Original article

Epidemiology of stroke patients in Tikur Anbessa Specialized Hospital: Emphasizing clinical characteristics of Hemorrhagic Stroke Patients.

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Abstract

Background: Stroke is one of the leading causes of death and adult disability. Unlike the developed world, hemorrhagic stroke has been reported to be more prevalent in sub-Saharan Africa. Risk factors and determinants of stroke are not well identified in Ethiopia.

Methods: A retrospective chart review of all stroke patients who presented from December 2010 to December 2014 was conducted. Demographic characteristics, risk factors and stroke types and their hospital outcome were reviewed, emphasizing on hemorrhagic stroke patients.

Result: During the study period, 301 patients were seen for stroke, of which a total of 139(46.1%) were hemorrhagic stroke patients. From the hemorrhagic stroke patients, 88 (63.3%) of them were male and 51 patients (36.7%) were female. From those hemorrhagic stroke patients, 103 patients (74.1%) of them had hypertension. Majority, 65(63.1%), of hypertensive hemorrhagic stroke patients were not adherent to their antihypertensive medication. From hemorrhagic stroke patients with HTN, 28(27%) of them were diagnosed to have HTN after stroke already occurred. From the study participants, 58(19.2%) of the patients died in the hospital and 35 (60.3%) of them were hemorrhagic stroke.

Conclusion: The proportion of hemorrhagic stroke is higher compared with other developed countries. Untreated hypertension may be the contributing factor. Early detection of hypertension and strict control, early health seeking, and good comprehensive stroke care will potentially decrease the mortality and morbidity of stroke. [*Ethiop. J. Health Dev.* 2017;31(1):13-17]

Key words: Stroke, Hemorrhagic, Hypertension, non-compliance

Introduction

Stroke is one of the leading causes of adult death and disability worldwide especially in the developing world. According to the latest World Health Organization (WHO) statistics cerebro vascular disease accounted for 10.8% of total deaths and 3.1% of disease burden worldwide. The burden of disease from stroke has been increasing in sub-Saharan Africa (SSA). Approximately 85% of death from stroke occur in low to middle income countries (1). Age and disability adjusted life-years loss rates and stroke mortality rates are 3.5-3.8-fold higher in low-income countries than in middle income and high-income countries (2). Although the exact prevalence and emergency burden of stroke in these communities are not known, it has been reported to be increasing. In Tikur Anbessa specialized Hospital (TASH), stroke accounted for 23.6% of all neurological admissions (3)and 5% of all head CT indications (4).

In developed nations, ischemic stroke accounts for 85 % of the stroke types (1,5-6), but in SSA hemorrhagic stroke is the most prevalent type of stroke reported in limited studies (7).The underlying cause for the predominance of hemorrhagic stroke in SSA and in particular blacks is not fully known, but untreated hypertension along with some genetic predisposition may be the contributing factors (8-9). According to a study by Sacco et al., there are also ethnic differences reported in risk factors and type of stroke (10).

Stroke has been used as a model to estimate disease burden from cardiovascular disease (CVD) in SSA (11). Even if the age-adjusted mortality rate from Cardio vascular diseases is declining, stroke remains the leading cause of death in this setups (12). Delayed presentation and diagnosis, inadequate emergency care and poor rehabilitation facilities are characteristics of stroke care in developing countries. Due to the demographic and epidemiologic shifts occurring in Ethiopia, increased prevalence of risk factors for stroke are anticipated. Studying epidemiological trends and risk factors is important to address the issues related to stroke (10, 13). In this study, we seek to determine the epidemiology of stroke patients with emphasis of clinical characteristics of hemorrhagic stroke patients in Black Lion Hospital.

Methods

The primary objective of this study was to assess the epidemiology of stroke patients seen in Black Lion Hospital, emphasizing hemorrhagic stroke patients. The secondary objective of the study was to assess the relation of risk factors to stroke type in the centre.

Study setting: Black Lion Hospital is the largest specialized teaching hospital in Ethiopia, located in the capital city, Addis Ababa. The hospital is the major receiving centre for tertiary and specialty medical care

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in the country with a diverse patient population in terms of socio-economic and demographic background.
Study design: A cross sectional study of stroke patients in Black Lion Hospital was conducted.

All stroke patients who were seen in adult emergency department from December 2010 to December 2014 were included in the study. In the centre, all first time stroke patients were initially seen in the emergency department. We excluded patients with normal brain imaging with less than 24 hour neurologic deficit and those with an alternative diagnosis in the subsequent visits.

Data collection: Standardized data abstraction form was prepared which included different variables such as outcome, length of stay, complications, motor function, aphasia, age, sex, region, and referral status, time since onset of symptoms, presenting symptom, hypertension (HTN), Diabetes Mellitus (DM), dyslipidmia, and stroke type. Standardization was made by group of experts. Data were abstracted by third year emergency department residents. The abstractors had a half day instruction session on how to fill the data abstraction form.

***Analysis*:** Data were analyzed using SPSS version 20.Descriptive statistics and logistic regression analysis was used to assess socio-demographic data, clinical characteristics of the study participants and the relation of risk factor to stroke type. P value <0.05 was considered as significant. In this study, missing data was managed by analyzing only the available data (ignoring the missing value). The data are assumed missing at random and due to descriptive analysis done for the missing variables and it did not affect the discussion.

Written permission was obtained from the College of Health Science Emergency Department. Patient identifiers were not recorded.

Results

Socio-demographic characteristics of stroke patients: From December 2010 to December2014, three hundred one (301) stroke patients were seen in Black Lion Hospital emergency departments. Of the total stroke patients, 128 patients (42.5%) were female and 173 patients (57.5%) were male. The median age of the patients was 55 years with minimum age 14 and maximum age of 95. These patients were referred from all regions of Ethiopia but majority came from Addis Ababa. Table 1 below shows socio-demographic data of patients of the referral regions.

Table 1: **Socio-demographic characteristics of the stroke patients, Tikur Anbessa Specialized Hospital, December 2010-December 2014**

Variables	Number	Percent (%)
Sex		
Male	128	42.5
Female	173	57.5
Age		
≤30	32	10.6
31-45	70	23.25
46-60	89	29.56
>60	110	36.5
Address		
Addis Ababa	140	46.4
SNNPR	67	22.2
Oromiya	67	22.2
Amara	12	4.0
Tigray	3	1.0
Harar	3	1.0
Others (Benshangul, Afar, Gambela, Diredawa, Ethiopian Somalie)	9	3.0

Demographic and Clinical characteristics of hemorrhagic stroke patients: A total of 139 hemorrhagic stroke patients were eligible with completed charts for review. These patients did have varying degrees of intracranial haemorrhage on CT scan of the brain. Of this patients, 88(63.3%) were male and 51 patients (36.7%) were female. The median age of these patients was 52 years. One hundred three patients (74.1%) had hypertension of which 65 patients (63.1%) were not taking antihypertensive medication or were taking their medications irregularly. Of those hypertensive hemorrhagic stroke patients, 28(27%) of them were diagnosed to have HTN after stroke already occurred. Only 14 patients (10.5%) had Diabetes Mellitus (DM) and 4 patients (4.1%) had Arial fibrillation (A fib). A history of dyslipidemia was present in 14 patient (39%) and four patients (4.1%) had valvular heart disease (VHD). For detailed demographics and clinical data see table 1 as well as figure 1 below.

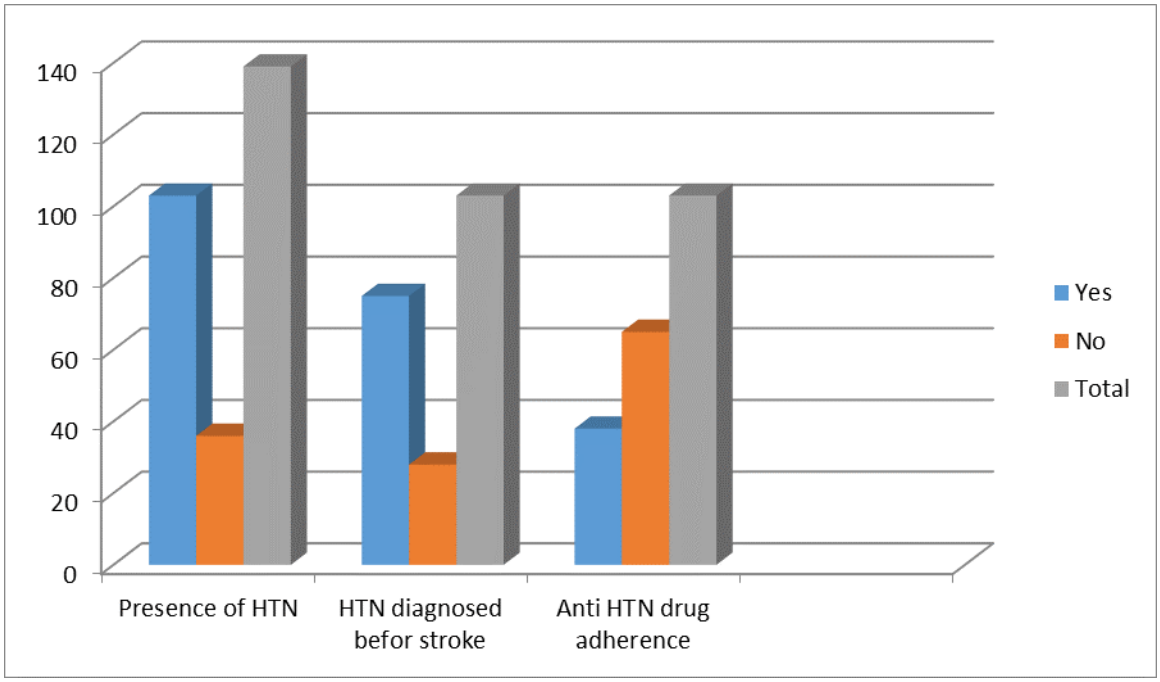

Figure 1: **Hemorragic stroke patients with hypertension, Tikur Anbessa Specialized Hospital, December 2010-2014.**

Table 2: **Demographics and clinical data of Hemorrhagic stroke patients, December 2010-2014, Tikur Anbessa Specialized Hospital, Addis Ababa**

Variable	Frequency	percentage
Sex		
Male	88	63.3
Female	51	36.7
Age		
≤30	4	2.9
31-45	46	33.1
46-60	52	37.4
>60	37	26.6
Hypertension		
Yes	103	74.1
No	36	25.9
On regular Anti Hypertension drugs		
Yes	38	36.9
No	65	63.1
Diabetes mellitus		
Yes	14	10.5
No	119	89.5
Ischemic heart disease		
Yes	6	6.8
No	81	93.2
Valvular hear disease		
Yes	4	4.1
No	93	95.9
Atrial fibrillation		
Yes	4	4.1
No	92	95.9
Dyslipidaemia		
Yes	14	20.2
No	55	79.8
Level of Consciousness at presentation (out of 15)		
≤8(sever)	50	36.0
8-13(moderate)	25	18.0
14-15(mild)	64	46.0
Died in the hospital		
Yes	35	25.2
No	104	74.8

Hemorrhagic and ischemic stroke patients and their associated factors: From the total 301 stroke patients seen during the study period, 162(53.8%) had ischemic and the rest 139(46.2%) had hemorrhagic stroke. Hemorrhagic stroke was found highly prevalent in age between 31-45 and 45-60 years and is more common in males 88(63.3%).The prevalence of HTN among hemorrhagic stroke is higher (54.5%Vs45.5%). Ischemic stroke patients had more prevalent atrial fibrillation (9.3%vs90.7%). Rheumatic heart disease and dyslidemia (9%vs91% and 39%vs91%) are also more associated with ischemic stroke as compared to hemorrhagic. For detailed comparison of hemorrhagic and ischemic stroke patients see table 3 below.

Table 3: **Hemorrhagic and ischemic stroke patients and their associated factors, Tikur Anbessa Specialized Hospital, December 2010-2014.**

Parameter	Hemorrhagic Number (%)	Ischemic Number (%)	Total	P Value
Age				
≤30	4(12.5)	28 (87.5)	32	**0.001**
31-45	46(62.9)	26(37.1)	70	
46-60	53(59.6)	36(40.4)	89	
>60	37(35.5)	71(64.5)	110	
SEX				
Female	51(39.9)	77(60.1)	128	**0.2**
Male	88(51.0)	85(49.0)	173	
Hypertension				
Yes	103(54.5)	86(45.5)	189	**0.001**
No	36(32.1)	76(67.9)	112	
Diabetes mellitus				**0.65**
Yes	14(33.3)	28(67.7)	42	
No	119(49.6)	121(50.6)	240	
Rheumatic heart disease				
Yes	3(9)	30(91)	33	**0.001**
No	93(49.7)	94(50.3)	187	
Atrial fibrillation				**0.001**
Yes	4(9.3)	39(90.7)	43	
No	92(49.2)	86(50.8)	178	
Coronary heart disease				
Yes	6(35.2)	11(64.8)	17	**0.45**
No	81(46)	95(54)	176	
Dyslipidemia				
Yes	14(39)	22(61)	36	**0.001**
No	55(79.7)	75(77.3)	130	

Discussion

This study showed 46.1% of the patients reviewed within the study time had hemorrhagic stroke. Hypertension appeared to be predominant, 103/139 (78.3%), in patients with hemorrhagic stroke and 63.3% were not compliant with or were not taking any antihypertensive medications. More than a quarter of hypertensive hemorrhagic stroke patients, 27% HTN were diagnosed after stroke already occurred. Hemorrhagic stroke tended to be more prevalent in productive age groups, 31-45 and 46-60 years of age than ischemic stroke (64% vs. 36% and 60 vs. 40 respectively). There is also male shaded a higher hemorrhagic stroke rate than females (62% vs. 38%).

Though the proportion of ischemic stroke in this study is slightly higher (54%Vs46%), hemorrhagic stroke proportion is significantly high as compared to developed nations, (46%vs15%) (5-6). A study by Abebe et al. showed a higher rate of ischemic stroke in Ethiopia (14), but subsequent hospital based studies reported higher rates of hemorrhagic stroke (3-4,15). The shift from ischemic to hemorrhagic stroke may reflect the changes in epidemiological and risk factor trends. The underlying cause for the higher proportion of hemorrhagic stroke in SSA and in particular Blacks is not fully known, but untreated hypertension along with some genetic predisposition may be the contributing factor.

Multiple factors contribute to CVD and stroke among which uncontrolled hypertension, and smoking seem to play major roles. In our study, similar to previous hospital based studies in Ethiopia, hypertension is a risk factor for hemorrhagic stroke but not all hemorrhagic stroke patients have hypertension. In one recent study in South Africa, hypertension appeared to be higher in blacks than white and so was the rate of hemorrhagic stroke (16-17). Agyemang et al. showed that patients of African descent as compared to Whites had higher rates of hypertension in the UK (18)similar to that in the USA. This phenomenon indicates that the type of stroke may reflect the nature of the risk factors. Markus et al reported a relative excess of small vessel disease in black patients with stroke compared with an excess of extra cranial atherosclerosis and embolic stroke in white patients with stroke, raising the question whether or not genetic differences exist that are reflected in stroke subtypes independent of the conventional risk factors for CVD (19).

In this study, more than a quarter (27%) of hemorrhagic stroke patients had their risk factor identified after the stroke has occurred and those who know their status were not taking their medication regularly. This can be due to low screening habit of the community and low awareness of the consequence of risk factors. Ethiopia belongs to one of the fastest growing economies in Africa and with the improved use of mass media, mobile technology and improved transportation system to the countryside (20). Raising awareness in regards to stroke symptoms, plan of action when recognizing the symptoms as well as education about preventative medicine present a valuable venue to tackle devastating disease such as stroke.

Limitation

Our study is limited by single centred facility based study; selection bias can be an issue. The incompleteness of the cards especially for some associated factor is also one limitation. These patients that present to a tertiary care centre may not represent patients in the whole country. We may have selected patients that were sicker and milder symptoms may have stayed in the primary hospital. And we are also unable to determine socioeconomic status of patients.

Conclusion and Recommendation

In the study hospital, like similar studies in sub-Saharan Africa, the proportion of hemorrhagic stroke is more common as compared to the western nation studies. Untreated hypertension may be the contributing factor for this phenomena. We recommend further community based and multi centred, prospective study on stroke risk factors. Community based preventive strategy and patient education with early detection of hypertension and strict control may be an effective way of preventing stroke in general. In addition, public education of symptoms of stroke and the need for immediate evaluation when noticing these symptoms could have an impact on the overall stroke management.

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