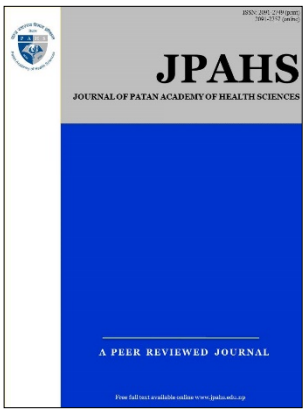

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Stroke patients presenting to the emergency department of a tertiary care hospital

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Abstract

Introduction: Stroke is one of the most common causes of morbidity and mortality in Nepal. It is the 3rd most common cause of death worldwide. In Nepal, among Non-communicable diseases, stroke accounts for nearly half of all deaths, and is increasing.

Method: A retrospective cross-sectional study of all stroke patients seen in Patan Hospital Emergency Department for a period of 1 y. Demographic data, presenting complaint, time of onset of symptoms, time presenting to the Emergency, patient's risk factors for stroke, head CT findings (hemorrhagic or ischemic stroke) were analyzed descriptively. Ethical approval was taken.

Result: Total 170 patients (96 males i.e.56.5% and 74 females i.e. 43.5%) were analyzed. 130(76.5%) were ischemic and 40(23.5%) were hemorrhagic stroke. The most common presenting symptom was hemiparesis and speech changes.

Conclusion: Stroke is a common disease seen in Nepal, with higher percentages of hemorrhagic stroke.

Keywords: Nepal, non-communicable diseases, risk factors, stroke

Introduction

Stroke is one of the most common causes of morbidity and mortality in Nepal.[1] It is the 3rd most common cause of death worldwide.[2] The burden of stroke is comparatively higher in developed countries as compared to developing countries.[1,3] It is a well-known condition causing a substantial communal burden including disability, neurological mortality, and morbidity. The most common modifiable risk factors include hypertension, smoking, atrial fibrillation, type two diabetes mellitus, and significant non-modifiable risk factors include increasing age and male sex. The World Health Organization (WHO) estimates that nearly 15 million people suffer from stroke per y with 5 million deaths and about 5 million being permanently disabled. Non-communicable diseases (NCDs) in Nepal states that stroke accounts for 42% of all deaths and is estimated to reach about 66.3% of all deaths by 2030.[4-6]

We are witnessing changing patterns in stroke in our practice. The incidence of stroke patients is increasing in low-income countries like Nepal. Moreover, the percentage of hemorrhagic stroke is increasing on our part than in western literature.[7-9] The objective of this study was to evaluate the current burden of stroke in an emergency department in Nepal. This data may help physicians provide more stroke education and improve treatment of risk factors.

Method

This was a cross-sectional study done at the Emergency Department of Patan Academy of Health Sciences, Patan Hospital. The duration of the study was one y from 01 Aug 2018 to 30 Jul 2019. Ethical approval for this study was taken from IRC-PAHS (REF: drs1807311209).

Patan Hospital is a tertiary care hospital located in Kathmandu Valley, Nepal. The Emergency Department of Patan Hospital sees approximately 32,000 patients each y. Approximately 25 patients with stroke visit Patan Hospital emergency per month, as per the data of record section of Patan Hospital.

All cases with the diagnosis of stroke were included in the study. The inclusion criteria included ischemic and hemorrhagic stroke and exclusion included transient ischemic attack. Diagnosis of stroke was done by doctors working in the emergency on clinical presentation, examination, and/or CT/MRI. written in their emergency chart which included hemorrhagic and ischemic stroke were enrolled in the study. The author, co-authors collected the charts containing the diagnosis of stroke and took a photograph of the charts. In absence of the author and co-authors, doctors in the emergency were requested to take a picture of charts containing the diagnosis of stroke. Photographs of the chart were then stored in a secure folder in the researchers' computer. A separate form with all the necessary information required was provided while evaluating such patients. We collected the following data: age, gender, district/village, comorbid conditions, home medications, family history, presenting complaint, time of onset of symptoms, time presenting to the Emergency Department. We also recorded/checked the patient's risk factors for stroke (hypertension, history of cardiac disease, atrial fibrillation, alcohol use, dyslipidemia, smoking history, diabetes, prior stroke). As per standard diagnostic workup for the patient's presentation with concern for stroke, we then recorded any head CT findings (hemorrhagic or ischemic stroke). The information collected was documented in a spreadsheet and analyzed using descriptive statistics in an excel sheet.

Result

Among 170 patients enrolled in the study, there were 96 males (56.5%) and 74 females (43.5%). The minimum age was 20y and the maximum 97y with a mean of 65 and a median of 67 y, Table 1. There were 117(68.8%) patients from Kathmandu valley and 53(31.17%) from outside the valley.

The shortest time of presentation from the initiation of symptoms was one hour, as seen in 18(10.5%) patients. The longest time of presentation was 120 h, as seen in four (2.4%)

patients. The median duration of the presentation was 24 h.

Out of 170 patients, 130(76.5%) were ischemic Cerebral Vascular Accidents (CVA) and 40 (23.5%) were hemorrhagic CVA. Among 130 ischemic CVA, 125(96.2%) patients got admitted, five (3.8%) were discharged and all 40(100%) hemorrhagic CVA were referred to other centers for neurosurgical services. Neurosurgical service was not available at Patan Hospital.

Hypertension most common risk factor seen in 64(37.1%) followed by without any known risk factors 43(25.3%). Diabetes mellitus accounted for 21(12.4%), smoking 19(11.2%), and previous history of stroke for 7(4.1%) as a risk factor.

The most common presenting symptoms were hemiparesis 92(54.1%) and speech changes 64(37.64%).

Table 1. Demographics of patients presenting with stroke to the emergency department of a tertiary care hospital

Demographics	N(%)
Age in y	
20-30	5(2.9)
31-40	10(5.88)
41-50	14(8.22)
051-60	34(20)
61-70	40(23.52)
71-80	40(23.52)
>80	27(15)
Gender	
Male	96(56.47)
Female	74(43.52)
Risk Factors	
Hypertension	64 (37.1)
No Risk Factor	21(12.35)
Diabetes	43(25.29)
Smoking	19(11.17)
Atrial Fibrillation	10(5.8)
Previous history of stroke	7(4.1)
Other diseases	6(3.52)

Discussion

In our study, among 170 strokes patients, 130 (76.5%) had ischemic stroke and 40 (23.5%) had hemorrhagic strokes. Our findings of hemorrhagic strokes were higher than cited in most Western literature. The American Heart Association showed 87% were ischemic and 10% were intracranial hemorrhage strokes, whereas 3% are subarachnoid hemorrhage strokes.[2] However, the findings of other studies done in various parts of Nepal report results similar to our study.[10-14] That is, hemorrhagic stroke is significantly higher in the studies done in Nepal. Also, the overall incidence of stroke is increasing than cited in western literature as cited above. This causes a lot of morbidity and mortality especially with advancing age and a lot of economic burden on the families of those afflicted with stroke.

Age and sex-standardized mortality were found to be the lowest in Japan, and highest in Mongolia while looking through the published data of South East Asia.[14] Moreover, the community-based incidence of stroke in few countries in South East Asia are available, the rates were observed to be lowest in Malaysia, and highest in Japan and Taiwan. For DALYs Japan had the lowest rates and Mongolia had the highest.[14] Stroke is a major public health burden worldwide being responsible for a large proportion of disability and ranks third in the causation of morbidity and mortality.[1] Its incidence in Asia has been increasing. The Jaya stroke foundation established by Nepalese

doctors and family members of stroke patients estimates that each y approximately 50,000 people have a stroke and 15,000 people die from it.[15,16]

The common modifiable risk factors seen in our study were hypertension 64(37.1%), smoking 19(11.2%), type two diabetes mellitus 21(12.4%). Risk factors associated with stroke are age, male population, hypertension, diabetes mellitus, smoking, and alcohol use as in most of the literature. In the modifiable risk factors for stroke, high blood pressure (BP)and atrial fibrillation are most important. The rest is high blood cholesterol levels, type two diabetes mellitus, current cigarette smoking, previous history of stroke. This is consistent with another study published in Nepal which showed hypertension 98(61.2 %), cigarette smoking 95(59.4%), alcohol use 43 (26.9%), left ventricular hypertrophy 44(27.5%), atrial fibrillation 37(23%), elevated triglyceride 37(23%), diabetes mellitus 15 (9.3%) and elevated total cholesterol 12(7.5%).[11] Yet another study from Nepal also showed Smoking 127(60.48 %), Alcohol consumption in excess 87(41.43 %), Hypertension 81(38.57 %), Diabetes Mellitus 21(10 %), Dyslipidemia 19 (9.05%), and Valvular Heart Disease 7 (3.33%).[13] Obesity, cholesterol, alcohol, and smoking were also listed to be statistically significant risk factors for stroke in a study published from India.[12] Other modifiable risk factors included in our study may be lack of physical activity, unhealthy diet, and alcohol consumption. In the non-modifiable risk factors increasing age and male sex were significant risk factors.

High BP is a potent determinant of risk for both ischemic stroke and intracranial hemorrhage. Epidemiologic studies show that there is a gradually increasing incidence of stroke as the BP rises above 110/75 mmHg. Both prior BP and current BP are important risk factors. As most of the studies, our studies also showed high BP is a significant modifiable risk factor in causing a stroke. Among 170 patients, 64(37.1%) stroke patients had associated hypertension. Severe uncontrolled hypertension is a strong risk factor for intracranial hemorrhage. From a meta-analysis, nine trials showed high strength evidence that BP control to less than 150/90 mmHg reduces stroke.[1817] Cigarette smoking is another significant modifiable risk factor associated with stroke. In our study, 19(11.2%) currently smoking patients had a stroke. Smoking increases the likelihood of extracranial occlusive vascular disease, nearly doubling the risk of stroke.[18] Current smokers have a two to four folds increased risk of stroke as compared to non-smokers or those who quit for more than 10 y.[17] Cigarette smoking is a major risk factor for ischemic stroke and subarachnoid hemorrhage (SAH).[2,19-21] Our data also showed hypertension is one of the leading causes of stroke followed by smoking and diabetes. Hypertension accounts for 64(37.1%) patients followed by smoking 19(11.17%) and diabetes accounts for 21(12.35%). Diabetes mellitus increases the likelihood of large and small artery occlusive disease and ischemic stroke but has not been shown to predispose to hemorrhagic stroke.[21]

Atrial fibrillation, though one of the significant causes of stroke as cited in most of the western literature, accounts for 10(5.8%) cases only in our studies. Most likely because of poor documentation on our part. Most of the time we don't have our previous electrocardiogram (ECG) or we don't usually do ECG in most of our hospitals. Therefore, the patient with no risk factor is so high 43(25.29%). A lot of patients with probable Atrial fibrillation fall under this category due to the lack of previous ECGs. Atrial fibrillation causes a cardiac embolus if not recognized early or not anticoagulated properly, most likely from left atrial appendages, and can cause ischemic stroke in most cases. This category may have also included lack of physical activity patients who have sedentary lifestyles, taking unhealthy diets, have high cholesterol levels, and those who are heavy alcohol consumers as these are the established modifiable risk factors. In our study, other diseases account for 6(3.25%) of the total patients.

Advancing age is the single most significant non-modifiable risk factor for causing both types of strokes.[22] The mean age in our study population was 65y. A similar study published

in Nepal found the mean age of stroke to be 65y.[12] This was consistent with findings of our study which is suggestive of an increase in age of incidence of the stroke to be around 60 y. Since the median value (67y) in our study was greater than the mean value (65y) for the age, the age of the population was skewed slightly towards the right side, suggesting stroke to be more common in the age group more than 60y in our study. Total 107(62%) patients were aged above 60 y. Among these 107 patients, 27(15%)were aged more than 80 y, and 5(2.9%)were below 30 y.

Another significant non-modifiable risk factor for both types of stroke is the male sex. In our study, 96 (56.41%) patients with a diagnosis of stroke were male, and the remaining 74 (43.52%) were female. One of the studies done in Nepal showed the male population to be 104 (65%) and females 56 (35%).[11] This is similar to other studies done in Nepal and other parts of the world.[23] Studies done in India showed men are 25% more likely to suffer from a stroke than women.[24] These findings are consistent with the fact that the male gender is a risk factor for the stroke.

In a study published from Nepal, the commonest presenting complaints were the weakness of limbs (90.3%), slurring of speech (33.3%), altered mental status (29.8%), deviation of angle of the mouth, and headache (22.2%) each, and urinary incontinence (13.9%).[10] This is consistent with our study where the most common presenting symptoms were hemiparesis 92(54.1%) followed by speech changes like slurring of speech and aphonia 64(37.64%), suggesting that medial cerebral artery territory was the most commonly affected.

The shortest time of presentation from the initiation of symptoms was one hour, as seen in 18 patients. The longest time of presentation was 120 h, as seen in four patients. The median duration of the presentation was 24 h. In our study, most of the patients did not come within the time frame for thrombolysis, this delay in seeking medical service may be due to lack of awareness or can also be due to lack of access to a neurological center where thrombolysis is possible. Therefore, it is necessary to create awareness amongst patients and healthcare workers. Besides this, access to early thrombolysis may decrease mortality and morbidity.

Conclusion

In our study, ischaemic stroke was common and it was more prevalent amongst males and age groups more than 65 y. Diabetes was the most common risk factor followed by diabetes and smoking. Most of the patients did not arrive hospital within the thrombolysis window.

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Conflict of Interest
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Author Contribution
Concept, design, planning: SR, SA, DRH; Literature review: SR; Data collection/analysis: ALL; Draft manuscript: SR; Revision of draft: SR, DRH; Final manuscript: ALL. Accountability of the work: ALL.

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