Original Article

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Medical complications during inpatient rehabilitation in patients with ischemic stroke in a tertiary care hospital in Nepal

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Abstract

Background: Complications are common in patients with ischemic stroke and hinder successful rehabilitation. Timely identification and management of complications are key factors in the management of patients with ischemic stroke.
Objectives: The aim of this study is to find the occurrence of different types of complications in patients admitted with the diagnosis of ischemic stroke and to find the risk factors associated with the occurrence of complications.
Methodology: The study is a cross sectional descriptive study. A total of 96 patients with ischemic stroke admitted to the Department of Neurology of Kathmandu Medical College Teaching Hospital over a period of six months (July 2018 to December 2018) were recruited. Data was recorded according to a designed proforma and analysed using Statistical Package for the Social Sciences version 20.
Results: The age group ranged from 25 to 91 years with the mean age of 64.36 years and 50 (52.1%)patients were male. A total of 62 (64.6%) patients developed at least one complication during hospital stay. Pneumonia and urinary tract infection were the most common complications occurring in 22(22.9%) patients. The occurrence of complications was positively correlated with National Institutes of Health Stroke Scale and Glasgow Coma Scale.
Conclusion: Pneumonia and urinary tract infection were the most common complications in our study and were similar to those quoted in the western literature. Severity of stroke had positive correlations with occurrence of complications.

Key words: Complications; GCS; NIHSS; Pneumonia.

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INTRODUCTION

Stroke is classically characterized as a neurological deficit attributed to an acute focal injury of the central nervous system (CNS) by a vascular cause, including cerebral infarction, intracerebral haemorrhage (ICH), and subarachnoid haemorrhage (SAH), and is a major cause of disability and mortality worldwide[1].

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Complications are a major problem after acute stroke, and may manifest as neurological or non-neurological. They play a major role in prolonged duration of hospital stay and recovery of a patient. Whilst complications of stroke may modify the natural course of the disease, they might also delay successful rehabilitations and may eventually lead to death. Several studies have suggested that complications are quite common with the estimated frequency ranging from 40% to 96% of the patients[2-7]. Not only are the complications common, but are also related to poor patient outcomes[6].

It has been suggested that the effectiveness of organized stroke care in reducing mortality[8] may be due to improvements in prevention, identification, and treatment of secondary complications[9]. Complication rates may also be a useful measure of outcome in comparative studies, and they have been used in both

non-randomized[10-12] and randomized controlled trials[13] of stroke units.

To the best of my knowledge, study regarding complications of stroke has not yet been published in context of Nepalese population. Thus, this study aims to study if the types of complications found in this demography are comparable with the studies done elsewhere.Moreover, the study aims to find the risk factors which are directly associated with the occurrence of certain complications in patients with acute stroke.

METHODOLOGY

The study was a cross sectional descriptive study. Ninety-six patients with ischemic stroke admitted to the Department of Neurology of Kathmandu Medical College Teaching Hospital (KMCTH) over a period of six months starting from July 2018 to December 2018, were recruited.The calculated sample size was 96 and convenient purposive sampling method was used. The sample size was calculated by the formula $N = Z^2pq/d^2$ where Z is the standard normal deviation (usually set as 1.96), d = degree of accuracy required (we take at 10 % error), p= proportion in the target population estimated to have a particular characteristic (since there is no reasonable estimation done in KMCTH, we use 50%) and q= 1-p. Patients were randomly selected from among all admitted inthe Medicine Intensive Care Unit (MICU), Medicine High care ward and Neurology ward. All patients with clinical diagnosis of ischemic stroke more than 16 years of age were included;patients with subarachnoid haemorrhage and intracerebral haemorrhage were excluded from the study. Patients were recruited within three days of admission and were followed every three days until discharge. The initial assessment included demographic details and National Institutes of Health Stroke Scale (NIHSS). For hospital follow up, simple clinical definitions of complications were used that were modified from those of Davenport et al[2]. Written informed consent was taken from the patient or their surrogate for the study and ethical clearance was obtained from the Institutional Review Committee of KMCTH.

Data was recorded according to the pre-designed proforma and entered into Statistical Package for the Social Sciences (SPSS) version 20 for analysis. Demographic and baseline characteristics were evaluated using descriptive statistics. Statistical significance was considered with p value less than 0.05. Categorical data were assessed using the Chi-Square test. Continuous variables were assessed using the t-test.

The proforma included demographic data including name, age, sex and address. It also included vital signs including heart rate, respiratory rate, temperature and blood pressure. National Institute of Health Stroke scale and modified Rankin scale was also included in the proforma. The proforma also included the risk factors including smoking status, history of hypertension, history of diabetes mellitus and history of cardiac arrhythmia. Finally, the proforma included investigation parameters and complications recorded in patients with ischemic stroke.

RESULTS

The age group ranged from 25 to 91 years with mean age of 64.36 with SD of 13.959 years. Fifty (52.1%) of the patients were male. The mean duration of hospital stay was 7.36 days and ranged from one to 26 days.

Fifty-two (54.2%) patients had NIHSS in the range of 5 to 14 representing moderate stroke and seven (7.3%) of the patients had severe stroke (Table 2).

The Modified Rankin Scale was calculated at discharge and the patients with different MRS score are shown in table 3.

Stroke was divided according to different vascular territory involved. Most of the stroke involved the middle cerebral artery (MCA) cortical territory followed by subcortical group. Distribution of stroke in different vascular territories is shown in the table 4.

A total of 62 (64.6%) patients developed atleast one complication during hospital stay. Pneumonia was seen in 22.9% of patients. Deep venous thrombosis was seen in two patients (Table 5).

The relationship between NIHSS, age and sex with the occurrence of complications is shown in table 6.

Table 1: Definitions of complications during hospital stay and follow up

Complications	Definition
Recurrent stroke	Clinical features lasting more than 24 hours consistent with the World Health Organization definition of stroke.
Epileptic seizure	Clinical diagnosis of focal and/or generalized seizure in a previously non-epileptic patient.
Urinary tract infection (UTI)	Clinical symptoms of urinary tract infection or positive urine culture.
Chest infection	Auscultatory respiratory crackles and fever or radiographic evidence, or new purulent sputum.
Pressure sore	Any skin break or necrosis resulting from either pressure or trivial trauma (skin trauma directly resulting from fall was not included).
Deep venous thrombosis (DVT)	Clinical diagnosis of deep venous thrombosis.
Falls	Any documented falls regardless of cause.

Table 2: NIHSS score and severity

NIHSS score	Number of patients (n)
1-4 (Minor stroke)	20
5-14 (Moderate stroke)	52
15-20 (Moderate to severe stroke)	17
>20 (Severe stroke)	7

Table 3: Modified Rankin Scale score of patients

MRS score	Number of patients(n)
1	10
2	36
3	35
4	11
5	4

Table 4: Stroke subtypes

Stroke subtypes	Number of patients (n)
Middle cerebral artery cortical infarct	47
Subcortical infarct	35
Cerebellar infarct	6
Brain stem infarct	3
Middle cerebral artery+Posterior cerebral artery infarct	2
Anterior cerebral artery infarct	2
Normal	1

Table 5: Frequency of complications in ischemic stroke

Complications	n (%)
Pneumonia	22 (22.9)
Epileptic seizure	2 (2.08)
UTI	22 (22.9)
Pressure sore	7 (9.37)
DVT	2 (2.08)
Falls	3 (3.12)

Table 6: Relation between NIHSS, age and sex with the occurrence of complications

NIHSS	Complications		p-value
	Yes	No	
Mild stroke	8	12	0.029
Moderate stroke	34	18	
Moderate to severe	14	3	
Severe	6	1	
Age	**Complications**		**p-value**
	Yes	**No**	
<45 years	7	2	0.685
45-65 years	26	15	
>65 years	29	17	
Sex	**Complications**		**p-value**
	Yes	**No**	
Male	29	21	0.160
Female	33	13	

Table 7: Relation between smoking, alcohol consumption, hypertension, diabetes and Glasgow Coma Scale(GCS) with the occurrence of complications

Smoking	Complications		p-value
	Yes	No	
Yes	32	16	0.670
No	30	18	
Alcohol consumption	**Complications**		**p-value**
	Yes	**No**	
Yes	17	4	0.076
No	45	30	
Hypertension	**Complications**		**p-value**
	Yes	**No**	
Yes	34	15	0.315
No	28	19	
Diabetes	**Complications**		**p-value**
	Yes	**No**	
Yes	12	5	0.568
No	50	29	
	Complications		**p-value**
	Yes	**No**	
Mean GCS	13.6±2.329	14.68±0.912	0.002

DISCUSSION

Patients who develop stroke are left with neurologic sequelae. In addition, many patients also develop other hazardous medical conditions, which hinder smooth recovery andat instances lead to mortality.

The most common risk factors in patients with stroke are diabetes, hypertension and smoking. Most of the patients fell in the NIHSS moderate stroke category. Moreover, most of the stroke incidents were found to be in the MCA cortical territory.Complications like deep venous thrombosis, epileptic seizures and falls were quite rare in patients with ischemic stroke; complications like pneumonia and urinary tract infectionswere also found.

Our study showed that pneumonia and urinary tract infection were the most common complications. Both these complications were present in 22(22.9%) patients. Pneumonia is common because many of the patients with ischemic stroke have difficulty in swallowing and some of the patients have low Glasgow Coma Scale with risk of aspiration. The higher incidence of urinary tract infection occurred because most of the patients were on Foley's catheter as they were non-ambulant. The low frequency of pressure sore (9.37%) and deep vein thrombosis (2.08%) in our study may be because of intensive nursing and physiotherapy care received by the patients in our hospital. In the database derived from the placebo limb of the Randomized Trial of TirilazadMesylate in Acute Stroke (RANTTAS), the most common serious medical complication was pneumonia[7]. In another cohort study of a total of 1029 patients, urinary tract infection (31%) was the most common medical problem[14]. Similarly, a study of 489 patients showed that during the first week, the most common complications were urinary tract infection in 78 (16.0%) and chest infections in 55 (11.2%), whereas, stroke recurrence, seizure, deep venous thrombosis, pulmonary embolism, and pressure sores were each present in ≤ 2.5% of the patients[15].Another study of 11,757 patients showed that the most common medical complications were urinary tract infection (15.5%) andpneumonia (8.8%)[16].

Stroke severity is the most important risk factor for complications in stroke.Different scales including the NIH stroke scale assess the severity of stroke.The severity of stroke as measured by NIHSS has positive correlations with the occurrence of complications in our study. This is because patients with higher NIHS score have low Glasgow Coma Scale and greater weakness. These patients have a higher risk of aspiration and many of them are on Foley's catheter, which make them more susceptible to develop pneumonia and urinary tract infections.

Other studies have also shown that greater severity of stroke was associated with the occurrence of complications[15,16].

CONCLUSION

Common complications of stroke in our study were pneumonia and urinary tract infections and were similar to the studies done elsewhere. Similarly, low GCS and high NIHSS were associated with the occurrence of complications as seen in other studies.

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