Original Article

Ischaemic stroke management by emergency care physicians at public sector hospitals of Karachi, Pakistan

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Abstract

Objective: To assess the clinicians management of patients presenting with acute ischaemic stroke in the emergency departments of two large state run hospitals in Karachi, Pakistan.

Methods: A questionnaire was filled by 59 registered medical practitioners working at these two government hospitals who would be managing stroke patients presenting in the emergency. It was a descriptive cross sectional study designed to assess the methods used by the doctors for diagnosing and treating stroke patients. The data was collected from October to November 2007 and entered using Epi Data Entry and analyzed by SPSS 13.0.

Results: The preferred overall investigation for a suspected stroke patient in an emergency ward was an ECG (98%). 51% of the respondents would prescribe aspirin to most patients (300 mg by 40% respondents). Intravenous tissue plasminogen activator was thought to be beneficial by 43% of doctors, low molecular weight heparin by 91%, subcutaneous heparin by 86.5%, intravenous Vitamin B complex by 20% and steroids by 39% of respondents.

Regarding elevated blood pressure, 60% answered that they would manage the blood pressure according to the type of stroke and 73% responded that they would lower blood pressure when it reached greater than 150/80. 88% of the doctors answered that they would use cholesterol lowering drugs in the management of stroke patients in an emergency. 97% of the doctors recommended rehabilitation and 88% of the respondents believed that there should be separate stroke units.

Conclusion: The development of a standardized protocol and stroke team is recommended which should speed the clinical assessment, decisions for early management and also increase the performance of diagnostic studies.

Keywords: Ischaemic stroke, Aspirin, Tissue plasminogen activator, Heparin, Steroids (JPMA 61:375; 2011).

Introduction

Stroke is a medical emergency and can cause permanent neurological damage or even death if not promptly diagnosed and treated. Acute stroke is one of the leading causes of mortality and morbidity worldwide.[1]

In North America, more than 750,000 individuals continue to suffer an acute stroke each year.[2] Although no large scale epidemiological studies are available to determine the true incidence of stroke in Pakistan, annual incidence is estimated to be 250/100,000, translating to 350,000 new cases every year.[3] Contrary to decline in the incidence of the disease in the Western population, the burden of the disease in South Asian countries (India, Pakistan, Bangladesh, and Sri-Lanka) has inclined and is expected to rise.[3]

Despite recent advances in the management of cerebrovascular diseases, stroke still exacts a heavy toll in death and disability worldwide.[4] However, over the last decade, there has been significant improvement in the management of stroke. The up to date knowledge and awareness of evidence based management of stroke can significantly reduce the morbidity and mortality from stroke. In developing countries a vast majority of patients make the initial visits to general practitioners. This necessitates that general practitioners, family doctors and emergency care physician should be well versed and motivated in order to diagnose and start treatment of stroke patients within an optimal timeframe or refer the patients to competent tertiary care centers. It is interesting to note that there was a low frequency of use by respondents of recombinant tissue plasminogen activator (rt-PA) by emergency physicians in the US. They admitted that their decision to use or not to use rt-PA in the ideal setting was largely due to their own experience, which emphasizes the practice of evidence-based medicine.[5]

The purpose of the study was to assess the methods used by doctors working in government hospitals in the management of stroke patients and to ascertain if they managed patients according to the latest guidelines. This would enable us to identify any deficiencies in the management of stroke patients. Steps taken to correct the deficiencies in care identified by research will improve the prognosis of stroke patients.

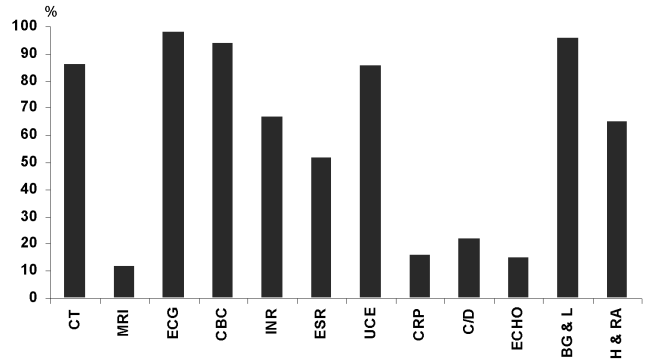
The study was conducted from October to November 2007 at the two largest public sector hospitals of Karachi. The protocol was written prior to the commencement of the study and at that time, there existed no formal research ethical committee. However, informed consent was taken from individual doctors after explaining the purpose and objectives of the study. Public sector hospitals receive the greatest number of patients because they provide treatment at affordable prices for the general masses. However, these hospitals have no standardized protocol for managing stroke patients. Our target population included registered medical practitioners managing stroke patients at two tertiary care government hospitals. In the government setup, the role of the doctors who are posted exclusively in the emergency room (ER) is restricted to stabilizing patients and calling doctors from Medical, Neurological and Neurosurgical wards. The latter doctors were thus selected to fill the questionnaires as these doctors are called on to the emergency department to manage these stroke patients. These doctors initially evaluate the patient, order tests and then decide upon the course for further management. A stroke patient is under the care of these doctors for a longer time compared to doctors posted only in the ER. Therefore, these doctors were chosen in the present study because they are primarily responsible for early diagnosis and management plan for the patients and optimal management by them can change the prognosis of the disease and outcome of the patients. We excluded House Officers (interns) from the study because we considered that they lack experience and do not admit patients, order investigations or initiate treatment. The authors were personally present with each doctor during the time the questionnaire was being filled to ensure there was no confusion. The authors intervened only to clarify a question, if required. No attempt was made to influence the respondents by suggesting the answers. The doctors were told to fill the form assuming that they have all the resources at their disposal and have no financial constraints.

The purpose of the study was to asses the management of stroke patients by doctors rather than knowing the prevailing practices which can be affected by the lack of funding and resources in the government sector. Most of the doctors obliged and filled out the questionnaire but some refused stating lack of time and various other reasons. The data was entered using Epi Data Entry and analyzed by SPSS 13.0. Descriptive statistics were used.

Results

In all 59 physicians filled out the questionnaires out of whom 26 (44%) were resident medical officers, 16 (27%) were post graduates, 7 (12%) were consultants and the rest 10(17%) did not mention their job titles. Fifty-eight (98%) respondents had managed stroke patients at some time in their clinical practice. The response rate was 84%.

The most common investigation carried out by the respondents was ECG 58 (98%). The preferred radiological investigation for a suspected stroke patient in an emergency was Computed Tomography scan (CT) Scan 51 (86.4%). Seven (12%) preferred Magnetic Resonance Imaging (MRI) as their investigation of choice. Figure-1 shows information



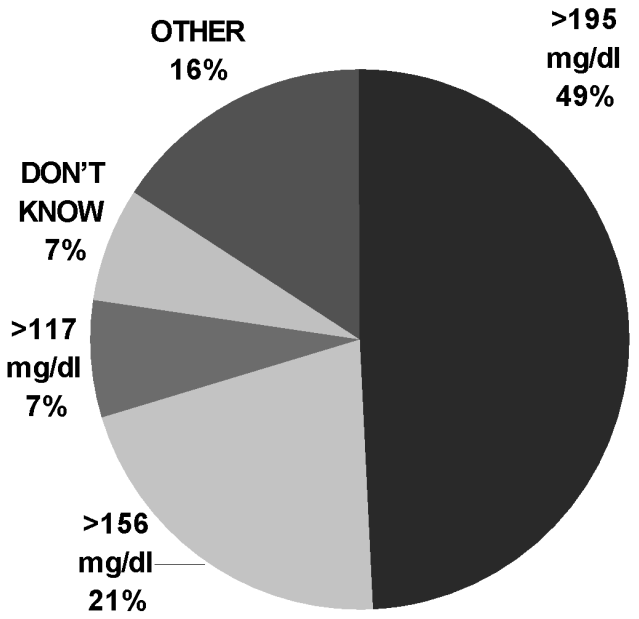
CT : Computed Tomography. MRI: Magnetic Resonance Imaging. ECG: Electrocardiography. CBC: Complete Blood Count. INR: International Normalized Ratio. ESR: Erythrocyte Sedimentation Rate. UCE: Urea, Creatinine and Electrolytes. CRP: C Reactive Protein. C/D: Carotid Doppler. ECHO: Echocardiography. BG&L: Blood Glucose and Lipids. H&RA: Hepatic & Renal Analysis.

Figure-1: Investigations opted by physicians in stroke patients.

Table: Comparison of physicians' choice of use of various drugs for patients with acute ischaemic stroke.

Treatment	Most patients n (%)	Particular patients n (%)	Rarely or never n (%)
Aspirin	52	48	0
SC Heparin	5	81	14
IV Heparin	3	56	41
Low Molecular Weight Heparin	5	86	9
IV rt-PA	3	40	57
I/V Vit B Complex	8	12	80
Steroids	13	26	61

Most patients: Drugs used irrespective of co-morbids. Particular patients: Drugs preferred based on co-morbids. SC: Sub-cutaneous. IV: Intravenous. rt-PA: Recombinant tissue plasminogen activator. VIT: Vitamin.



Other — refers to any level besides the above mentioned.

Figure-2: Physician's response to management of blood cholesterol level in acute ischaemic stroke patients.

regarding investigations opted for by physicians in the management of stroke patients.

Thirty one (52%) of the respondents would prescribe Aspirin to most patients irrespective of their co-morbids while 28 (48%) would prescribe it to particular patients depending on co-morbids. The usual aspirin dose started was 300 mg by 23 (40%), 75 mg by 17 (29%) and 150 mg by 15 (26%) of the respondents. Twenty six (44%) of the respondents also opted for other anti platelet agents in addition to aspirin.

Intravenous Tissue Plasminogen activator (rt-PA) was thought to be beneficial in most or particular situations by 25 (43%) and chosen to be used rarely by 34 (57%) respondents. Low molecular weight heparin was preferred by 54 (91%), subcutaneous heparin by 51 (86.5%) while 35 (59%) respondents preferred to use Intravenous Heparin in most or particular stroke patients.

Other immediate medications which the doctors preferred to use are mentioned in Table. In this table the terms "most", "some", "rarely or never" are used based on whether or not the frequency of administration of these drugs will be influenced by the presence of various comorbids for example atrial fibrillation. Intravenous Vitamin B complex was used in most or particular situations by 12 (20%) respondents and steroids were used in most or particular situations by 23 39%) respondents. Eighteen (30.5%) respondents also mentioned Mannitol to be important in the management of stroke.

Regarding stroke patients presenting with elevated blood pressure, 35 (60%) answered that they would manage the blood pressure according to the type of stroke while 16 (28%) said they would wait for some time irrespective of the type of stroke before initiating treatment. All of these 16 (28%) respondents gave various waiting periods ranging within 48 hours from stroke onset. Four (7%) doctors opted to do nothing while 3 (5%) would immediately lower elevated blood pressure.

Forty-three (73%) responded that they would lower blood pressure when it reached more than 150/80 mm of Hg. Among these doctors the systolic value they would act on was selected as 200-220 mm of Hg by 13(30%) and 160-180 mm Hg (median and mode of 180 mm Hg) by 30 (70%). The diastolic value they thought significant enough to act on was mostly 100 mm Hg, 18 (43%) with most answering in the range of 100-120 mm Hg, 41 (95%) The most favoured antihypertensive drugs were angiotensin converting enzyme inhibitors (ACEI) (preferred by 40 (68%) doctors) followed by a diuretic (preferred by 12 (20%), while the beta blockers and calcium channel blockers being the least favoured with only 10 (17%) doctors opting for them. Thirteen (22%) selected various combinations of antihypertensives and the most common combination selected was AceI / diuretic 7 (54%) followed by AceI / beta blocker combination 5 (38.4%).

Fifty two (88%) doctors answered that they would use cholesterol lowering drugs in the emergency management of stroke patients. Amongst those who chose to recommend statins, the most favoured was simvastatin, closely followed by atorvastatin.

Twenty nine (49%) said that they will use cholesterol lowering drugs if blood cholesterol was greater than 195 mg/dl while 12 (21%) opted to use them when blood levels exceeded 156 mg/dl (Figure-2). Fifty-seven (97%) doctors

stated that they would also recommend rehabilitation for a stroke victim.

Most 47 (80%) physicians said they would treat a stroke patient in an emergency without delay while some 7 (12%) opted to refer them to another doctor without administering any medication. Fifty-eight (98%) respondents were of the opinion that time was critical when it comes to managing stroke victims. When asked what time window was important in managing ischaemic stroke patients, 43 (74%) clinicians opted for 3 hours or earlier. When asked about significance of separate stroke units in the management of stroke patients, 52 (88%) respondents believed that there should be Stroke Units as they would prove to be more beneficial.

Almost all respondents 58 (98%) answered that they would perform a swallowing assessment on the patient. In patients unable to take adequate food or fluid orally, 49 (83%) responded that they would initiate enteral feeding. 27 (46%) answered that they would start enteral feeding within 24 hours while 20 (34%) said they would start between 24 to 48 hours.

Discussion

There is clear evidence for the benefit of stroke units and clear recommendations for the provision of stroke units in Australasian, European and North American stroke guidelines.[6-8] In our study also doctors supported this finding with 88% of the respondents believing that it would improve the management of the patients in optimal manner.

The results depict that most of the treating physicians are aware regarding urgency of time in management of ischaemic stroke patients. Fifty-eight (98%) respondents thought time was important when it comes to the management of stroke victims. This is in accordance with developed countries like Australia where nearly all GPs' agreed that stroke is a medical emergency.[9]

The evaluation and initial treatment of patients with stroke should be performed as a priority in the Emergency Department.[6] Almost all respondents, 58 (98%) answered that they would perform a swallowing assessment on the patient. In patients unable to take adequate food or fluid orally, 49 (83%) responded that they would initiate enteral feeding. Twenty-seven (46%) answered they would start enteral feeding within 24 hours while 20 (34%) opted to initiate it between 24 to 48 hours.

The results of the Feed Or Ordinary Diet trials[10] found that early enteral feeding results in increased survival, but at the expense of a worse functional outcome. In light of these results, and in contrast to the trend towards earlier feeding seen in the current study, it seems reasonable to hold off enteral feeding in dysphagic patients for several days after stroke.[11]

The analysis of the results of the International Stroke Trial and the Chinese Acute Stroke Trial suggested that one early death, recurrent stroke or late death was prevented for every 100 treated with aspirin within 48 hours of stroke onset.[12] Aspirin was used by most doctors in our setup but there were different responses regarding the dosages. The usual dose initiated was 300 mg by 24 (40%), 75 mg by 17(29%) and 150 mg by 15(26%) respondents. This varied response highlighted the inconsistency of the dosage used when compared with the recommendation of the American Heart Association which recommends initial oral administration of 325 mg aspirin within 24 to 48 hours after onset of the stroke.[6]

The administration of clopidogrel alone or in combination with aspirin does not have any significant added benefit for the treatment of acute ischaemic stroke except among the patients who are intolerant to aspirin. Outside the setting of clinical trials, the intravenous administration of antiplatelet agents that inhibit the glycoprotein IIb/IIIa receptor is also not recommended.[6] Twenty-six (44%) of our respondents on the other hand had opted for various anti platelet like clopidogrel and dipyridamole in addition to aspirin.

In last few years significant developments have taken place in the early diagnosis and management of ischaemic stroke patients which have significantly changed the outcome of stroke patients. The Diffusion/Perfusion weighted MRI of brain has helped a lot to evaluate the earliest onset of ischaemic changes in the brain and extent of edema and hence helped the neurologists to decide upon the adoption of new drugs to dissolve the clot in the brain vessels. Intravenous recombinant tissue plasminogen activator (rt-PA) (0.9 mg/kg, maximum dose 90 mg) is recommended by American Heart Association for selected ischaemic stroke patients within time window of 3 hours of onset of symptoms.[6] Some recent trials has even extended time window to 4.5 hours since the onset of symptoms of ischaemic stroke as suitable for beneficial effects of rt-PA in a selected group of patients.[13] Our survey demonstrated that rt-PA was thought to be beneficial in most or particular situations by only 25 (43%) of our respondents. The low frequency of use of rt-PA by physicians may simply reflect the lack of awareness among physicians and the need for standardized protocol for stroke management. Another reason for the lack of use may be due to the high cost of rt-PA and the insufficient funding to these government run hospitals and inability of the poor patients to afford it. The doctors were explained before filling the survey to assume an ideal scenario where lack of funds was not a problem. It is likely that the lack of emphasis on use of rt-PA by senior doctors may be misinterpreted by the junior ones as lack of

its effectiveness. In a research conducted among emergency physicians in USA it was observed that forty percent of physicians reported that they were not likely to use rt-PA. Symptomatic intracerebral haemorrhage risk was the factor most likely to preclude rt-PA use by emergency physicians and another cause stated as the relative lack of benefit. Overall, only approximately 1% to 2% of stroke patients are being treated with rt-PA.[5]

Urgent anticoagulation with the goal of preventing early recurrent stroke, halting neurological worsening, or improving outcome after acute ischaemic stroke is not recommended for treatment of patients with acute ischaemic stroke.[6] Our study, however, shows it to be favoured among doctors as low molecular weight heparin was preferred by 54 (91%) subcutaneous heparin by 51 (86.5%), and 35 (59%) would use intravenous heparin in most or particular stroke patients. This seems to show lack of knowledge about recent advances in the management of ischaemic stroke. National guidelines of the Stroke Foundations of New Zealand and Australia strongly recommend against the routine use of anticoagulation in acute ischaemic stroke.[7,8] The New Zealand guidelines suggest that intravenous heparin may be considered in carefully selected patients, although there is only limited evidence to support its use.[7] It is alarming that heparin and low molecular weight heparin are still widely used in acute ischaemic stroke. A meta-analysis assessing the effectiveness and safety of anticoagulants compared with antiplatelet agents for the treatment of acute ischaemic stroke has found anticoagulants to be inferior to antiplatelet agents.[14] Doctors should be cautioned against use of heparin and should be told to substitute it with aspirin which is effective and a cheaper alternative.

It was also noted that drugs with no benefit in the management of stroke patients were used like intravenous Vitamin B complex in most or particular situation by 12 (20%) respondents and steroids in most or particular situations by 23 (39%) respondents.

The primary objective of early ischaemic stroke management is to salvage the penumbra, an ischaemic area which has partially compromised blood supply. Abrupt decrease of blood pressure could further reduce the circulation to this area and hence would have deleterious effect on it. That is why most of international guidelines discourage the early reduction of blood pressure. However, it is generally agreed that patients with markedly elevated blood pressure may have their blood pressure lowered. A reasonable goal would be to lower blood pressure by 15% during the first 24 hours after onset of stroke. The level of blood pressure that would mandate such treatment is not known, but consensus exists that medications should be withheld unless the systolic blood pressure is >220 mm Hg or the diastolic blood pressure is >120 mm Hg.

Our survey highlighted that antihypertensive drugs were usually started before it reached blood pressure levels mentioned above. Only 11 (16%) started treatment when blood pressure reached 220 mm of Hg or more and 9 (15.3%) when diastolic reached 120 mm Hg with the rest starting antihypertensive drugs before these values. We feel that this is an important flaw of stroke management which should be brought to attention. It can be rectified easily and can cause an appreciable decrease in morbidity and mortality.

Fifty two (88%) of the doctors answered that they would use cholesterol lowering drugs in the management of stroke patients in an emergency. Twenty-nine (49%) said that they will use cholesterol lowering drugs at blood cholesterol levels greater than 195mg/dl while 12 (21%) answered that they will use them when blood cholesterol levels reaches greater than 156 mg/dl. Some guidelines recommend starting statin therapy irrespective of a patient's baseline cholesterol.[7,8]

All the doctors who opted to use cholesterol lowering drugs recommended 3-hydroxy-3 methylgluturyl coenzyme A reductase inhibitors (statins), with the most favoured being simvastatin followed closely by atorvastatin. The Medical Research Council /British Heart Foundation Heart Protection Study found that in patients with cerebrovascular disease, simvastatin significantly reduced the risk of a major vascular event irrespective of pre-treatment cholesterol levels.[15]

The most favoured radiological investigation for a suspected stroke patient in an emergency was Computerized Tomography scan 51 (86.4%). This is in accordance with the American Heart Association recommendations which states that in most instances, Computerized Tomography will provide the information to make decisions about emergency management.[6]

Stroke rehabilitation units reduce death and severe disability[16] and 57 (97%) doctors stated that they would also recommend rehabilitation for a stroke victim.

Our study has highlighted various aspects in the management of stroke patients where outdated drugs and management methods are still being employed. Drugs like tissue plasminogen activator and aspirin are not being used at all or not in recommended doses while ineffective ones like heparin, steroids and Vitamin B complex are still being used. Elevated blood pressure is not being handled according to latest recommendations. A standardized protocol for the emergency evaluation and management of patients with suspected stroke is recommended. This should be according to the latest recommendations and should be updated regularly.

Although our study comprised only 2 hospitals of

Karachi, it shows general trends of reflection of knowledge regarding management of patients suffering from acute ischaemic stroke in the country. However, this may vary from one institution to another. Our study highlights the local adaption of outdated drugs and management methods for these patients. Prognosis altering medication are either not used or are utilized in suboptimal doses. Treating the cause of stroke is secondary for the emergency physicians.

Conclusion

Our study reflects the practices of most public sector institutes. It highlights the fact that regular update of knowledge of treating physicians is of pivotal importance. The international guidelines for the management of stroke should be adopted in the hospitals and practice of outdated management protocols should be discouraged. There is need of protocol development with local resources and keeping the physicians updated can be concluded. Establishing a stroke team and unit is recommended to expedite assessment, performance of diagnostic studies and decisions for early management at all institutes.

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