Is it Important to Classify Ischaemic Stroke?

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Abstract

Thirty-five percent of all ischamtic events remain classified as cryptogenic. This study was conducted to ascertain the accuracy of clinical diagnosis of ischaemic stroke based on information given in the medical notes. It was tested by applying the clinical information to the (TOAST) criteria. Hundred and five patients presented with acute stroke between Jan–June 2007. Data was collected on 90 patients. Male to female ratio was 39:51 with age range of 47–93 years. Sixty (67%) patients had total/partial anterior circulation stroke; 5 (5.6%) had a lacunar stroke and in 25 (28%) the mechanism of stroke could not be identified. This study revealed deficiencies in the clinical assessment of patients and treatment was not tailored to the mechanism of stroke in some patients.

Introduction

Stroke is the second leading cause of mortality worldwide. Thirty-five percent of all ischamtic events remain classified as cryptogenic, mostly because no potential etiologic mechanism is detected. Sixty percent of acute ischamtic strokes have a known cause i.e cardio-embolic (atrial fibrillation); artery-to-artery thromboembolism (carotid stenosis); lacunar microangiopathy (lipohyalinosis / microatheroma). Establishing the cause of ischamtic stroke can be difficult in the setting of multiple risk factors. Establishing the cause of ischamtic stroke is important as it has implications both in terms of prognosis and treatment. This study was conducted to ascertain the accuracy of diagnosis of ischamtic stroke based on information given in the medical notes. It was tested by applying the clinical information to the Trial of Org 10172 in Acute Stroke Treatment (TOAST) Stroke 1993 criteria. Omissions in the clinical assessment which impact upon making a clinical diagnosis and in further classification of stroke syndrome was taken into account. Therefore we analysed a) the accuracy of clinico-anatomical diagnosis and whether the pathogenic mechanism of stroke was established at the time of the diagnosis b) whether the treatment outcome was a reflection of mechanism of stroke.

Methods

A retrospective review of medical records was carried out in a teaching hospital by a specialist registrar. Emphasis was to retrieve admission notes and diagnosis with ischaemic stroke. Patients were admitted, evaluated and managed by general medical physicians with no specific training in stroke management. Stroke was defined as a clinical syndrome consisting of rapidly developing clinical signs of focal disturbance of cerebral function, lasting more than 24 hours with no apparent cause other than that of vascular origin. Acute diffusion-attenuation on MRI brain DWI/ADC was a diagnostic criterion for acute stroke. The study included patients who presented between Jan/June 2007. CT brain and MRI brain with DWI/ADC maps were the imaging modalities used for stroke evaluation and were reported by a consultant radiologist. Other supportive investigations included electrocardiogram, echocardiogram, holter, carotid ultrasound and relevant blood tests etc.

The details of clinical assessment performed for the purpose of reaching a clinical diagnosis of acute stroke included handedness, speech disturbance; visual field defects; facial weakness; limb weakness; sensory examination; plantar response; brainstem signs; cerebellar signs and other cortical signs i.e neglect etc. The final treatment offered to stroke patients i.e antiplatelet/anticoagulant therapy was also recorded. Only patients with accessible notes with clinical features clearly suggestive of acute stroke were included in the study. Inpatient strokes, cerebral haemorrhage, other stroke mimics i.e seizures, hypoglycaemia were excluded from the study.

Results

There were 105 stroke patients who presented to the Accident and Emergency department over the 6 month period. Data was collected on 90 patients: 15 were excluded among which 6 had a cerebral haemorrhage, and in 9 patients the symptoms were not diagnosed stroke. There were 39 males and 51 females patients. Mean age was 78 years with age range of 47–93. The results of clinical assessment documented in the medical notes was recorded and shown in (Table 1). However it is important to note that details not documented in the notes do not necessarily mean they were not examined or inquired about, but rather there was no record of documentation in the medical notes.

Stroke syndromes were classified according to TOAST classification. The results revealed that 60 (67%) patients had Total/Partial Anterior circulation (TACI/PACI); 5 (5.6%) patient had lacunar stroke and in 25 (28%) the mechanism could not be identified (unclear localization). The correlation between the initial clinico-anatomical diagnosis, subsequent imaging findings and final treatment given is shown on Table 2. Sixty patients (67%) received antiplatelet therapy; 5 (6.6%) received anticoagulation; 6 (6.66%) underwent CEA (carotid endarterectomy) and 2 (2.2%) patients received antithrombotic therapy. In 2 (2.2%) patients the treatment given was unclear. Among the 6 (6.6%) patients who underwent CEA, 4 were cases of total/partial anterior circulation infarct. The details were as follows: 82 male HTN 80-99% ICA stenosis; 53 female, smoker, HTN, 50 ICA stenosis. It is important to note that 2 (2.2%) patients who underwent CEA had infact ablation.

Discussion

Classifying stroke and elucidating the mechanism is crucial in the management and prognosis of stroke. Therefore we tested our hypothesis by conducting this study in a university hospital setting where all the necessary equipment apparatus were available. This study revealed major deficits in documentation of clinical assessment which impacted upon reaching a correct clinico-anatomic diagnosis. This was more evident in documenting handedness, speech disturbance; visual field defects; facial weakness; limb weakness; sensory examination; plantar response; brainstem signs; cerebellar signs and other cortical signs i.e neglect etc. The final treatment offered to stroke patients i.e antiplatelet/anticoagulant therapy was also recorded. Only patients with accessible notes with clinical features clearly suggestive of acute stroke were included in the study. Inpatient strokes, cerebral haemorrhage, other stroke mimics i.e seizures, hypoglycaemia were excluded from the study.

We felt the efforts to actually classify stroke was suboptimal in this study. The data above clearly shows that in a significant proportion 25 (26%) of patients the mechanism of stroke could not be identified. This was attributed to incomplete documentation. To take into account of significant importance as accuracy of stroke classification and etiology further determines prognosis, management and recurrence. For example, small vessel disease is associated with a lower 5-year mortality rate and better functional outcomes whereas cardioembolic stroke has the highest 5-year mortality rate (>80%). The risk of stroke recurrence also varies according to ischemic stroke subtype. Small vessel disease is associated with a lower 30-day risk of recurrence, and large vessel disease stroke conveys the highest 30-day risk of recurrence.

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This study revealed that 4 (4.4%) patients with small vessel disease were anticoagulated; 5 (5.6%) patients with atrial fibrillation received antplatelet therapy and 2 (2.2%) patients with atrial fibrillation underwent CEA. This clearly showed that treatment was not tailored to the mechanism of stroke in these patients. Recent evidence shows that stroke-patient population is heterogeneous, and treatment strategies need to be uniquely tailored not only to the ischemic stroke subtype but also to the patient. Some large vessel disease stroke patients with severe carotid artery stenosis, extracranial vertebral artery stenosis, or hemodynamically significant intracranial stenosis benefit from surgical or endovascular interventions. Anticoagulant agents are recommended for cardioembolic stroke patients with a high-risk source of embolism, whereas antplatelet agents are preferred for other stroke subtypes. Treatment decisions should always consider the subtype of the initial ischemic stroke, and they should be individualized with regard to the patients modifiable risk factors.

Therefore we propose that for determination of the subtype of ischemic stroke, the original TOAST (Trial of ORG 10172 in Acute Stroke Treatment) criteria should be used. One of the major categories of the TOAST classification include large-artery atherosclerosis. This subgroup have clinical and brain imaging findings of either significant (>50%) stenosis or occlusion of a major brain artery. Cortical or cerebellar lesions and brain stem or subcortical hemispheric infarcts greater than 1.5 cm in diameter on CT or MRI are considered to be of potential large-artery atherosclerotic origin. In cardioembolism arterial occlusions occur presumably due to an embolus arising in the heart. At least one cardiac source for an embolus must be identified for a possible or probable diagnosis of cardiac embolic stroke. Evidence of a previous TIA or stroke in more than one vascular territory or systemic embolism supports a clinical diagnosis of cardiogenic stroke. Treatment in cardioembolism is anticoagulation and has been firmly established by various studies. Small-artery occlusion is one of the traditional clinical lacunar syndromes and does not have evidence of cerebral cortical dysfunction. A history of diabetes mellitus or hypertension supports the clinical diagnosis. Current evidence-based treatment guidelines recommend that patients with noncardioembolic stroke or TIA be treated with antplatelet agents. Stroke of other determined etiology includes rare causes of stroke, such as non-atherosclerotic vasculopathies, hypercoagulable states, or hematologic disorders etc.

The limitations of this study are that it relies on the quality of documentation and study is conducted in a single centre and reflected analysis in an acute medical setting and not in a stroke unit. The designation of the clinical syndrome was also retrospective. In conclusion the clinical assessment and clino-anatomical diagnosis made by the medical physicians in the acute setting was suboptimal, and can be improved by adhering to TOAST criteria and NIHSS scale during assessment of patients with stroke.

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References