Original article

Delays in the presentation to stroke services of patients with transient ischaemic attack and minor stroke

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Background: **The UK National Institute for Health and Care Excellence (NICE) guidelines state that carotid endarterectomy should be scheduled within 2 weeks of symptoms. The recent National Stroke Strategy has reduced the time interval to 48 h. This study aimed to review the possible delays.**

Methods: **This study analysed patients with confirmed transient ischaemic attack (TIA) or minor stroke, referred to a single tertiary centre clinic and followed up 1 month after the event. A questionnaire was used to collect data on the rapid-access clinic pathway, and details of previous medication and treatment.**

Results: **Some 150 patients presented with a confirmed TIA or minor stroke during a 5-month interval (June to October 2014). Fifty-one (34·0 per cent) had a history of TIA or stroke and 35 (23·3 per cent) had undergone an 'index' event in the 5 days before presentation. Forty-five patients (30·0 per cent) experienced a reduction or loss of vision. Of this group, 32 had a deficit in vision only, none of whom attributed these symptoms to a cerebrovascular event. Overall 92 (61·3 per cent) of the 150 patients had a delay in presentation to medical services. Forty-seven (31·3 per cent) had residual symptoms at the clinic appointment. Eighty-eight patients (58·7 per cent) did not think they were having a stroke and 54 (36·0 per cent) were unaware of the National Stroke Strategy (FAST campaign – Face, Arm, Speech, Time).**

Conclusion: **Two-thirds of patients were not aware they were having a stroke, one-third were unaware of the FAST campaign and nearly one-third presented with eye symptoms. Inclusion of eye symptoms and reaffirmation of the need to react might avoid unnecessary delays in the presentation of patients with TIA and minor stroke.**

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Introduction

Following a transient ischaemic attack (TIA) or minor stroke, the risk of a completed stroke is up to 8 per cent in the first 15 days[1]. Consequently, patients presenting to medical services with suggestive symptoms are commenced on best medical therapy to reduce further events.

The EXPRESS (Early Use of EXisting PREventive Strategies for Stroke) study[2] highlighted the importance of intervention in this group of patients, with an 80–90 per cent reduction in the risk of recurrent stroke following early treatment. In light of this, a public campaign was launched in the UK in 2009 to raise awareness of stroke symptoms and highlight the importance of urgent medical care. The acronym FAST (Face, Arm, Speech, Time) was adopted, to include the common presenting features of weakness and dysphasia[3].

Following the launch of the Act FAST campaign[4], pressures on stroke services have become increasingly evident. Approximately 110 000 people in England experience stroke symptoms each year[5] and, with stroke being one of the leading causes of death and long-term disability[6], health services are put under significant strain to see and treat patients effectively and in a timely manner. The instigation of nationwide rapid-access clinics in the UK has allowed prompt diagnosis and treatment of patients who present to stroke services, but it is clear that delays in symptom recognition and patient presentation still occur[7].

To ensure adequate treatment in a growing stroke infrastructure, national guidelines from the National Institute for Health and Care Excellence (NICE) have advised that all appropriate carotid endarterectomies

(CEAs) are carried out within 14 days of symptoms[8]. In 2007, the National Stroke Strategy[7] also stated that urgent carotid interventions have improved patient outcomes, and advised a timeline of less than 48 h from symptoms to CEA.

Although campaigns such as Act FAST appear to have had a positive effect on recognition of stroke symptoms by patients, there are several time points in a patient's stroke pathway where delays can occur[9]. This is particularly the case if the symptoms do not fit with the campaign's acronym; examples of this include visual disturbance and loss of balance[10].

It is easily possible to audit each hospital's service from initial presentation to CEA. However, to comply with national stroke guidelines, it is imperative to reduce and/or eliminate delays in patient presentation before their clinic appointment. Reducing the time from symptoms to CEA can improve patient outcomes, and minimize morbidity and mortality[11].

This study was designed to assess accurately why patients are failing to present to stroke services promptly, and to identify at which time points these delays increase the time to surgical review.

Methods

This study analysed a consecutive group of patients following a clinically confirmed TIA or minor stroke (stroke with mild but persistent symptoms), during the months of June to October 2014. All patients were referred to a single regional referral centre (John Radcliffe Hospital, Oxford) and seen in a rapid-access TIA clinic by a specialist consultant stroke physician. As part of the clinic all patients with a suspected TIA/stroke underwent carotid duplex ultrasound imaging and head CT. CT was used to help exclude other neurological causes for the symptoms. Following confirmation of a TIA/stroke all patients were followed up 1 month after the significant event, by a specialist nurse.

Some patients were assessed prospectively during a follow-up clinic appointment. Either a foundation doctor or TIA nurse facilitated the completion of a patient questionnaire (*Appendix S1*, supporting information). All these patients attended a follow-up appointment between August and October 2014. Other patients were assessed retrospectively during a telephone conversation with a foundation doctor only. These patients attended follow-up appointments in either June or July 2014.

All patients were consented before completion of the questionnaire. The questionnaire collected data on: symptoms; whether the patient had experienced any similar symptoms in the days leading up to the event; how they acted upon the symptoms at the time of the event; whether they were aware they were experiencing a TIA/stroke; and whether they were aware of the FAST campaign. Details of previous medical therapy and treatment for TIA/stroke were also sought.

Possible time points for patient delay were categorized as follows: from symptoms to patient recognition; from patient recognition to acting upon symptoms; from acting upon symptoms to review by a medical practitioner; from medical review to clinic appointment; from clinic appointment to review by a vascular surgeon; and from vascular surgical review to CEA (T5).

Results

A total of 150 consecutive patients were included in the study, of whom 148 (98·7 per cent) had experienced symptoms attributable to a cerebrovascular event in the previous days or weeks. No exclusions were necessary as all had clinical and radiological (CT) confirmation of TIA/stroke. Seventy-two patients were assessed prospectively during a follow-up clinic appointment and 78 were assessed retrospectively via telephone conversation. Seventy-nine of the patients (52·7 per cent) were men.

Fifty-one (34·0 per cent) of the 150 patients had experienced symptoms of a stroke previously before their acute presentation; 16 (10·7 per cent of total population) had received a previous diagnosis of stroke/TIA and 35 (23·3 per cent) had undergone an 'index' event in the 5 days before presentation (the patient had experienced similar symptoms before their presenting event and sought medical advice only when the symptoms recurred).

Of the 150 patients, 58 (38·7 per cent) experienced difficulty in speaking as part of their symptomatology. This was the most common presenting complaint (including those with combined symptoms) (*Fig. 1*). All symptoms showed a greater predominance on the right-hand side compared with the left (left cerebral hemisphere affected). Forty-five patients (30·0 per cent) experienced symptoms of reduction or loss of vision. Of these, 32 had a deficit in vision only. More importantly, none of these patients reporting visual disturbance alone were aware they were having a stroke.

Upon experiencing symptoms, patients chose a variety of routes to present to medical services (*Fig. 2*): 27 (18·0 per cent) of 150 came straight to hospital, 26 (17·3 per cent) called 999, 82 (54·7 per cent) called their general practitioner (GP) and 15 (10·0 per cent) presented to other services, such as opticians.

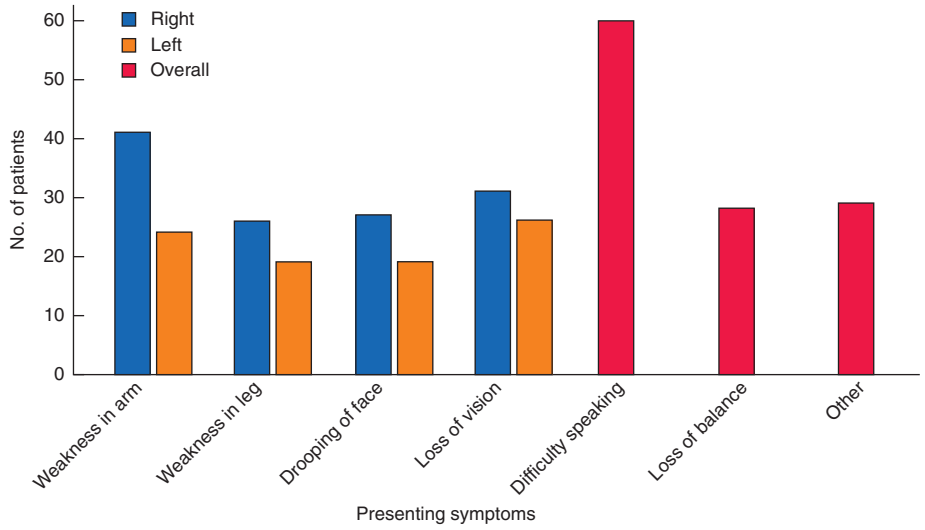

Fig. 1 Presenting symptoms

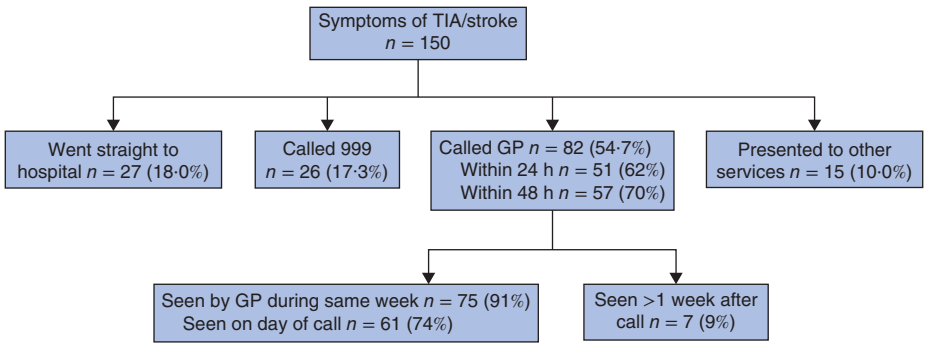

Fig. 2 Routes of presentation of patients with minor stroke/transient ischaemic attack (TIA). GP, general practitioner

However, 92 patients (61·3 per cent) delayed presentation to medical services: 18 (20 per cent) of 92 initially phoned a family member; six (7 per cent) initially phoned 111; nine (10 per cent) had a 'cup of tea' and slept on it (waited until the next day); and 59 (64 per cent (39·3 per cent of the total study population) initially did nothing. The delay ranged from 1 to 120 days, with a median of 2·5 days from symptoms to presentation (*Fig. 3*).

Further analysis of the GP population (82 patients) showed that (*Fig. 2*): 51 (62 per cent) called the GP within 24 h of developing symptoms and a further six called the GP within 48 h, so a total of 57 (70 per cent) of 82 patients called within 48 h; 61 (74 per cent) were seen by the GP on the day of the telephone call; a further 14 (17 per cent) were seen during the same week; and seven (9 per cent) were seen more than 1 week after their symptoms developed. Not all patients discussed their symptoms over the telephone. The mean delay in referral by the GP was 2 days.

Of the total population, 76 (50·7 per cent) of 150 patients were seen by a healthcare professional on the same day as the event and 97 (64·7 per cent) within 48 h. Some 134 patients (89·3 per cent) were seen within the same week.

At the time of completing the questionnaire (within 5 months of patient presenting event), 47 (31·3 per cent) of the 150 patients had residual symptoms.

After the initial clinic appointment, 149 patients (99·3 per cent) were commenced on best medical therapy. Many patients, however, were already receiving multiple components of best medical therapy (*Table 1*). Four patients in the present cohort underwent CEA.

On direct questioning, 88 (58·7 per cent) of the 150 patients did not think they were having a stroke. Fifty-four patients (36·0 per cent) were unaware of the FAST campaign. Of those who were aware, 13 (16 per cent) of

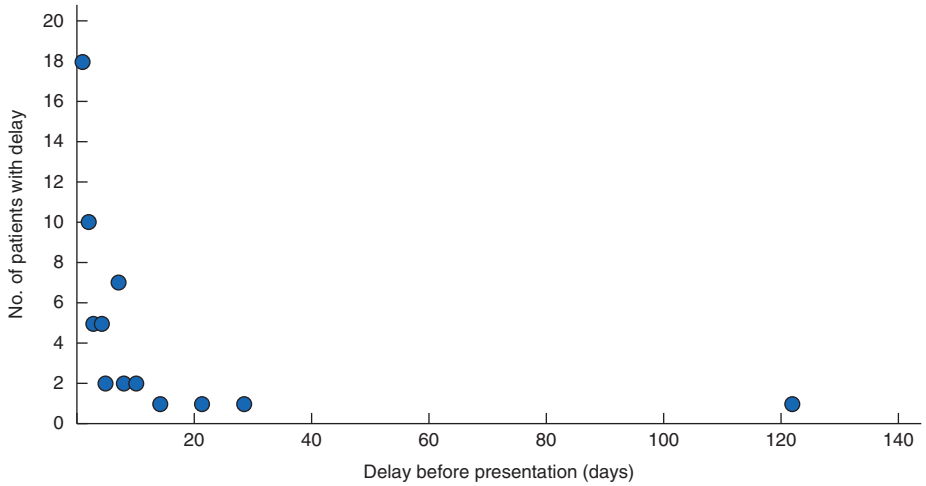

Fig. 3 Delay before presentation to medical services

Table 1 Patient medications before presenting with transient ischaemic attack/stroke

	No. of patients receiving medication before TIA/stroke
Antihypertensive	83 (55·3)
Statin	62 (41·3)
Aspirin	45 (30·0)
Clopidogrel	6 (4·0)
Warfarin	11 (7·3)

Values in parentheses are percentages. TIA, transient ischaemic attack.

79 men thought they were having a stroke but delayed presentation.

Discussion

The Act FAST campaign may have had a positive effect on patient recognition of TIA or minor stroke. Approximately two-thirds of the patients were aware of the campaign at clinic review. However, even in light of public awareness, two-thirds of patients did not associate their symptoms with a cerebrovascular event. Consequently, further work is needed to enhance public knowledge.

A key point highlighted in this data set is that approximately 25 per cent of patients underwent an 'index' event in the 5 days before their presenting event. With greater awareness of the importance of presentation, the delay to seeking medical care could be eliminated.

Although patients presented with a variety of symptoms, one of the most common (30·0 per cent) was loss or disturbance of vision. None of the patients who experienced eye signs alone attributed their symptoms to stroke, and consequently they delayed presentation, for up to 28 days. With visual disturbance not part of the FAST campaign acronym, this area of patient awareness could be a particular target.

Over 60 per cent of all patients delayed their presentation from 1 to 120 days. The reasons for delay included: being away on holiday, awaiting optician appointments and minor GP/hospital hold-ups, but by far the most significant was failure of symptom recognition by the patient, and men refusing to admit that their symptoms were due to a cerebral event, even when instinct told them so.

Overall, GP delays in referral were at a minimum (mean 2 days) and almost all patients (99·3 per cent) were commenced on best medical therapy at the end of the clinic consultation.

Vascular surgeons are expected to meet a 2-week target from symptoms to surgery. If the primary delay is due to patients' symptom recognition (as demonstrated in this study), no matter how effective the TIA services are, the time window for CEA is reduced significantly.

This study has highlighted the importance of patient recognition of cerebrovascular symptoms and acting on these rapidly. Key areas for proposed improvement have been exposed: greater patient awareness and the inclusion of posterior cerebral symptoms (visual defects) in the campaign acronym. If time to patient presentation can be targeted, delays from initial symptoms to CEA can be reduced, patient outcomes should improve and national guidelines can be met.

In light of the above, a stroke campaign with inclusion of eye symptoms and rapid action may be more appropriate; hence FASTER (Face, Arm, Speech, Time, Eyes, React) may be better.

Disclosure

The authors declare no conflict of interest.

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Supporting information

Additional supporting information may be found in the online version of this article:

Appendix S1 Clinic questionnaire (Word document)

Snapshot quiz

Snapshot quiz 16/12

Answer: This stricture of the terminal ileum is caused by Crohn's disease (A). The typical features illustrated here are: creeping fat (B), thickened mesentery (C), thickened fibrotic intestinal wall (D) and dilated small bowel proximal to the stricture (E). The other abnormality that is not a feature of Crohn's disease is a small Meckel's diverticulum (F).