two weeks; the American Heart Association (AHA) guidelines recommend within one week, and in 2004 the Royal College of Physicians (RCP) updated the national clinical guidelines in line with the AHA's recommendation.<sup>3–5</sup> A rapid access neurovascular clinic has been provided at Stoke Mandeville Hospital since 1999 and its performance was examined and compared to these guidelines.

A variety of scores have been described recently to help distinguish patients at high risk eg the California, ABCD, and ABCD<sup>2</sup> scores.<sup>6</sup> These scores include simple clinical features, such as presence of speech disturbance and motor weakness. A referral proforma was developed to try to establish whether patients were likely to have had a cerebrovascular event based on similar simple clinical criteria. The performance of this proforma was examined to assess the likelihood of a final diagnosis of either

stroke or TIA and whether faster evaluations were provided for high-risk patients.

## Methods

Data were prospectively collected from all attendees to the urgent access neurovascular clinic between 2000 and 2006. The clinic was initially held on a fortnightly basis but it took place weekly from 2004. In addition, in 2003 the referral proforma was introduced to help assess the likelihood of a cerebrovascular diagnosis.

Data collection included the time of the most recent event (when known), the date of referral (information on the date of referral was not collected routinely until 2004), the date when seen in clinic, date of imaging (when performed) and the delay from the most recent event to completion of clinical opinion and imaging. Basic demographics and vascular risk factors were recorded along with the final diagnosis and the results of investigation. For this clinic, magnetic resonance imaging (MRI), including diffusion weighted imaging, was the primary brain imaging modality and carotid magnetic resonance angiogram (MRA) was the primary vascular imaging used, and they were generally performed together.<sup>7,8</sup> Stroke and TIA were diagnosed according to World Health Organization (WHO) criteria.

Beginning in 2003, we requested general practitioner (GP) referrers to use a proforma to help assess patients. High-risk symptoms were considered to be speech disturbance and motor symptoms. Symptoms thought to indicate against a TIA include paraesthesias, amnesia and loss of consciousness. Based on the symptoms marked on the proforma, patients were classified as 'high', 'intermediate' and 'low' probability. 'High' probability required one of the high-risk symptoms, 'intermediate' none of the high-risk symptoms but none of the symptoms indicating against a TIA, and 'low' probability one of the symptoms thought to indicate against a TIA.

Statistical analysis used simple chi-square of proportions and the Kruskal–Wallis test for equality of populations rank test.

## Results

Between 2000 and 2006, a total of 1,292 patients attended the clinic, with a mean age of 67 (18–100). Stroke (32%) was the most common diagnosis followed by TIA (23%). Other diagnoses included migraine (14%), epilepsy (4%), syncope (4%), brain tumour (1%) and a miscellany of other diagnoses for the remainder. Imaging was performed in the majority of patients (76%), predominantly with MRI, which demonstrated acute infarction in 28%. Computed tomography (CT) scanning was performed in 2%, predominantly due either to claustrophobia

Dennis Briley, Consultant Neurologist

Chris Durkin, Consultant Physician

Tom Meagher, Consultant Radiologist

Departments of Neurology, Medicine for Older People and Radiology, Stoke Mandeville Hospital, Aylesbury

or a cardiac pacemaker. Data on imaging are missing for 69 patients (5.3%). Not all patients could give us a precise date of onset of symptoms but this was provided by 860 patients. The median delay from event to being seen was 16 days, (interquartile range (IQR) 10–25). Overall, 45% (388) were seen within two weeks of symptom onset, and only 15% (132) within one week. Figure 1 displays the percentage of patients who completed their evaluation within one or two weeks according to the year seen. Significantly fewer were seen within the two-week guideline in 2006 compared to previous years, and the median delay to being seen was likewise longer in 2006, at 21 days compared to previous years ( $p=0.0001$  Kruskal–Wallis test).

The proforma was used by referrers in 45% (193/425) of patients seen in the clinic. Patients classified as ‘high’ probability on the proforma were more likely to have had a stroke or TIA (58%,  $n=60/103$ ), compared to both ‘intermediate’ (40%,  $n=19/47$ ) and ‘low’ probability (7%,  $n=3/43$ ),  $p<0.001$ . There was a trend to see patients sooner with ‘high’ probability (median delay 17 days), compared to ‘intermediate’ (27 days) and ‘low’ probability (22 days),  $p=0.05$ .

The results of imaging also correlated with the probability as assessed by the referral proforma. Of patients with low probability, 51% (22/43) had normal imaging, 47% (20/43) were not scanned and only one patient (2%) demonstrated an infarct. In the intermediate category, 45% (21/47) had normal scans, 32% (15/47) were not scanned, and 23% (11/47) demonstrated infarction. In the high probability category, 65% (67/103) had normal scans, 4% (4/103) were not scanned, and 31% (32/103) had acute infarction demonstrated on diffusion weighted imaging.

The proportion of patients with a clinical diagnosis of stroke or TIA was similar in patients seen within two weeks compared to patients seen later at 59% versus 54% ( $p=ns$ ),

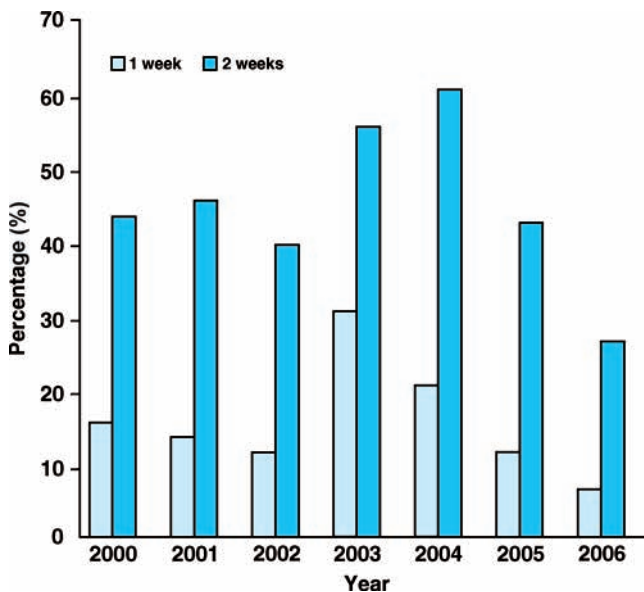


Fig 1. Percentage of patients seen within the one- and two-week guideline for evaluation of recent transient ischaemic attack or minor stroke.

but the proportion of patients with a positive diffusion-weighted imaging (DWI) result was reduced from 40% to 22% ( $p<0.001$ ).

## Discussion

Our audit demonstrates a failure to achieve either the initial RCP standard or the 2004 revised target in the majority of patients. This failure occurred despite increasing the number of practitioners in the clinic and imposing modifications to improve access for imaging. It was concluded that a weekly district general hospital (DGH) outpatient system is not capable of achieving the targets.<sup>9</sup>

This audit confirms that simple clinical criteria can be used to appropriately classify patients at higher or lower risk of a cerebrovascular event.<sup>6</sup> The audit also demonstrates imaging is more likely to be diagnostic when performed early.<sup>7,8</sup> This supports the National Stroke Strategy recommendation for immediate referral in patients presenting with a recent TIA or minor stroke.<sup>10</sup>

Although not a subject of this audit, interventions to prevent stroke have also been shown to be time dependent,<sup>2</sup> again reinforcing the need for urgent evaluation and management of patients with minor stroke or TIA. Local studies indicate few patients receive carotid endarterectomy in a timely fashion.<sup>11</sup> The use of a score such as the ABCD<sup>2</sup> score or modifications thereof may help to determine if some patients are of sufficiently low risk to consider outpatient evaluation. Emergency assessment and treatment of TIA lowers risk of recurrent vascular events.<sup>12</sup> In the setting of a DGH, the most practical solution may be admission of high-risk patients, although alternative solutions, such as a daily open access clinic or the use of a telephone hotline, could also be feasible. The new National Clinical Guidelines for Stroke recommends implementation of urgent evaluation of high-risk TIA patients as a key priority.<sup>13</sup>

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**Address for correspondence: Dr D Briley, Department of Neurology, J21, Stoke Mandeville Hospital, Mandeville Road, Aylesbury, Bucks HP21 8AL.**  
**Email: [dennis.briley@buckshosp.nhs.uk](mailto:dennis.briley@buckshosp.nhs.uk)**

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