

Common Non-Neurological Medical Complications in Acute Ischemic Stroke Patients

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Abstract:

Ischemic stroke patients suffer from different complications among which non-neurological medical complications are common along with stroke related neurological complications. This observational study was aimed to find out these non-neurological common medical complications of acute ischemic stroke patients admitted in hospital in this country. This study was conducted by every day observation of acute ischemic stroke patients admitted in the hospital. Medical complications were diagnosed on the basis of clinical features and laboratory findings. In acute ischemic stroke patients, development of medical complications is more common (60%). Among them infective complications were found more than non-infective complications. Urinary tract infections (17.8%), respiratory tract infection (17.8%), mixed complications (13.3%) were found commoner than other complications. Length of hospital stay (LOHS) was prolonged in those patients who developed these complications. These complications play a vital role in outcome of the patients.

Keywords: acute ischemic stroke, complication, infection, length of hospital stay.

Introduction:

Stroke is a major cause of death and disability worldwide¹. Stroke is usually characterized by rapid onset of focal neurological deficit due to infarction or hemorrhage lasting more than 24 hours². The definition of stroke is clinical and laboratory studies including brain imaging are used to support the diagnosis³. Countries of low and middle income have the largest burden of stroke, accounting for more than 85% of stroke mortality worldwide⁴. Cause of mortality and morbidity depends upon different neurological and non-neurological complications of acute ischemic stroke (AIS) patients. Most of the time we are concerned about the neurological complications only, but non-neurological medical complications also play devastating impact in outcome of stroke patients⁵.

We have observed multiple medical complications like urinary tract infection, sepsis, respiratory tract infection, myocardial infarction etc in stroke patients. These complications cause deterioration

of the patients. It is also strongly linked to a poor inpatient prognosis as well higher rate of complications lead to longer hospital stay and increase cost of care⁶⁻⁹.

Such type of study was not previously performed in Bangladesh. It is important to identify the common complications in-hospital of AIS patients to provide necessary informations regarding proper management of AIS patients.

Materials and Methods:

This observational study was conducted in the department of Neurology of Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh during January 2013 to December 2013 and received prior approval from Ethical Review Committee of BSMMU and all participants/ attendants gave informed written consent. All collected data were checked, edited and analyzed by using computer based SPSS software version 16.0. Data were presented by frequency distribution

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and percentage. Parametric data was expressed in mean \pm SD. Categorical data was evaluated by Chi square test. Significance was defined by p value < 0.05 .

A total of 90 AIS patients admitted in the Neurology department of BSMMU were included in this study. Sampling technique was purposive. Patients presented with first ever AIS, confirmed by CT scan/MRI of brain from 01 day to 02 weeks were enrolled in this study. Hemorrhagic stroke patients were excluded from this study.

After selection of subjects, detailed history, clinical examinations and all other information's were taken in a prescribed data collection form. Relevant baseline investigations (e.g. - complete blood count, urine R/M/E etc.) were performed. Imaging study (CT/MRI) was done for diagnosis and categorization of stroke. AIS subtype is defined by Oxford shire Community Stroke Project classification (OCSP) criteria. Cerebral infarctions were divided into the following clinical categories: total anterior circulation infarcts (TACI), partial anterior circulation infarcts (PACI), lacunar infarcts (LACI), and posterior circulation infarcts (POCI). Modified Rankin Scale (mRS) was measured to see functional outcomes at fourteenth day of stroke. Patients were followed up every day to see any in-hospital medical complications eg. Respiratory Tract Infection (RTI), Urinary Tract Infection (UTI), Bed sore, Electrolyte Imbalance (Sodium or Potassium abnormalities) and MI. Diagnosis of this complications were made by clinical findings, expert opinion and appropriate laboratory reports like Urine R/E and C/S for UTI, Chest X ray and Sputum C/S for RTI, ECG and/or Troponin I for MI, Serum Electrolytes, d-dimer, duplex study of lower limb vessels, Stool R/E etc. Length of hospital stay (LOHS) was measured from admission to discharge day of the patient.

Results:

Out of the 90 AIS patients, majority 36(40%) were belonged to age group of 61-70 years. The mean age was found 59 years with range from 30 to 75 years (Table I).

It was observed that more than half 49(54%) were male and 41(46%) were female. Male to female

ratio was 1.2:1. It also showed that 49(54%) patients came from rural area and 41(46%) came from urban area (Table I).

Table-I
Socio-demographic characteristics of the patients (n=90)

Characteristics		No. of respondents	Percentage
Sex	Male	49	54.4
	Female	41	45.6
Age	≤ 40	7	7.8
	41-50	9	10.0
	51-60	34	37.8
	61-70	36	40.0
	> 70	4	4.4
Residence	Urban	41	45.6
	Rural	49	54.4

It was observed that non-smoker was found in 43(47.8%) patients, current smoker was 30(33.3%) and former smoker 17(18.9%).

It was observed that 52(57.8%) patients had hypertension and 38(42.2%) had no hypertension.

This study revealed that 32(35.6%) patients had diabetes mellitus (DM).

By Oxford shire Community Stroke Project classification (OCSP), It was observed that 4(4.4%) TAC, 15(16.7%) LAC, 51(56.7%) PAC, 14(15.6%) POC and 6(6.6%) syndromes.

It was observed that majority 38(42.2%) of patients had hospital stay of 11-15 days. The mean hospital stay was found in 13.68 ± 6.6 days (Table II).

Table-II
Distribution of the patients by length of hospital stay (n=90)

Length of Hospital stay (days)	Number of patients	Percentage
≤ 5	3	3.3
6-10	23	25.6
11-15	38	42.2
16-20	4	4.4
21-25	18	20.0
> 25	4	4.4
Mean \pm SD	13.68 ± 6.6	
Range (min, max)	(4, 31)	

Table II shows length of hospital stay of the patients. It was observed that majority 38(42.2%) of patients

had hospital stay of 11-15 days. The mean hospital stay was found in 13.68±6.6 days.

Medical complications were found in 54 (60%) patients. No complication was found in 36 (40%) patients. This present study results showed that UTI and RTI were found same, is 16 (17.8%) of patients. Bed sore was found in 3 (3.3%) patients. Electrolyte Imbalance was found in 2(2.2%) patients. Others/mixed complications were found in 12 (13.3%) patients. Gastroenteritis was 4 (4.4%) and myocardial infarction was 1 (1.11%) (Table IV).

Table-III
In-hospital medical complications in AIS patients (n=90)

Medical Complications	Number of (N) patients	Percentage
Complications	54	60
No complication	36	40

Table III Shows in-hospital medical complications were found in 54 (60%) patients, no complications in 36 (40%) patients.

Table-IV
Different in-hospital complications in AIS patients (n=90)

In-hospital complications	n	%
Gastroenteritis	4	4.4
UTI	16	17.8
RTI	16	17.8
Bed sore	3	3.3
Electrolyte Imbalance	2	2.2
MI	1	1.1
Others/Mixed complication	12	13.3

UTI- Urinary Tract Infection, RTI- Respiratory tract infection, MI- Myocardial infarction.

Discussion:

Frequency of stroke rises exponentially with increasing age¹⁰. Majority of the study subject (40%) were in seventh decade and the mean age was 59 years varied from 30 to 75 years (Table I). Similarly Hossain et al. in Faridpur Medical College showed highest incidence of stroke was between the sixth and seventh decade^{11,12}. Kundu et al. in

a Bangladeshi study showed 16% were young stroke (age<40years) and most patients (54%) were at and above 60 years of age¹³. Basu et al. obtained that median age was 60 years, mean age 60 ± 13 years varied from 25-88 years, which is closely resembled with the present study¹⁴. On the other hand, Gentile et al. showed the mean age was 65.7±13.6 years varied from 20 to 101 years. In another study conducted in University of south Carolina, USA, Bhatt and Rizvi found the average age of AIS patients was 67.8 years, which are higher with the current study, this may be due to increased life expectancy, and geographical influences may have significant impacts to developed AIS of their study patients¹⁵.

In current study it was observed that AIS was predominant in male subjects, where 54% and 46% patients were male and female respectively and male to female ratio was 1.2:1. Similar observations regarding the sex incidence were also made by Basu et al. where they found 57.0% were male and 43.0% were female¹⁴. However, Gentile et al. and Bhatt and Rizvi were found 55.0% and 57.0% patients were female respectively.^{15,3} More than a half (54%) of the patients attended from rural area and 46% came from urban. These findings are almost similar of the study done by Hossain et al¹². The reason of higher percentage of AIS in rural patients might be that, lack of knowledge regarding risk factors due to low economical condition. It was observed that non-smoker was found in 47.8%patients, current smoker was 33.3% and former smoker 18.9%. In Stollberger et al. study showed 9.0% patients were current smoker. Hossain et al. showed 20.75% current smoker in a Bangladeshi study¹².

This study findings showed that more than one third (35.6%) of the patients had DM. Basu et al. from Kolkata and Bhatt and Rizvi from South Carolina showed 26.0% and 51.4% had a known history of DM respectively^{14,15}. Stollberger et al. in 2005 found that 30% patients had a history of DM²⁰. Gentile et al. obtained DM 39% in their study patients³. Hossain et al. showed 21% DM in stroke patients at Faridpur Medical College¹². Kundu et al. showed DM is found in 99 (20%) patients¹³. And of these 99 patients only 57 (12%) patients

were known diabetic and the remaining patients were labeled as diabetic after admission.

In this study, it was observed that 57.8% patients had hypertension and 42.2% patients were normotensive. Similarly, Stollberger et al. found that 66.0% patients were hypertensive²⁰. Basu et al. and Gentile et al. showed that 74.0% and 73.8% patients were known hypertensive respectively, which is higher with the current study^{3,13}. In a study conducted at Faridpur Medical College showed 63% were hypertensive in stroke patients.¹² In the study by Kundu et al. hypertensive patients were found 69.60% (284) out of 500 patients¹³.

In this present study it was observed that majority (42.2%) of patients had hospital stay of 11-15 days and the mean duration of hospital stay was 13.68±6.6 days varied from 4-31 days. Similarly, Stollberger et al. showed duration of hospitalization was 13 days varied from 9-20 days²⁰. Gentile et al. and Bhatt and Rizvi (2010) observed the mean length of hospital stay were 7.40±8.15 days and 6.12±4.2 days respectively, which are lesser with the current study^{3,15}.

In this study, 54(60%) patients developed complications. This present study results showed that UTI and RTI were found same, is 16 (17.8%) of patients. Bed sore was found in 3 (3.3%) patients. Electrolyte Imbalance was found in 2 (2.2%) patients. Others/mixed complications were found in 12 (13.3%) patients. Gastroenteritis was 4 (4.4%) and myocardial infarction was 1 (1.11%). Stollberger et al. at Austria studied 992 patients of stroke where 12% had UTI, mixed complications in 29%, but RTI in stroke patients is 14%²⁰. These findings are similar with current study.

Conclusion:

Ischemic stroke patients suffer from both neurological and non-neurological medical conditions. Our observation at a large urban teaching hospital showed non-neurological medical complications of acute ischemic stroke patients is very common in this country. Among them infective complications were found more common than non-infective complications. Urinary tract infections (17.8%), respiratory tract infection (17.8%), mixed complications (13.3%) were found more common

than other complications. Length of hospital stay (LOHS) was prolonged in the patients who developed these complications. These complications play a vital role in outcome of acute ischemic stroke patients. This study should be conducted in a large scale in different hospitals for better understanding of different complications of so that proper steps can be taken to reduce mortality and morbidity of ischemic stroke patients.

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