

Delays in Presentations of Stroke Patients at the University Hospital of the West Indies

EW Williams¹, SO Cawich², S Shah², SJ Hendricks¹, I Edwards¹, G Gordon-Strachan³, J Williams-Johnson¹, CAR Bruce², P Singh¹, S French¹, R Hutson¹, M Reid⁴, IW Crandon²

ABSTRACT

Thrombolytic therapy has been proven to be beneficial in selected patients with ischaemic strokes. Early diagnosis is paramount because there is a narrow therapeutic window for these patients to derive benefit from thrombolytics. We sought to evaluate the timing of stroke presentations at the University Hospital of the West Indies (UHWI) in order to assess the potential eligibility for definitive therapy.

A retrospective audit of all consecutive patients who had emergent computed tomographic (CT) scans for suspected ischaemic stroke at the UHWI was performed over a six-month period between February 2006 and July 2006. Data were extracted from the hospital records and analysed using SPSS version 12. There were 331 patients evaluated with brain CT for a clinically suspected stroke during the study period. Complete time documentation and CT scans were available for analysis in 171 patients with ischaemic strokes.

The average age was 64.5 years (range \pm SD: 3-98 \pm 19.9 years) with a slight male preponderance (58% vs 42%). There was considerable pre-hospital delay with 63% of patients presenting more than 12 hours after the onset of symptoms. There were also long in-hospital delays. Only 52% of patients were assessed by a physician within an hour of presentation to hospital and only 55% of patients had CT scans completed within three hours of a physician's request. Although thrombolysis is not routinely performed for ischaemic strokes at our institution, sensitization of physicians and the general public in our setting to symptoms and signs of this disease is urgently needed to improve stroke management, whereby definitive treatment can be considered for selected patients.

Demoras en las Presentaciones de Pacientes con Accidente Cerebrovascular en el Hospital Universitario de West Indies

EW Williams¹, SO Cawich², S Shah², SJ Hendricks¹, I Edwards¹, G Gordon-Strachan³, J Williams-Johnson¹, CAR Bruce², P Singh¹, S French¹, R Hutson¹, M Reid⁴, IW Crandon²

RESUMEN

Se ha demostrado que la terapia de trombolítica es beneficiosa en los pacientes seleccionados con accidentes cerebrovasculares isquémicos. El diagnóstico temprano es primordial porque hay una ventana terapéutica estrecha para que estos pacientes deriven beneficio de los trombolíticos. Buscamos evaluar el ritmo con que se presentaban los casos de accidente cerebrovascular en el Hospital Universitario de West Indies (HUWI) con el propósito de evaluar la elegibilidad potencial para una terapia definitiva.

Una auditoría retrospectiva de todos los pacientes consecutivos a los que se realizó tomografía computarizada (TAC) de urgencia, se realizó por un periodo de seis meses, entre febrero de 2006 y julio de 2006. Se tomaron datos de los archivos del hospital y se analizaron usando la versión 12 del SPSS. Hubo 331 pacientes evaluados con TAC por sospecha clínica de isquemia durante el periodo de estudio. el cerebro CT para un golpe clínicamente sospechado durante el periodo del estudio. Hubo documentación de tiempo completa y escáners disponibles para el análisis de 171 pacientes con accidentes cerebrovasculares isquémicos.

From: ¹Emergency Medicine Division, ²Department of Surgery, Radiology, Anaesthesia and Intensive Care, ³Dean's Office, Faculty of Medical Sciences, and ⁴Sickle Cell Unit, Tropical Medicine Research Institute, The University of the West Indies, Kingston 7, Jamaica, West Indies.

Correspondence: Dr EW Williams, Emergency Medicine Division, Department of Surgery, Radiology, Anaesthesia and Intensive Care, The University of the West Indies, Kingston 7, Jamaica, West Indies. E-mail: ver3us@yahoo.com.

La edad promedio fue de 64.5 años (el rango \pm SD: 3-98 \pm 19.9 años) con un ligero predominio de los machos (58% frente a 42%). Hubo una considerable demora pre-hospitalaria con el 63% de los pacientes presentándose 12 horas después del comienzo de los síntomas. Había también largas demoras en el hospital. Sólo el 52% de los pacientes fueron evaluados por un médico dentro de una hora tras su presentación al hospital, y sólo 55% de pacientes tuvieron su TAC completo en tres horas luego de la solicitud del médico. Aunque en nuestra institución no se realiza la trombólisis como rutina para los accidentes cerebrovasculares isquémicos, se necesita sensibilizar a los médicos y al público en general en nuestro contexto con los síntomas y señales de esta enfermedad, a fin de mejorar el tratamiento del accidente cerebrovascular, de modo que se puede considerar un tratamiento definitivo para los pacientes seleccionados.

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INTRODUCTION

Stroke is the third commonest cause of death and a leading cause of severe long-term disability in the United States of America (USA), trailing only heart disease and cancer (1–2). This is attributed to both increasing age of the population as well as the overall population gain. Many Caribbean countries have a comparatively high incidence of stroke. Approximately 8.5% of the population is 60 years and over and this number is anticipated to increase to 15.2% by the year 2020 (3). Recently, there have been reports with regard to stroke epidemiology and community-based stroke registries in the Caribbean. The Barbados Register of Strokes (BROS) was established in 2001. Census data provided a detailed population profile on ethnic origin. Stroke incidence among the Black population was found to be lower than among African-origin populations in the USA and the United Kingdom [UK] (4). Martinique also reported on their population: the incidence of first-ever stroke in the very old Black Caribbean patients was found to be similar to that in White patients. Interestingly, they have the same pathological type of stroke as in their younger counterparts. It was suggested that the poorer stroke outcome in morbidity and mortality in the older age group may be correlated to less active management than in the younger population. (5) These registries provide very useful information as it is essential to have data on the local patterns of stroke epidemiology in order to identify patterns to maximize available resources and capacity.

The modern approach to treating patients with strokes requires early computed tomography (CT) scan as it is imperative to diagnose whether the stroke is ischaemic or haemorrhagic. Thrombolytic therapy has been proven to be beneficial if administered within three hours after the onset of an ischaemic stroke (6–10). Significant delays during the pre-hospital or in-hospital phases of care may render patients ineligible. The proportion of patients experiencing stroke symptoms who present to hospital within this narrow therapeutic window remains unknown.

This is the first local study that attempts to assess these delay times and to determine some of the factors that impede presentation in patients with strokes. This information could be useful in the development of future prospective studies to delineate appropriate interventions that will increase the

efficiency in management of stroke patients and the provision of public education programmes.

SUBJECTS AND METHODS

This was a retrospective clinical audit of all patients with clinically suspected stroke syndromes presenting to the University Hospital of the West Indies (UHWI) over a six month period from February 2006 to July 2006. Consecutive patients who presented to the Emergency Room or Casualty Departments that had a brain CT scan for a suspected clinical diagnosis of a stroke were selected from the logbook of the Radiology Department during the study period. Hospital records were retrieved for further analysis.

A stroke was defined clinically as a sudden occurrence of a neurologic deficit and/or disorder in consciousness, presumably of vascular origin. Patients were considered to have ischaemic stroke when neurologic deficits (*eg* slurred speech, hemiparesis) were present clinically and CT scan was either normal or demonstrated cerebral infarcts. Patients with CT evidence of intra-parenchymal and/or subarachnoid intracranial haemorrhage (ICH) were excluded from analysis because these patients would not have been candidates for thrombolysis. When a subarachnoid ICH was suspected but could not be excluded by CT, the diagnosis was further investigated by lumbar puncture.

A transient ischaemic attack (TIA) is a clinical syndrome characterized by an acute loss of focal, cerebral or ocular function with symptoms lasting less than 24 hours often without evidence of pathology on imaging. The primary goal of TIA management is the prevention of ischaemic stroke. We did not attempt to distinguish between patients with TIAs and possible reversible ischaemic neurological events (RINEs) because we could not accurately determine the time of onset due to the retrospective study design. These patients were grouped to have an “ischaemic stroke” for the purposes of the study although thrombolytic therapy would not have been a consideration.

The CT scans were performed using a single slice spiral scanner (General Electric® Synergy Plus). Non-contrast scans were performed initially using 5 mm axial slices through the posterior fossa and 10 mm slices for the remaining brain. Post contrast scans were performed using

Iopromide 300 mgI/mL (Ultravist[®], Bayer Pharmaceuticals Incorporated, New Jersey, USA) when appropriate. Each CT scan was interpreted by an on-call radiology resident with consultant review. The scans were initially assessed for evidence of intracranial haemorrhage (ICH). Features, extent and chronicity of ischaemia were then sought. Early CT findings of ischaemia include loss of grey-white differentiation (insula ribbon sign and obscuration of the lentiform nucleus).

Only patients who had their initial CT scans directly from the Emergency Room were included in the final analysis. Patients with suspected strokes that had CT scans as outpatients, from the medical wards or from other hospitals during the study period were excluded from further analysis because accurate timelines could not have been established. The study population therefore represented patients with out-of-hospital stroke who came directly from the community to the Emergency Room at the UHWI with the relevant documentations of specific times. Hospital records for the patients meeting inclusion criteria for the study were retrieved and data extracted for analysis using SPSS version 12.0. The relevant data included patient demographics, co-morbidities, number of prior strokes, approximated time of stroke onset, time of presentation and time of CT scanning. In the event that an interval could not be determined from the hospital records, the period was labelled unknown and these patients were also excluded from further analysis. A total of 171 patients fulfilled the criteria for the study.

Time of stroke onset was defined as the time recorded by the patient and/or when an observer first noted the presence of neurological deficits such as slurred speech, change in mentation, sensory deficits, paresis or paralysis. This was recorded from those patient files with this documentation. As the study was retrospective, a number of patients were excluded because of insufficient or unrecorded data. Presentation time was defined as the time of triaging by a hospital medical staff. In general, the time for a request for brain CT was estimated at the time documented by the Emergency Room doctor on seeing the patient or relative and not the time the form was received in the radiology suite. The times of the actual scans were retrieved from the films. Patients with a history of a previous stroke documented in their hospital records were considered to have recurrent strokes. Otherwise patients were considered to have new onset strokes. This audit was part of an overall quality improvement initiative and did not require collection of any identifying patient information or any patient interaction.

RESULTS

During the study period, there were 331 patients evaluated in the Emergency Room with brain CT for a clinically suspected stroke. There were 160 patients (48%) who were excluded from the final analysis either because the relevant information was not reliably available from the medical records (80 patients), CT scans could not be retrieved

(30 patients) or the CT scans confirmed (ICH) [50 patients]. The total number of cases in the study was 171.

The average age was 64.5 years (range \pm SD: 3–98 \pm 19.9 years) with a slight male preponderance (58% vs 42%). As expected, many patients had multiple co-morbidities, including hypertension (64%), diabetes (33%) and history of a previous stroke (24%) as outlined in the Table. Most of the

Table: Distribution of stroke patients profile (UHWI)

Category		Number of patients n = 171 (%)
Age (years)	< 20	7 (4.1%)
	20–39	10 (5.8%)
	40–59	47 (27.5%)
	60–79	62 (36.3%)
	> 80	45 (26.3%)
Gender	Male	98 (57.3%)
	Female	73 (42.7%)
Hypertension	Yes	109 (63.7%)
	No	62 (36.3%)
Diabetes mellitus	Yes	56 (32.7%)
	No	115 (67.3%)
Previous stroke	Yes	41 (24.0%)
	No	130 (76.0%)
CT findings	Cerebral infarction	58 (33.9%)
	Normal CT	113 (66.1%)
Total		171

patients (63%) with symptoms of a stroke presented more than 12 hours after the onset of their symptoms (Fig. 1).

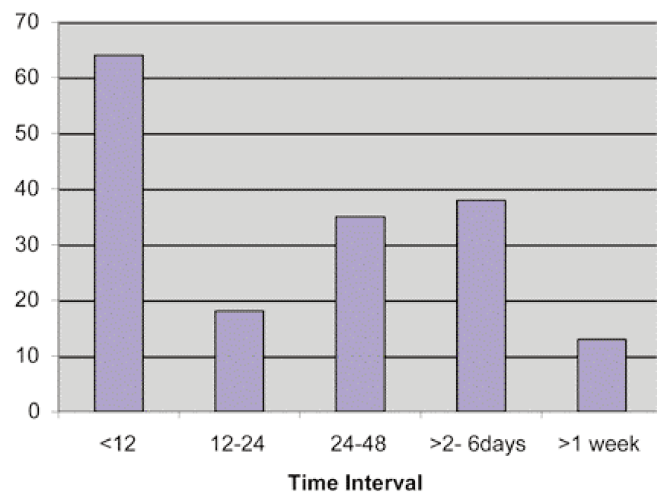


Fig. 1: Time interval from onset of symptoms and presentation to A+E (n = 171).

There was an average delay of 60 minutes between patient presentation to the Emergency Room and physician evaluation in 52% of the cases (Fig. 2). After physician evaluation and a request for CT scan, there was a mean delay of 180 minutes before the scan was completed for 55% of the patients (Fig. 3). Only 12% of the patients had their CT scan completed within an hour of the request for CT.

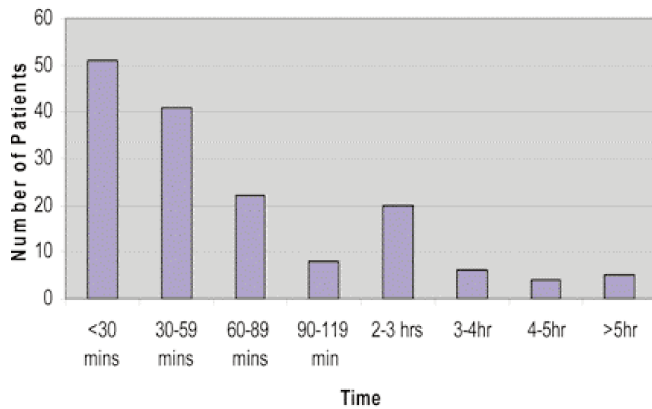


Fig. 2: Interval from registration to emergency physician assessment (n = 171).

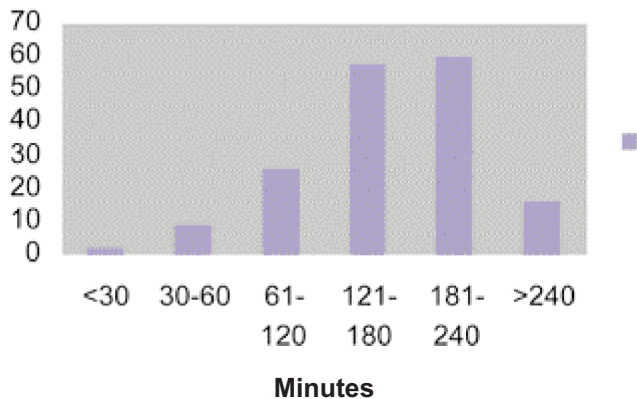


Fig. 3: Time interval between physician assessment and completion of CT scan (n = 171).

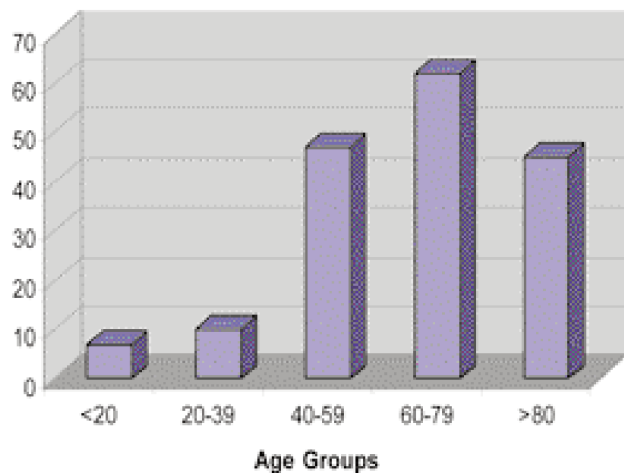


Fig. 4: Age range of stroke patients (n = 171).

Of 171 patients who had brain CT scan, 34% of patients had confirmed features of ischaemic stroke (Table). Interestingly, 113 patients (66.1%) with clinically suspected stroke had normal CT scans.

DISCUSSION

In 1995, the National Institute of Neurological Disorders and Stroke (NINDS) published a landmark study of thrombolytic therapy for acute ischaemic stroke within 3 hours from symptom onset. Using rt-PA (alteplase) within a strict set of guidelines, the NINDS trial demonstrated a significant benefit in clinical outcome at 3 months for acute ischaemic stroke patients. The modern approach involves early CT scan to confirm the clinical diagnosis and identify patients with ischaemic strokes who may benefit from thrombolytics (6–10).

In this study at the UHWI, there were considerable delays in patient presentation, with 63% of the patients presenting after 12 hours of symptoms. However, these results were comparable to those in other reports from larger centres (7, 11 – 15).

The presentation time for the total initial number of the 331 patients varied significantly with the type of cerebrovascular accident. The longest delay was seen in patients with ischaemic strokes as opposed to haemorrhagic. This is likely as the neurologic deficits are mild in comparison to the dramatic clinical deterioration seen in patients with ICH. Increasing the utility of public education programmes may be one way in which we can increase community stroke awareness to identify subtle clinical presentations in patients with likely ischemic strokes. Public education programmes have been shown to increase the percentage of patients reaching the Emergency Department (ED) within 24 hours from 39.2% to 85.5% in some studies (3).

Other reasons worldwide for the delay in presentation to hospital include stroke occurring at home or during the night (7), patients living alone (13) and at long distances from hospital (13, 15). The common patient practice of first presentation to general practitioners rather than a hospital Emergency Room also compounds this problem. Most of these factors are not directly amenable to physician control, but policy makers can intervene with effective public education programmes.

There may also be scope for the development of a “stroke surveillance system” where each community designates a team of individuals that regularly communicates with elderly individuals living on their own who may not be able to notify someone of their difficulties in an emergency. These first responders should be trained in basic resuscitation techniques and should be equipped with rapid effective communication systems to optimize patient presentation to hospitals.

Before definitive treatment can be considered, the patients with clinical diagnosis of strokes should have quick access to

obtaining a CT scan. This is another area of potential in-hospital delay that should be minimized. In our setting, the mean delay between patient presentation and physician assessment was over one hour for most (52%) patients.

Ineffective triage may delay identification of these patients in the Emergency Room. It must be ensured that medical personnel trained in triage are at the first point of patient contact in busy hospital Emergency Rooms. The importance of maintaining physician awareness cannot be underestimated.

Stroke is a clinically defined disease, which can benefit from preventive strategies. It is important to address the need for improvements in stroke data collection from health facilities, community-based clinics and hospitals, which can impact on prevention and treatment. Stroke surveillance system has been used with great success in developed countries (16–17). This ongoing systematic collection, analysis, interpretation and dissemination of health information, is essential in measuring the impact of efforts to prevent stroke as well as to direct links to public health programmes. Like other non-communicable diseases, stroke is the end result of exposure to risk factors such as level of blood pressure, diabetes and smoking. Changes in the exposure of these risk factors are therefore likely to be reflected in changes in the stroke occurrence rate. Surveillance system for stroke is a valuable tool in evaluating preventive interventions and is a strong recommendation for a disease that has a major impact in all countries.

Despite the potential advantages of thrombolytic therapy, there are considerable obstacles hindering the overall acceptance. Not only is late presentation to institutions a major drawback, thrombolytic therapy for acute stroke poses considerable logistical challenges that need a re-engineering of stroke-care surveillance and stroke care systems. Risk of haemorrhage, cost considerations, and availability on demand for the entire setup remains a major challenge. Strict exclusion criteria and risk stratification narrows the number of eligible candidates. Furthermore, the possibility that some patients responding to thrombolysis for an ischaemic stroke could have improved on their own within 24 hours (RINEs) poses further consideration to interpret apparent favourable outcomes. One of the hurdles to the widespread use of rt-PA is that many other trials have not reproduced similar benefits, whereas some studies revealed an alarming rate of intracranial haemorrhage (the European Cooperative Acute Stroke Study [ECASS 1 and 11], and Acute Noninterventional Therapy in Ischemic Stroke [ATLANTIS]).

There are several limitations to the extrapolation of this data to wider clinical practice including the retrospective nature of the study and the small proportion of patients. In order to overcome these limitations, a multi-centre study may be necessary to accumulate larger numbers to gain statistical power. The creation of an accelerated diagnostic protocol,

stroke surveillance and the impact of a stroke team also deserves further study.

CONCLUSION

Several deficiencies in the current local stroke management have been identified. An area that can be easily targeted to improve outcomes in these patients is the long pre-hospital delay. Public education and improved access to pre-hospital care are means by which this can be improved. We cannot underscore the concomitant need for increased physician awareness, especially in general practice settings, Emergency Rooms and radiology departments. It is mandatory that healthcare workers regard strokes as true emergencies. Institutional protocols must be developed to ensure speedy clinical and radiological assessment of patients with strokes. At this time, thrombolytics cannot be considered as a routine option for the majority of candidates due to significant late delays of presentation (among other factors) of stroke patients at this institution.

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