A Hospital Based Observational Assessment of Quality of Acute Ischemic Stroke Care

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Abstract

Aim: This study was undertaken to examine the quality of acute ischemic stroke care.

Methods: The present study was conducted at Paras HMRI Hospital, Patna, Bihar, India and 100 patients were admitted at the hospital with acute ischemic stroke (AIS) as the confirmed diagnosis duly documented in the patients' medical records for the period of one year.

Results: The social demographics of the patients showed a mean (±SD) age of 65 ± 12 years. More than half of these patients were females (approximately 60%). It is observed that 65% of the patients had National Health Insurance Scheme (NHIS) coverage, whilst 35% exclusively paid out of pocket for their medical services. A review of the patients' clinical characteristics for vascular risk factors for stroke indicated that hypertension was the highest (88%), followed by diabetes mellitus (38%), previous stroke (12%), dyslipidemia (7%), previous TIA (5%), atrial fibrillation/flutter (3%), and smoking (2%) being the least.

Conclusion: There were several gaps in the quality of acute ischemic stroke care provided to patients. With the exception of discharging patients on statin medications, there was poor adherence to all other stroke performance indicators.

Keywords: Quality Indicators, Acute Ischemic Stroke, Performance Measurement, Outcome and Processes Measures.

Introduction

A straightforward approach to quality assessment from the perspective of a clinician is to evaluate whether known effective and efficient diagnostic and therapeutic procedures are actually applied to patients for whom they are considered to be appropriate. [1] Clinical trials have provided scientific evidence for the efficacy of a variety of interventions after acute ischemic stroke, including early treatment with aspirin, [2] thrombolysis within 3 hours from onset, [3,4] and multidisciplinary organized inpatient stroke care. [5] Furthermore, most guidelines stress the importance of early brain imaging and a 12-lead ECG. [6] Regarding prevention of new vascular events after ischemic stroke, clinical trials have established the efficacy of carotid endarterectomy for severe symptomatic carotid stenosis, [7] antiplatelet therapy, [8] and anticoagulation for atrial fibrillation. [9] In addition, a favorable effect of medical treatment of hypertension and hyperlipidemia on the incidence of new vascular events has been reported,

[10] and the need for rapid-access transient ischemic attack (TIA) clinics is increasingly highlighted in guidelines. [11]

Development and implementation of stroke performance measures has been widely advocated as part of measures to bridge the gap between evidence-based clinical practice guidelines recommendations and routine clinical practice. To reduce the global burden of cerebrovascular diseases, stroke key performance indicators have been developed for adaptation depending on level of health service capacity. [12,13] Routine activities of clinical practice which aligns with guidelines-directed recommendations can have an overall favorable effect on patient outcomes through continuous quality improvement efforts. Adherence to key stroke performance indicators which are based on stroke clinical practice guidelines (swallowing assessment, stroke unit admission, antiplatelet for ischemic stroke admission etc.) have been shown to be associated with a reduction in the risk of death or disability from stroke. [14,15]

Across the world, stroke has been recognized as a leading cause of mortality and morbidity. Stroke is among the top-ranked causes of disability-adjusted life-years (DALY) in the middle aged and the elderlies. [16] The risk of cerebrovascular disease is higher in low-to-middle income countries owing to barriers to stroke care. [12]

This study was undertaken to examine the quality of acute ischemic stroke care.

Materials and Methods

The present study was conducted at Paras HMRI Hospital, Patna, Bihar, India and 100 patients were admitted at the hospital with acute ischemic stroke (AIS) as the confirmed diagnosis duly documented in the patients' medical records for the period of one year.

Inclusion criteria: Patients with medical records documenting a diagnosis of ischemic stroke, complete patient characteristics, and treatment outcomes.

Exclusion criteria:

1. Patients with diagnosis of hemorrhagic stroke.
2. Patients with ischemic stroke with incomplete patient characteristics, or without treatment outcomes.
3. Patients discharged against medical advice.

Study variables

Criteria for diagnosis of ischemic stroke: An episode of neurological dysfunction caused by focal cerebral, spinal or retinal infarction based on i) pathological, imaging [e.g. computated tomographic (CT) scan, magnetic resonance imaging (MRI) etc.], or other objective evidence [17] or ii) an episode of neurological dysfunction caused by focal cerebral, spinal or retinal infarction based on clinical symptoms (e.g. hemiparesis, monoparesis, quadriparesis, facial drop, slurred speech, retinopathy etc.) persisting -24 h or until death and other etiologies excluded. [18]

Data collection

Data extracted from patients' medical record included demographic information, stroke risk factors, stroke severity and health insurance plan. In addition to these, the following stroke performance indicators as adapted from the World Stroke Organization Global Stroke Services Guidelines and Action Plan [12] as well as stroke performance measures of the American Heart Association/ American Stroke Association (AHA/ASA) Clinical Performance Measures [13] were collected by trained research assistants with the aid of standardized data collection tool: computed tomography (CT) scan performed within 24 h of admission; time (hours) last known-well documented; last known-well 4.5 h; thrombolytic therapy

provided if patient presented within 4.5 h of last known well; antiplatelet prophylaxis on day of admission or day after admission; documented reasons for not prescribing antiplatelet prophylaxis; antithrombotic therapy prescribed by end of day 2; discharged on antithrombotic therapy; atrial fibrillation or flutter patients discharged on anticoagulation; discharged on a statin medication; documented stroke education provided to caretakers or patients; assessed for or received rehabilitation/physiotherapy; documented stroke education provided to caretakers or patients; National Institutes of Health Stroke Scale (NIHSS) on arrival;

documented dysphagia screening within 24 h of admission; carotid imaging assessment by end of day 2.

Data analysis

Statistical Package for the Social Sciences (SPSS) Version 22.0 was used to analyzed the data. All data, including demographics, baseline characteristics and performance measures were analyzed with descriptive statistics of frequency such as mean (± standard deviation and data summarize into percentages were presented into tables.

Results

Table 1: Baseline characteristics of participants

Characteristic	Frequency	Percent (%)
Social factors		
Male	40	40
Female	60	60
Age, years (mean ± SD)	65 ± 12	
National Health Insurance Scheme coverage	65	65
Non- National Health Insurance Scheme coverage	35	35
Vascular risk factors		
Hypertension	88	88
Diabetes mellitus	38	38
Previous stroke	12	12
Dyslipidemia	7	7
Previous TIA	5	5
Atrial fibrillation or atrial flutter	3	3
Smoking	2	2
Stroke severity on admission		
GCS 13–15 (mild)	55	55
GCS 9–12 (moderate)	25	25
GCS 3–8 (severe)	20	20

The social demographics of the patients showed a mean (±SD) age of 65 ± 12 years. More than half of these patients were females (approximately 60%). It is observed that 65% of the patients had National Health Insurance Scheme (NHIS) coverage, whilst 35% exclusively paid out of pocket for their medical services. A review of the patients' clinical characteristics for vascular risk factors for stroke indicated that hypertension was the highest (88%), followed by diabetes mellitus (38%), previous stroke (12%), dyslipidemia (7%), previous TIA (5%), atrial fibrillation/flutter (3%), and smoking (2%) being the least.

Table 2: Quality of ischemic stroke care parameters

Indicators	Frequency	Percent (%)
CT scan performed within 24 h of admission, N = 100	**25**	**25**
Time (hours) last known-well documented, N = 105	20	20
Last known well 4.5 h, N = 20	3	15
Thrombolytic therapy provided if patient presented within 4.5 h of last known well, N = 3	0	0
VTE prophylaxis on day of admission or day after, N = 105	17	17
Documented reasons for not prescribing VTE prophylaxis, N = 90	9	10
Antiplatelet therapy prescribed by end of day 2, N = 100	35	35
Discharged on antiplatelet therapy, N = 94	30	31.9
Atrial fibrillation or flutter patients discharged on anticoagulation, N = 3	3	100
Discharged on a statin medication, N = 100	55	55
Documented stroke education provided to caretakers or patients, N = 100	32	32
Assessed for or received rehabilitation/physiotherapy, N = 100	42	42
Documented dysphagia screening within 24 h of admission, N = 100	20	20
Carotid imaging assessment by end of day 2, N = 100	0	0
National Institutes of Health Stroke Scale (NIHSS) on arrival, N = 100	0	0

From our review, 25/100 (25%) of the admitted patients with stroke had CT scan performed within 24 h of admission. Less than a quarter of the patients 20/100 (20.0%) had a last known well time documented. Out of the patients with last known well time documented, 3/20 (15%) were last known well within 4.5 h (i.e. symptom of ischemic stroke occurred 4.5 h). However, these patients were not administered any thrombolytic therapy.

Table 3: Outcome measures

Outcome	N	Percent (%)
Discharged	90	90
Died before discharge	10	10

Majority of the patients (90%) were discharged, however 10/100 (10%) died on admission.

Discussion

Despite scientific evidence and consensus, several national audits have demonstrated significant gaps between guidelines and management of ischemic stroke patients. [19,20] Little is known, however, about the reasons for nonadherence to these guidelines and the management of outpatients with minor ischemic stroke or TIA.

Non-contrast-enhanced computed tomography (NECT) is recommended to be done within 25 min of patient's arrival at the emergency department (ED) in order to facilitate timely administration of intravenous fibrinolytic therapy. [18] In this study, only about 25 (25%) of patients had their CT-scan results available within 24 h from the time of hospital admission. Out of these patients, only 3 had their results available within an hour of presentation to the hospital. We found out that throughout the study period, the hospital's CT scan equipment was intermittently non-functional, hence

patients often had to undergo CT imaging at private diagnostic centers outside the hospital. This obviously hampered timely evaluation and management of patients who presented with stroke. An opportunity therefore exists to improve the quality of care provided to stroke patients. Regular maintenance of the CT scan machine in addition to seamless integration of the neuroimaging center of the hospital into the care process for stroke patients can be explored by the facility management. Poor access to stroke diagnostic and assessment services across the country, particularly in the northern part has earlier been reported [21] and indeed this finding is consistent with results from another resource constraint country in West Africa. [22]

Only less than a quarter of the patients whose medical records were reviewed had a clear last time known well documented in their medical record. Additionally, there was no standardized format of documenting this information. Recommendations regarding specific ways of documenting the date and time last known well have been proffered to ensure uniformity in documenting the time of stroke symptoms. [23] This important historical information could be obtained from the patient, care giver or bystander in the event that the patient is suffering from speech impairment. [18] Of the 20 patients who had properly documented time of symptom onset to presentation at the hospital, only 3 patients presented within 4.5 h from the time last known well. The excessive delay of stroke patients, especially in lower income countries, in presenting to the hospital for timely treatment has been widely acknowledged as well as the underlying barriers to timely intervention have been similarly explored. [18]

Stroke raises the risk of venous thromboembolism by three (3) fold. [24] The incidence of deep vein thrombosis (DVT) and pulmonary embolism (PE) after stroke has been estimated as ranging from 1 to 80%. [25] Both DVT and PE are responsible for almost 10% of mortality after stroke. [13] Interventions for prevention of DVT include intermittent pneumatic compression (IPC). [26] Although IPC has been suggested to be safer and also effective compared to administration of anticoagulants, thus the hospital relies on anticoagulant therapy for DVT and PE prophylaxis in ischemic stroke patients. In this study about 17% of ischemic stroke patients were prescribed medications for prophylaxis against venous thromboembolism (VTE). This is in sharp contrast to a similar study which reported that almost all patients had DVT prophylaxis by end of hospital day-2. [27] One key underlying factor could be the absence of a dedicated stroke care unit and physicians with specialized knowledge and skills in stroke care management.

The importance of life-style related counselling in secondary prevention of ischemic is well documented and as such healthcare providers need to advise patients or care givers on the potential benefits of restriction of daily salt intake and following Mediterranean-diet. [28,29] Less than a one-third of the patients or caretakers were provided documented counselling on the importance of lifestyle management. In addition to dietary advise, people who survive stroke are encouraged to also increase their level of physical activity to an extent permitted by their circumstances and if possible, attain physical activity goals that apply to the normal the population. [28,30,31]

Conclusion

There were several gaps in the quality of acute ischemic stroke care provided to patients. With the exception of adherence to the need to discharge patients on statin medications, there was poor adherence to all other stroke performance measures across the various dimensions of ischemic stroke care. The management of the hospital could consider supporting clinicians like doctors, physiotherapists,

pharmacists and nurses to pursue specialization programs in the field of neurology as well as establish a functional stroke unit as this can help improve stroke management.

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